



**EGREJOB**  
EURO-MEDITERRANEAN GREEN JOBS



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## ***Green skilled Jobs Sector Database :***

- **Agriculture & Forestry Jobs**
- **ENVIRONMENTAL PROTECTION Jobs**
- **Recycling and Waste Reduction Jobs**
- **Renewable Energy Jobs**
- **Energy Efficiency Jobs**
- **Energy Trading Jobs**
- **Green Construction Jobs**
- **Green Manufacturing Jobs**
- **Green Transportation Jobs**
- **Research design and consulting**
- **Government & Regulatory Jobs**

ILO Green Jobs Programme :

[www.ilo.org/greenjobs](http://www.ilo.org/greenjobs)

Green Jobs Training Platform :

<http://greenjobs.itcilo.org>





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Agenzia di Innovazione e Sviluppo di Andalusia IDEA  
CONSEJERIA DE ECONOMIA, INNOVACION, CIENCIA Y EMPLEO

## Agriculture & Forestry Jobs

As the name explains, this green job sector focuses on the great outdoors. Activities such as efficient land management and organic or green farming will fall within this sector as well. Lastly, aquaculture and the creation and utilization of natural pesticides will be found under agriculture and forestry jobs.

title	characterstics	Skills	key word
Agricultural Inspectors	Inspect agricultural commodities, processing equipment, and facilities, and fish and logging operations, to ensure compliance with regulations and laws governing health, quality, and safety.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Clerical — Knowledge of administrative and clerical procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and other office procedures and terminology.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Brand Inspector; Consumer Safety Inspector (CSI); Deputy Brand Inspector; Food Inspector; Food Sanitarian; Grain Inspector; Inspector; Inspector, Food Safety and Inspection Service (Inspector, FSIS); Seed and Fertilizer Specialist; Shipping Point Inspector
Agricultural Technicians	Set up or maintain laboratory equipment and collect samples from crops or animals. Prepare specimens or record data to assist scientists in biology or related life science experiments.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Biology — Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Agricultural Research Technician, Agricultural Research Technologist, Agricultural Technician, Laboratory Technician (Lab Tech), Research Assistant, Research Associate, Research Specialist, Research Technician, Seed Analyst, Senior Agricultural Assistant
Buyers and Purchasing Agents, Farm Products	Purchase farm products either for further processing or resale. Includes tree farm contractors, grain brokers and market operators, grain buyers, and tobacco buyers.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Economics and Accounting — Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Buyer, Grain Buyer, Grain Merchandiser, Grain Merchandising Manager, Grain Origination Specialist, Merchandiser, Merchandising Manager, Procurement Manager, Purchasing Agent, Tobacco Buyer
Farm Managers	Plan, direct, or coordinate the management or operation of farms, greenhouses, aquacultural operations, nurseries, timber tracts, or other agricultural establishments. May hire, train, or supervise farm workers or contract for services to carry out the day-to-day activities of the managed operation. May engage in or supervise planting, cultivating, harvesting, financial, or marketing activities.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Food Production — Knowledge of techniques and equipment for planting, growing, and harvesting food products (both plant and animal) for consumption, including storage/handling techniques.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Economics and Accounting — Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Accredited Farm Manager (AFM), Cash Crop Farmer, Dairy Farmer, Farm Manager, Farm Operator, Farmer, Grain Farmer, Rancher, Sow Farm Manager
First-Line Supervisors of Agricultural Crop and Horticultural Workers	Directly supervise and coordinate activities of agricultural crop or horticultural workers.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Biology — Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.</li> <li>• Education and Training — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.</li> <li>• Food Production — Knowledge of techniques and equipment for planting, growing, and harvesting food products (both plant and animal) for consumption, including storage/handling techniques.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Farm Owner Operator, Field Operations Farm Manager, Grower, Harvest Supervisor, Harvesting Supervisor, Head Grower, Orchard Manager, Pest Management Supervisor, Supervisor Grower, Team Foreman

## Agriculture & Forestry Jobs

As the name explains, this green job sector focuses on the great outdoors. Activities such as efficient land management and organic or green farming will fall within this sector as well. Lastly, aquaculture and the creation and utilization of natural pesticides will be found under agriculture and forestry jobs.

title	characterstics	Skills	key word
General and Operations Managers	Plan, direct, or coordinate the operations of public or private sector organizations. Duties and responsibilities include formulating policies, managing daily operations, and planning the use of materials and human resources, but are too diverse and general in nature to be classified in any one functional area of management or administration, such as personnel, purchasing, or administrative services.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Personnel and Human Resources — Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Business Manager, Facilities Manager, Facility Manager, General Manager (GM), Operations Director, Operations Manager, Plant Manager, Plant Superintendent, Production Manager, Store Manager
Landscape Architects	Plan and design land areas for projects such as parks and other recreational facilities, airports, highways, hospitals, schools, land subdivisions, and commercial, industrial, and residential sites.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Designer, Director of Landscape Architecture and Planning, Golf Course Architect, Land Planner, Landscape Architect, Landscape Architect and Planner, Landscape Designer, Planner, Project Landscape Architect, Senior Landscape Architect
Precision Agriculture Technicians	Apply geospatial technologies, including geographic information systems (GIS) and Global Positioning System (GPS), to agricultural production or management activities, such as pest scouting, site-specific pesticide application, yield mapping, or variable-rate irrigation. May use computers to develop or analyze maps or remote sensing images to compare physical topography with data on soils, fertilizer, pests, or weather.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Biology — Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Crop Specialist, Nutrient Management Specialist, Precision Agriculture Department Manager, Precision Agronomist, Precision Farming Coordinator

## ENVIRONMENTAL PROTECTION JOBS

Keeping the planet safe from harmful toxins, polluters and companies that don't care about future generations falls on people in the field of Environmental Protection. Those with careers in environmental protection are there to help prevent environmental damage or even repair it if damage has already been done. The sector covers activities related to environmental remediation, climate change adaptation, and ensuring or enhancing air quality.

title	characteristics	Skills	key word
Architectural and Engineering Managers	Plan, direct, or coordinate activities in such fields as architecture and engineering or research and development in these fields.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Chief Engineer, Civil Engineering Manager, Director of Engineering, Engineering Group Manager, Engineering Manager, Engineering Program Manager, Principal Engineer, Project Engineer, Project Engineering Manager, Project Manager
Atmospheric and Space Scientists	Investigate atmospheric phenomena and interpret meteorological data, gathered by surface and air stations, satellites, and radar to prepare reports and forecasts for public and other uses. Includes weather analysts and forecasters whose functions require the detailed knowledge of meteorology.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Geography — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Broadcast Meteorologist, Chief Meteorologist, Forecaster, General Forecaster, Hydrometeorological Technician, Meteorologist, Meteorologist-in-Charge, Science and Operations Officer (SOO), Warning Coordination Meteorologist, Weather Forecaster
Brownfield Redevelopment Specialists and Site Managers	Plan and direct cleanup and redevelopment of contaminated properties for reuse. Does not include properties sufficiently contaminated to qualify as Superfund sites.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Brownfield and Economic Development Director; Brownfield Program Coordinator; Business Development Manager; Chief of Planning; Deputy Commissioner; Director; Director of Development; Environmental Program Manager; Manager, Division of Environmental Quality; Senior Environmental Practice Leader
Climate Change Analysts	Research and analyze policy developments related to climate change. Make climate-related recommendations for actions such as legislation, awareness campaigns, or fundraising approaches.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Geography — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Communications and Media — Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Principal Scientist; Research Associate; Policy Scientist; Senior Advisor; Senior Advocate; Senior Associate, Climate and Energy Program; Senior Climate Advisor; Senior Policy Analyst; Senior Policy Associate; Staff Climate Scientist
Construction Managers	Plan, direct, or coordinate, usually through subordinate supervisory personnel, activities concerned with the construction and maintenance of structures, facilities, and systems. Participate in the conceptual development of a construction project and oversee its organization, scheduling, budgeting, and implementation. Includes managers in specialized construction fields, such as carpentry or plumbing.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Concrete Foreman, Construction Area Manager, Construction Foreman, Construction Manager, Construction Superintendent, General Contractor, Job Superintendent, Project Executive, Project Manager, Project Superintendent
Environmental Economists	Conduct economic analysis related to environmental protection and use of the natural environment, such as water, air, land, and renewable energy resources. Evaluate and quantify benefits, costs, incentives, and impacts of alternative options using economic principles and statistical techniques.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Economics and Accounting — Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Economist, Environmental Economist, Natural Resource Economist, Principal Associate, Principal Research Economist, Resource Economist, Senior Economist
Environmental Engineering Technicians	Apply theory and principles of environmental engineering to modify, test, and operate equipment and devices used in the prevention, control, and remediation of environmental problems, including waste treatment and site remediation, under the direction of engineering staff or scientist. May assist in the development of environmental remediation devices.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Air Quality Instrument Specialist, Engineer Technician, Environmental Engineering Assistant, Environmental Engineering Technician, Environmental Field Technician, Environmental Specialist, Environmental Technician, Haz Tech (Hazardous Technician), Industrial Waste Inspector, Senior Environmental Technician

## ENVIRONMENTAL PROTECTION JOBS

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title	characteristics	Skills	key word
Environmental Engineers	Research, design, plan, or perform engineering duties in the prevention, control, and remediation of environmental hazards using various engineering disciplines. Work may include waste treatment, site remediation, or pollution control technology.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Air Pollution Control Engineer; Chief, Pesticides and Toxic Substances Branch; Environmental Analyst; Environmental Engineer; Environmental Remediation Specialist; Global Director Air and Climate Change; Hazardous Substances Engineer; Marine Engineer CPVEC (Marine Engineer Commercial Passenger Vessel Environmental Compliance); Regulatory Environmental Compliance Manager; Sanitary Engineer
Environmental Restoration Planners	Collaborate with field and biology staff to oversee the implementation of restoration projects and to develop new products. Process and synthesize complex scientific data into practical strategies for restoration, monitoring or management.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Biology — Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.</li> <li>• Geography — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Coastal and Estuary Specialist; Director, Forest Restoration Institute; Director, River Restoration; Executive Director; Fish and Wildlife Biologist, Endangered Species Conservation and Recovery; Fisheries Habitat Restoration Specialist; Marine Habitat Resource Specialist; Program Manager, Environmental Planning; Project Manager; Watershed Coordinator
Environmental Science and Protection Technicians, Including Health	Perform laboratory and field tests to monitor the environment and investigate sources of pollution, including those that affect health, under the direction of an environmental scientist, engineer, or other specialist. May collect samples of gases, soil, water, and other materials for testing.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Environmental Health Specialist, Environmental Specialist, Environmental Technician, Industrial Pretreatment Program Specialist (IPP Specialist), Laboratory Specialist, Laboratory Technician, Process Laboratory Specialist, Public Health Sanitarian, Sanitarian, Sanitarian Specialist
Environmental Scientists and Specialists, Including Health	Conduct research or perform investigation for the purpose of identifying, abating, or eliminating sources of pollutants or hazards that affect either the environment or the health of the population. Using knowledge of various scientific disciplines, may collect, synthesize, study, report, and recommend action based on data derived from measurements or observations of air, food, soil, water, and other sources.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Clerical — Knowledge of administrative and clerical procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and other office procedures and terminology.</li> <li>• Biology — Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Environmental Analyst, Environmental Health and Safety Specialist, Environmental Programs Specialist, Environmental Protection Specialist, Environmental Scientist, Environmental Specialist, Hazardous Substances Scientist, Registered Environmental Health Specialist (REHS), Research Environmental Scientist, Senior Environmental Scientist
Farm and Home Management Advisors	Advise, instruct, and assist individuals and families engaged in agriculture, agricultural-related processes, or home economics activities. Demonstrate procedures and apply research findings to solve problems; and instruct and train in product development, sales, and the use of machinery and equipment to promote general welfare. Includes county agricultural agents, feed and farm management advisors, home economists, and extension service advisors.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Education and Training — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Biology — Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.</li> <li>• Food Production — Knowledge of techniques and equipment for planting, growing, and harvesting food products (both plant and animal) for consumption, including storage/handling techniques.</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	4-H Youth Development Specialist, Agricultural Extension Educator, Extension Agent, Extension Educator, Extension Specialist, Family and Consumer Sciences Extension Agent, Family Development Extension Specialist, Family Resource Management Extension Specialist, Marine Extension Agent, Natural Resources Extension Educator
First-Line Supervisors of Logging Workers	Directly supervise and coordinate activities of logging workers. Monitor workers to ensure that safety regulations are followed, warning or disciplining those who violate safety regulations. Monitor logging operations to identify and solve problems, improve work methods, and ensure compliance with safety, company, and government regulations. Change logging operations or methods to eliminate unsafe conditions. Train workers in tree felling or bucking, operation of tractors or loading machines, yarding or loading techniques, or safety regulations. Assign to workers duties such as trees to be cut, cutting sequences and specifications, or loading of trucks, railcars, or rafts	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Crew Foreman, Crew Leader, Crew Supervisor, Feller Buncher Operator (FB Operator), Harvesting Supervisor, Loader Operator Supervisor, Logging Crew Foreman, Logging Crew Supervisor, Logging Supervisor, Trucking Supervisor

## ENVIRONMENTAL PROTECTION JOBS

Keeping the planet safe from harmful toxins, pollutants and companies that don't care about future generations falls on people in the field of Environmental Protection. Those with careers in environmental protection are there to help prevent environmental damage or even repair it if damage has already been done. The sector covers activities related to environmental remediation, climate change adaptation, and ensuring or enhancing air quality.

title	characteristics	Skills	key word
Fish and Game Wardens	Patrol assigned area to prevent fish and game law violations. Investigate reports of damage to crops or property by wildlife. Compile biological data.	<ul style="list-style-type: none"> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• Biology — Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p>Education: Most of these occupations require a four-year bachelor's degree, but some do not.                      Related Experience: A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.                      Job Training: Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	District Wildlife Manager, Fisheries Enforcement Officer, Game Warden, Law Enforcement Officer (LEO), Natural Resource Officer, State Game Warden, State Wildlife Officer, Wildlife Conservation Officer, Wildlife Manager, Wildlife Officer
Forest and Conservation Technicians	Provide technical assistance regarding the conservation of soil, water, forests, or related natural resources. May compile data pertaining to size, content, condition, and other characteristics of forest tracts, under the direction of foresters; or train and lead forest workers in forest propagation, fire prevention and suppression. May assist conservation scientists in managing, improving, and protecting rangelands and wildlife habitats.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Geography — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p>Education: Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.                      Related Experience: Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.                      Job Training: Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Conservationist, Fire Technician, Forest Ranger, Forest Technician, Forestry Aide, Forestry Technician, Natural Resources Technician, Resource Manager, Resource Technician, Wildlife Technician
Forest and Conservation Workers	Under supervision, perform manual labor necessary to develop, maintain, or protect areas such as forests, forested areas, woodlands, wetlands, and rangelands through such activities as raising and transporting seedlings; combating insects, pests, and diseases harmful to plant life; and building structures to control water, erosion, and leaching of soil. Includes forester aides, seedling pullers, and tree planters.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Geography — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• Biology — Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.</li> </ul> <p>Education: Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.                      Related Experience: Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.                      Job Training: Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Conservation Officer, Crew Leader, Field Laborer, Foreman, Forest Resource Specialist, Forestry Support Specialist, Geographic Information Systems Coordinator (GIS Coordinator), Park Maintainer, Reforestation Worker, Tree Planter
Geoscientists, Except Hydrologists and Geographers	Study the composition, structure, and other physical aspects of the Earth. May use geological, physics, and mathematics knowledge in exploration for oil, gas, minerals, or underground water; or in waste disposal, land reclamation, or other environmental problems. May study the Earth's internal composition, atmospheres, oceans, and its magnetic, electrical, and gravitational forces. Includes mineralogists, crystallographers, paleontologists, stratigraphers, geodesists, and seismologists.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Geography — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> </ul> <p>Education: Most of these occupations require a four-year bachelor's degree, but some do not.                      Related Experience: A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.                      Job Training: Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Engineering Geologist, Environmental Protection Geologist, Exploration Geologist, Geological Specialist, Geologist, Geophysicist, Geoscientist, Mine Geologist, Petroleum Geologist, Project Geologist
Hazardous Materials Removal Workers	Identify, remove, pack, transport, or dispose of hazardous materials, including asbestos, lead-based paint, waste oil, fuel, transmission fluid, radioactive materials, or contaminated soil. Specialized training and certification in hazardous materials handling or a confined entry permit are generally required. May operate earth-moving equipment or trucks.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> </ul> <p>Education: Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.                      Related Experience: Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.                      Job Training: Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Abatement Worker, Asbestos Abatement Worker, Asbestos Hazard Abatement Worker, Asbestos Remover, Asbestos Worker, Decontamination / Decommissioning Operator (D & D Operator), Field Technician, Hazmat Technician (Hazardous Materials Technician), Site Worker, Waste Handling Technician
Hydrologists	Research the distribution, circulation, and physical properties of underground and surface waters; and study the form and intensity of precipitation, its rate of infiltration into the soil, movement through the earth, and its return to the ocean and atmosphere.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> </ul> <p>Education: Most of these occupations require a four-year bachelor's degree, but some do not.                      Related Experience: A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.                      Job Training: Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Assistant Groundwater Engineer, Environmental Consultant, Groundwater Consultant, Groundwater Programs Director, Hydraulic Engineer, Hydrogeologist, Hydrologic Engineer, Hydrologist, Professor, Research Hydrologist
Industrial Ecologists	Apply principles and processes of natural ecosystems to develop models for efficient industrial systems. Use knowledge from the physical and social sciences to maximize effective use of natural resources in the production and use of goods and services. Examine societal issues and their relationship with both technical systems and the environment.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Education and Training — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> </ul> <p>Education: Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).                      Related Experience: Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.                      Job Training: Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Ecologist, Environmental Consultant, Environmental Programs Manager, Environmental Protection Agency Counselor, Environmental Services Director, Environmental Sustainability Manager, Research Environmental Engineer, Research Scientist, Researcher

## ENVIRONMENTAL PROTECTION JOBS

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title	characteristics	Skills	key word
Landscape Architects	Plan and design land areas for projects such as parks and other recreational facilities, airports, highways, hospitals, schools, land subdivisions, and commercial, industrial, and residential sites.	<ul style="list-style-type: none"> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> </ul> <p>Education: Most of these occupations require a four-year bachelor's degree, but some do not.            Related Experience: A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.            Job Training: Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Designer, Director of Landscape Architecture and Planning, Golf Course Architect, Land Planner, Landscape Architect, Landscape Architect and Planner, Landscape Designer, Planner, Project Landscape Architect, Senior Landscape Architect
Maintenance and Repair Workers, General	Perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of an establishment in repair. Duties may involve pipe fitting; boiler making; insulating; welding; machining; carpentry; repairing electrical or mechanical equipment; installing, aligning, and balancing new equipment; and repairing buildings, floors, or stairs.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> </ul> <p>Education: Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.            Related Experience: Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.            Job Training: Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Building Maintenance Mechanic, Building Mechanic, Equipment Engineering Technician, Facilities Manager, Maintenance Engineer, Maintenance Man, Maintenance Mechanic, Maintenance Supervisor, Maintenance Technician, Maintenance Worker
Natural Sciences Managers	Plan, direct, or coordinate activities in such fields as life sciences, physical sciences, mathematics, statistics, and research and development in these fields.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Biology — Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.</li> </ul> <p>Education: Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).            Related Experience: Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.            Job Training: Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Environmental Program Manager, Fisheries Director, Health Sciences Manager, Laboratory Manager, Natural Science Manager, Research and Development Director, Research Manager, Senior Investigator, Senior Scientist, Water Team Leader
Public Relations Specialists	Engage in promoting or creating an intended public image for individuals, groups, or organizations. May write or select material for release to various communications media.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Communications and Media — Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.</li> <li>• Sales and Marketing — Knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> </ul> <p>Education: Most of these occupations require a four-year bachelor's degree, but some do not.            Related Experience: A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.            Job Training: Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Account Executive, Communications Director, Communications Specialist, Corporate Communications Specialist, Media Relations Specialist, Public Affairs Specialist, Public Information Officer, Public Information Specialist, Public Relations Coordinator, Public Relations Specialist (PR Specialist)
Reporters and Correspondents	Collect and analyze facts about newsworthy events by interview, investigation, or observation. Report and write stories for newspaper, news magazine, radio, or television.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Communications and Media — Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Telecommunications — Knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems.</li> </ul> <p>Education: Most of these occupations require a four-year bachelor's degree, but some do not.            Related Experience: A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.            Job Training: Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Anchor, General Assignment Reporter, News Director, News Reporter, Reporter, Sports Writer, Staff Writer, Television News Anchor (TV News Anchor), Television News Reporter, Television Reporter (TV Reporter)
Soil and Plant Scientists	Conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Biology — Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Education and Training — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> </ul> <p>Education: Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).            Related Experience: Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.            Job Training: Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Agronomist, Agronomy Research Manager, Agronomy Specialist, Crop Nutrition Scientist, Extension Specialist, Microbiology Soil Scientist, On-Site Soil Evaluator, Research Soil Scientist, Soil Fertility Extension Specialist, Soil Scientist
Soil and Water Conservationists	Plan or develop coordinated practices for soil erosion control, soil or water conservation, or sound land use.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Biology — Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Geography — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.</li> </ul> <p>Education: Most of these occupations require a four-year bachelor's degree, but some do not.            Related Experience: A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.            Job Training: Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Conservationist, Environmental Analyst, Erosion Control Specialist, Land Manager, Land Reclamation Specialist, Land Resource Specialist, Resource Conservation Specialist, Resource Conservationist, Soil Conservationist, Watershed Program Manager

## ENVIRONMENTAL PROTECTION JOBS

Keeping the planet safe from harmful toxins, polluters and companies that don't care about future generations falls on people in the field of Environmental Protection. Those with careers in environmental protection are there to help prevent environmental damage or even repair it if damage has already been done. The sector covers activities related to environmental remediation, climate change adaptation, and ensuring or enhancing air quality.

title	characterstics	Skills	key word
Water Resource Specialists	Design or implement programs and strategies related to water resource issues such as supply, quality, and regulatory compliance issues.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> </ul> <p><b>Education :</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Hydrogeologist; National Stormwater Leader; Owner, Consulting Engineer; Owner, Professional Engineer; Research Hydraulic Engineer; Senior Group Manager; Senior Hydrogeologist; Senior Water Resources Engineer; VP-Senior Principal Water Resources Engineer; Water Resources Business Segment Leader
Water/Wastewater Engineers	Design or oversee projects involving provision of potable water, disposal of wastewater and sewage, or prevention of flood-related damage. Prepare environmental documentation for water resources, regulatory program compliance, data management and analysis, and field work. Perform hydraulic modeling and pipeline design.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Acting Section Chief, Assistant County Engineer, Director Water and Waste Services, Engineer and Geologist, Principal Consulting Engineer, Principal Technologist, Program Manager, Project Manager/Design Manager, Surface Water Manager, Water Reuse Program Manager
Zoologists and Wildlife Biologists	Study the origins, behavior, diseases, genetics, and life processes of animals and wildlife. May specialize in wildlife research and management. May collect and analyze biological data to determine the environmental effects of present and potential use of land and water habitats.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Biology — Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Aquatic Biologist, Assistant Research Scientist, Conservation Resources Management Biologist, Environmental Specialist, Fish and Wildlife Biologist, Fisheries Biologist, Fishery Biologist, Wildlife Biologist, Wildlife Manager, Zoologist

## Recycling and Waste Reduction Jobs

This green jobs sector focuses on the activities surrounding solid waste and wastewater management, treatment and reduction. It also covers recycling and recycling support jobs, which are careers that focus on converting what was once waste into a usable material.

title	characterstics	Skills	key word
Hazardous Materials Removal Workers	Identify, remove, pack, transport, or dispose of hazardous materials, including asbestos, lead-based paint, waste oil, fuel, transmission fluid, radioactive materials, or contaminated soil. Specialized training and certification in hazardous materials handling or a confined entry permit are generally required. May operate earth moving equipment or trucks.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Abatement Worker, Asbestos Abatement Worker, Asbestos Hazard Abatement Worker, Asbestos Remover, Asbestos Worker, Decontamination / Decommissioning Operator (D & D Operator), Field Technician, Hazmat Technician (Hazardous Materials Technician), Site Worker, Waste Handling Technician
Recycling and Reclamation Workers	Prepare and sort materials or products for recycling. Identify and remove hazardous substances. Dismantle components of products such as appliances.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• Education and Training — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Bobcat Driver/Labor, Box Sorter, Convenience Recycle Center Tech, Crane Operator, Deconstruction and Decontamination Waste Operations Specialist, Equipment Operator, Non-Ferrous Material Handler, Sort Line Worker, Sorter, Transfer Station Operator
Recycling Coordinators	Supervise curbside and drop-off recycling programs for municipal governments or private firms.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Clerical — Knowledge of administrative and clerical procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and other office procedures and terminology.</li> <li>• Education and Training — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Heavy Equipment Supervisor, Recycle Coordinator, Recycling Coordinator, Recycling Director, Recycling Manager, Recycling Program Manager, Recycling Specialist, Route Supervisor, Solid Waste Division Supervisor, Waste Reduction Coordinator
Refuse and Recyclable Material Collectors	Collect and dump refuse or recyclable materials from containers into truck. May drive truck.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Driver, Front Load Trash Truck Driver, Garbage Collector, Garbage Man, Recycle Driver, Rolloff Truck Driver, Sanitation Laborer, Swamper, Trash Collector, Truck Driver
Brownfield Redevelopment Specialists and Site Managers	Plan and direct cleanup and redevelopment of contaminated properties for reuse. Does not include properties sufficiently contaminated to qualify as Superfund sites.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Brownfield and Economic Development Director; Brownfield Program Coordinator; Business Development Manager; Chief of Planning; Deputy Commissioner; Director; Director of Development; Environmental Program Manager; Manager, Division of Environmental Quality; Senior Environmental Practice Leader

## Renewable Energy Jobs

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title	Characterstics	Knowledge&Education	key words
Biofuels/Biodiesel Technology and Product Development Managers	Define, plan, or execute biofuels/biodiesel research programs that evaluate alternative feedstock and process technologies with near-term commercial potential.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience :</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Analytical Research Program Manager, Biodiesel Division Manager, Biofuels Manager, Chief Technology Officer (CTO), Laboratory Manager (Lab Manager), Manager of Business Development and New Technology, Project Development Director, Scientist, Senior Research Associate, Senior Research Scientist
Biomass Plant Technicians	Control and monitor biomass plant activities and perform maintenance as needed.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Auxiliary Engineer, Auxiliary Operator, Biomass Facilitator, Boiler Operator, Control Room Operator, Equipment Operator, Fuel Handler, Fuel Quality Tech, Instrumentation and Controls Technician, Plant Operator
Biomass Power Plant Managers	Manage operations at biomass power generation facilities. Direct work activities at plant, including supervision of operations and maintenance staff.	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Fuel Manager, Maintenance Manager, Maintenance Supervisor, Operations and Maintenance Manager, Operations Manager, Operations Supervisor, Plant Manager, Production Supervisor, Production Support Manager, Production Support Supervisor

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title	Characterstics	Knowledge&Education	key words
Civil Engineers	Perform engineering duties in planning, designing, and overseeing construction and maintenance of building structures, and facilities, such as roads, railroads, airports, bridges, harbors, channels, dams, irrigation projects, pipelines, power plants, and water and sewage systems.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• <b>Engineering and Technology</b> — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• <b>Building and Construction</b> — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• <b>Mathematics</b> — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• <b>Design</b> — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, an</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Bridge/Structure Inspection Team Leader, City Engineer, Civil Engineer, Civil Engineering Manager, County Engineer, Design Engineer, Project Engineer, Railroad Design Consultant, Structural Engineer, Traffic Engine
Continuous Mining Machine Operators	Operate self-propelled mining machines that rip coal, metal and nonmetal ores, rock, stone, or sand from the mine face and load it onto conveyors or into shuttle cars in a continuous operation.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• <b>Mechanical</b> — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• <b>Production and Processing</b> — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• <b>Law and Government</b> — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• <b>Public Safety and Security</b> — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• <b>Education and Training</b> — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects</li> </ul> <p><b>Education:</b> Some of these occupations may require a high school diploma or GED certificate.</p> <p><b>Related Experience :</b> Little or no previous work-related skill, knowledge, or experience is needed for these occupations. For example, a person can become a waiter or waitress even if he/she has never worked before.</p> <p><b>Job Training :</b> Employees in these occupations need anywhere from a few days to a few months of training. Usually, an experienced worker could show you how to do the job.</p>	Continuous Miner Operator (CMO), Continuous Mining Machine Operator, Miner, Miner Operator

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title	Characterstics	Knowledge&Education	key words
Electrical Engineers	Research, design, develop, test, or supervise the manufacturing and installation of electrical equipment, components, or systems for commercial, industrial, military, or scientific use.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Circuits Engineer, Design Engineer, Electrical Controls Engineer, Electrical Design Engineer, Electrical Engineer, Electrical Project Engineer, Instrumentation and Electrical Reliability Engineer (I&E Reliability Engineer), Power Systems Engineer, Project Engineer, Test Engineer
Geological Sample Test Technicians	Test or analyze geological samples, crude oil, or minerals to detect presence of petroleum, gas, or mineral deposits indicating potential for exploration or production or to determine physical or chemical properties to ensure that products meet quality standards.	<ul style="list-style-type: none"> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Core Inspector, Electron Microprobe Operator, Environmental Field Services Technician, Environmental Sampling Technician, Laboratory Technician, Materials Technician, Organic Section Technical Lead, Physical Science Technician, Quality Control Technician (QC Technician), Research Associate
Geothermal Production Managers	Manage operations at geothermal power generation facilities. Maintain and monitor geothermal plant equipment for efficient and safe plant operations.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b></p>	Maintenance Manager, Operations Manager, Operations Supervisor, Plant Manager, Plant Supervisor, Power Plant Operations Manager, Site Manager

## Renewable Energy Jobs

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title	Characterstics	Knowledge&Education	key words
Geothermal Technicians	Perform technical activities at power plants or individual installations necessary for the generation of power from geothermal energy sources. Monitor and control operating activities at geothermal power generation facilities and perform maintenance and repairs as necessary. Install, test, and maintain residential and commercial geothermal heat pumps	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Control Operator; Control Room Operator (CRO); Instrument and Controls Technician (I & C Technician); Instrumentation and Electrical Technician (I & E Technician); Instrumentation, Control, and Electrical Technician (I C & E Technician); Maintenance Mechanic; Maintenance Technician; Mechanical Technician; Operations Technician; Operator Technician
Power Distributors and Dispatchers	Coordinate, regulate, or distribute electricity or steam.	<p><b>Knowledge:</b></p> <p>Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions. See more occupations related to this knowledge.</p> <p>Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services. See more occupations related to this knowledge.</p> <p>Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming. See more occupations related to this knowledge.</p> <p>Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance</p> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience :</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Control Operator, Distribution Dispatcher, Distribution Operations Supervisor, Distribution System Operator, Electric System Operator, Journeyman Lineman, Power System Dispatcher, Power System Operator, System Operator, Transmission System Operator
Power Plant Operators	Control, operate, or maintain machinery to generate electric power. Includes auxiliary equipment operators.	<p><b>Knowledge:</b></p> <p>Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</p> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p> <p><b>Education :</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Auxiliary Operator, Control Operator, Control Room Operator, Multicraft Operator (MCO), Operations and Maintenance Technician (O & M Technician), Plant Control Operator, Power Plant Operator, Senior Power Plant Operator, Station Operator, Unit Operator

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title	Characterstics	Knowledge&Education	key words
Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	Set up, operate, or tend continuous flow or vat-type equipment; filter presses; shaker screens; centrifuges; condenser tubes; precipitating, fermenting, or evaporating tanks; scrubbing towers; or batch stills. These machines extract, sort, or separate liquids, gases, or solids from other materials to recover a refined product. Includes dairy processing equipment operators.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> </ul> <p>Education: These occupations usually require a high school diploma.</p> <p>Related Experience: Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p>Job Training: Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Blender / Cook, Brewer, Cellar Worker, Cheese Maker, Digester Cook, Machine Tender, Paper Machine Tender, Plant Operator, Pulper Operator, Winemaker
Service Unit Operators, Oil, Gas, and Mining	perate equipment to increase oil flow from producing wells or to remove stuck pipe, casing, tools, or other obstructions from drilling wells. May also perform similar services in mining exploration operations. Includes fishing-tool technicians.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> </ul> <p>Education : These occupations usually require a high school diploma.</p> <p>Related Experience: Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p>Job Training: Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Fisherman, Operator, Pulling Unit Operator, Reverse Unit Operator-Fisherman, Rig Operator, Service Operator, Service Rig Operator, Tool Pusher, Well Servicing Rig Operator, Wireline Operator
Sheet Metal Workers	fabricate, assemble, install, and repair sheet metal products and equipment, such as ducts, control boxes, drainpipes, and furnace casings. Work may involve any of the following: setting up and operating fabricating machines to cut, bend, and straighten sheet metal; shaping metal over anvils, blocks, or forms using hammer; operating soldering and welding equipment to join sheet metal parts; or inspecting, assembling, and smoothing seams and joints of burred surfaces. Includes sheet metal duct installers who install prefabricated sheet metal ducts used for heating, air conditioning, or other purposes.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> </ul> <p>Education: These occupations usually require a high school diploma.</p> <p>Related Experience: Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p>Job Training: Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Field Installer; HVAC Sheet Metal Installer (Heating, Ventilation, and Air Conditioning Sheet Metal Installer); Journeyman Sheet Metal Worker; Sheet Metal Apprentice; Sheet Metal Fabricator; Sheet Metal Foreman; Sheet Metal Installer; Sheet Metal Layout Mechanic; Sheet Metal Mechanic; Sheet Metal Worker

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Solar Energy Installation Managers	Direct work crews installing residential or commercial solar photovoltaic or thermal systems.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education :</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Branch Operations Manager, Crew Lead, Crew Leader, Foreman, Installation Manager, Installation Technician, Residential Field Manager, Solar Energy Installation Manager, Solar Installation Manager, Solar Installation Supervisor
Solar Energy Systems Engineers	Perform site-specific engineering analysis or evaluation of energy efficiency and solar projects involving residential, commercial, or industrial customers. Design solar domestic hot water and space heating systems for new and existing structures, applying knowledge of structural energy requirements, local climates, solar technology, and thermodynamics.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub- atomic structures and processes.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Consulting Engineer, Distributed Energy Systems Consultant, Energy Systems Laboratory Director, Engineering Vice President, Field Engineer, Power Systems Engineer, Renewable Energy Division Manager, Research Engineer, Solar Engineer

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Solar Photovoltaic Installers	Assemble, install, or maintain solar photovoltaic (PV) systems on roofs or other structures in compliance with site assessment and schematics. May include measuring, cutting, assembling, and bolting structural framing and solar modules. May perform minor electrical work such as current checks.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads..</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Installer, Photovoltaic Installer (PV Installer), PV Design and Installation Technician, Solar Designer/Installer, Solar Installer, Solar Installer Technician, Solar Photovoltaic Installer (Solar PV Installer), Solar Technician
Solar Sales Representatives and Assessors	Contact new or existing customers to determine their solar equipment needs, suggest systems or equipment, or estimate costs.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Sales and Marketing — Knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> </ul> <p><b>Eucation:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Commercial Sales Manager, Energy Consultant, Sales, Sales Associate, Sales Manager, Sales Rep, Sales Representative, Salesman, Solar Consultant, Solar Sales Representative

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title	Characterstics	Knowledge&Education	key words
Solar Thermal Installers and Technicians	Install or repair solar energy systems designed to collect, store, and circulate solar-heated water for residential, commercial or industrial use.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> </ul> <p>Education: Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p>Related Experience: Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p>Job Training: Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Installer, Maintenance Technician, Service Technician, Solar Energy Technician, Solar Hot Water Installer (SHW Installer), Solar Installer, Solar Maintenance Technician, Solar System Installer, Solar Technician, Solar Thermal Installer
Storage and Distribution Managers	Plan, direct, or coordinate the storage or distribution operations within an organization or the activities of organizations that are engaged in storing or distributing materials or products.	<ul style="list-style-type: none"> <li>• principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Personnel and Human Resources — Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p>Education: Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p>Related Experience: A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p>Job Training: Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Cold Storage Supervisor, Customer Service Manager, Distribution Center Manager, Distribution Manager, Distribution Operation Manager, Load Out Supervisor, Shipping Manager, Shipping Supervisor, Stores Supervisor, Warehouse Manager
Wind Energy Engineers	Design underground or overhead wind farm collector systems and prepare and develop site specifications.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub- atomic structures and processes.</li> </ul> <p>Education: Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p>Related Experience: A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p>Job Training: Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Project Designer, Transmission and Distribution Engineering; Project Engineer; Senior Engineer/Practice Leader-Land Development and Engineering; Senior Project Engineer; Senior Wind Energy Consultant; Turbine Measurements Engineer; Utility Engineer; Wind Farm Siting and Development Consultant; Wind Science and Planning; Wind Turbine Design Engineer

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Wind Turbine Service Technicians	Inspect, diagnose, adjust, or repair wind turbines. Perform maintenance on wind turbine equipment including resolving electrical, mechanical, and hydraulic malfunctions.	<p><b>Knowledge:</b></p> <p><b>Mechanical</b> — Knowledge of machines and tools, including their designs, uses, repair, and maintenance. See more occupations related to this knowledge.</p> <p><b>Computers and Electronics</b> — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming. See more occupations related to this knowledge.</p> <p><b>Engineering and Technology</b> — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services. See more occupations related to this knowledge.</p> <p><b>Physics</b> — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub- atomic structures and processes. See more occupations related to this knowledge.</p> <p><b>Public Safety and Security</b> — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</p> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Field Service Technician; Lead Technician; Maintenance Technician; Operations, Maintenance and Service Wind Turbine Technician (OMS Wind Turbine Technician); Senior Wind Turbine Technician; Technician; Wind Farm Support Specialist; Wind Technician; Wind Turbine Service Technician; Wind Turbine Technician
Mechanical Engineers	Perform engineering duties in planning and designing tools, engines, machines, and other mechanically functioning equipment. Oversee installation, operation, maintenance, and repair of equipment such as centralized heat, gas, water, and steam systems.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• <b>Engineering and Technology</b> — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• <b>Mathematics</b> — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• <b>Design</b> — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• <b>Mechanical</b> — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• <b>Physics</b> — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub- atomic structures and processes.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Application Engineer, Design Engineer, Design Maintenance Engineer, Equipment Engineer, Mechanical Design Engineer, Mechanical Engineer, Process Engineer, Product Engineer, Project Engineer, Test Engineer
Machinists	Set up and operate a variety of machine tools to produce precision parts and instruments. Includes precision instrument makers who fabricate, modify, or repair mechanical instruments. May also fabricate and modify parts to make or repair machine tools or maintain industrial machines, applying knowledge of mechanics, mathematics, metal properties, layout, and machining procedures.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• <b>Mathematics</b> — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• <b>Mechanical</b> — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• <b>Production and Processing</b> — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• <b>Design</b> — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Gear Machinist, Journeyman Machinist, Machine Operator, Machine Repair Person, Machinist, Maintenance Machinist, Maintenance Specialist, Production Machinist, Set-Up Machinist, Tool Room Machinist

## ENERGY EFFICIENCY JOBS

The energy efficiency green job sector focuses on the efficient utilization of energy . It covers activities related to increasing energy efficiency, making energy demand response more effective, constructing "smart grids" and other energy efficient activities.

Title	Characteristics	Knowledge&Education	key words
Boilermakers	Construct, assemble, maintain, and repair stationary steam boilers and boiler house auxiliaries. Align structures or plate sections to assemble boiler frame tanks or vats, following blueprints. Work involves use of hand and power tools, plumb bobs, levels, wedges, dogs, or turnbuckles. Assist in testing assembled vessels. Direct cleaning of boilers and boiler furnaces. Inspect and repair boiler fittings, such as safety valves, regulators, automatic-control mechanisms, water columns, and auxiliary machines.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations</p>	Boiler Maker, Boiler Mechanic, Boiler Repairman, Boiler Service Technician, Boiler Technician, Boilermaker, Boilermaker Mechanic, Boilermaker Pipe Fitter, Boilermaker Welder, Service Technician
Electrical Engineers	Research, design, develop, test, or supervise the manufacturing and installation of electrical equipment, components, or systems for commercial, industrial, military, or scientific use.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Circuits Engineer, Design Engineer, Electrical Controls Engineer, Electrical Design Engineer, Electrical Engineer, Electrical Project Engineer, Instrumentation and Electrical Reliability Engineer (I&E Reliability Engineer), Power Systems Engineer, Project Engineer, Test Engineer
Electrical Power-Line Installers and Repairers	Install or repair cables or wires used in electrical power or distribution systems. May erect poles and light or heavy duty transmission towers.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> </ul>	A Class Lineman, Apprentice Lineman Third Step, Class A Lineman, Electric Lineman, Electrical Lineman (Power), Electrical Lineworker, Journeyman Lineman, Lineman, Lineworker, Power Lineman
Energy Auditors	Conduct energy audits of buildings, building systems, or process systems. May also conduct investment grade audits of buildings or systems.	<ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Building Performance Consultant, Energy Auditor, Energy Consultant, Energy Rater, Home Energy Rater, Home Performance Consultant
Energy Engineers	Design, develop, or evaluate energy-related projects or programs to reduce energy costs or improve energy efficiency during the designing, building, or remodeling stages of construction. May specialize in electrical systems; heating, ventilation, and air-conditioning (HVAC) systems; green buildings; lighting; air quality; or energy procurement.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Distributed Generation Project Manager, Energy Efficiency Engineer, Energy Engineer, Energy Manager, Environmental Solutions Engineer, Industrial Energy Engineer, Measurement And Verification Engineer, Test and Balance Engineer
Financial Analysts	Conduct quantitative analyses of information affecting investment programs of public or private institutions.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Economics and Accounting — Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Credit Products Officer, Equity Research Analyst, Financial Analyst, Investment Analyst, Operational Risk Analyst, Planning Analyst, Real Estate Analyst, Research Analyst, Securities Analyst

## ENERGY EFFICIENCY JOBS

The energy efficiency green job sector focuses on the efficient utilization of energy . It covers activities related to increasing energy efficiency, making energy demand response more effective, constructing "smart grids" and other energy efficient activities.

Title	Characteristics	Knowledge&Education	key words
General and Operations Managers	Plan, direct, or coordinate the operations of public or private sector organizations. Duties and responsibilities include formulating policies, managing daily operations, and planning the use of materials and human resources, but are too diverse and general in nature to be classified in any one functional area of management or administration, such as personnel, purchasing, or administrative services.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Personnel and Human Resources — Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Business Manager, Facilities Manager, Facility Manager, General Manager (GM), Operations Director, Operations Manager, Plant Manager, Plant Superintendent, Production Manager, Store Manager
Heating and Air Conditioning Mechanics and Installers	Install, service, or repair heating and air conditioning systems in residences or commercial establishments.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> </ul> <p><b>Education</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	A/C Tech (Air Conditioning Technician); HVAC Installer (Heating, Ventilation, Air Conditioning Installer); HVAC Mechanic (Heating, Ventilation, Air Conditioning Mechanic); HVAC Service Tech (Heating, Ventilation, Air Conditioning Service Technician); HVAC Service Technician (Heating, Ventilation, Air Conditioning Service Technician); HVAC Specialist (Heating, Ventilation, and Air Conditioning Specialist); HVAC Technician (Heating, Ventilation, Air Conditioning Technician); HVAC Technician (Heating, Ventilation, and Air Conditioning Technician); Service Technician; Systems Mechanic
Insulation Workers, Floor, Ceiling, and Wall	Line and cover structures with insulating materials. May work with batt, roll, or blown insulation materials.	<ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> </ul> <p><b>Education</b> : These occupations usually require a high school diploma.</p> <p><b>Related Experience</b>: Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training</b> : Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Attic Blower, Installer, Insulation Estimator, Insulation Installer, Insulation Mechanic, Insulation Worker, Insulator, Retrofit Installer, Spray Foam Installer, Warehouse Insulation Worker
Maintenance and Repair Workers, General	Perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of an establishment in repair. Duties may involve pipe fitting; boiler making; insulating; welding; machining; carpentry; repairing electrical or mechanical equipment; installing, aligning, and balancing new equipment; and repairing buildings, floors, or stairs.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> </ul> <p><b>Education</b> : Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience</b> : Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training</b> : Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Building Maintenance Mechanic, Building Mechanic, Equipment Engineering Technician, Facilities Manager, Maintenance Engineer, Maintenance Man, Maintenance Mechanic, Maintenance Supervisor, Maintenance Technician, Maintenance Worker
Mechanical Engineers	Perform engineering duties in planning and designing tools, engines, machines, and other mechanically functioning equipment. Oversee installation, operation, maintenance, and repair of equipment such as centralized heat, gas, water, and steam systems.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> </ul> <p><b>Education</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Application Engineer, Design Engineer, Design Maintenance Engineer, Equipment Engineer, Mechanical Design Engineer, Mechanical Engineer, Process Engineer, Product Engineer, Project Engineer, Test Engineer

## ENERGY EFFICIENCY JOBS

The energy efficiency green job sector focuses on the efficient utilization of energy . It covers activities related to increasing energy efficiency, making energy demand response more effective, constructing "smart grids" and other energy efficient activities.

Title	Characteristics	Knowledge&Education	key words
Refrigeration Mechanics and Installers	Install and repair industrial and commercial refrigerating systems.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	<p>Ammonia Refrigeration Technician; Heating, Ventilation, Air Conditioning / Refrigeration Technician (HVAC / R Technician); Heating, Ventilation, Air Conditioning Service Technician (HVAC Service Technician); Heating, Ventilation, Air Conditioning Technician (HVAC Technician); HVAC/R Service Technician (Heating, Ventilation, and Air Conditioning/Refrigeration Service Technician); Refrigeration Mechanic; Refrigeration Operator; Refrigeration Technician; Service Technician; Transportation Refrigeration Technician</p>
Stationary Engineers and Boiler Operators	Operate or maintain stationary engines, boilers, or other mechanical equipment to provide utilities for buildings or industrial processes. Operate equipment, such as steam engines, generators, motors, turbines, and steam boilers.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Education and Training — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	<p>Boiler Operator, Boiler Technician, Building Engineer, Fireman, Operating Engineer, Plant Operator, Plant Utilities Engineer, Stationary Engineer, Stationary Steam Engineer, Utilities Operator</p>
Training and Development Specialists	Design and conduct training and development programs to improve individual and organizational performance. May analyze training needs.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Education and Training — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Personnel and Human Resources — Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	<p>Computer Training Specialist, Corporate Trainer, E-Learning Developer, Job Training Specialist, Management Development Specialist, Senior Instructor, Supervisory Training Specialist, Technical Trainer, Trainer, Training Specialist</p>
Transportation Vehicle, Equipment and Systems Inspectors, Except Aviation	Inspect and monitor transportation equipment, vehicles, or systems to ensure compliance with regulations and safety standards.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Technical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	<p>Air Inspector, Carman, Chief Mechanical Officer (CMO), Emissions Inspector, Inspector, Quality Assurance Inspector, Railroad Track Inspector, Safety Officer, Smog Technician, Transit Vehicle Inspector</p>
Weatherization Installers and Technicians	Perform a variety of activities to weatherize homes and make them more energy efficient. Duties include repairing windows, insulating ducts, and performing heating, ventilating, and air-conditioning (HVAC) work. May perform energy audits and advise clients on energy conservation measures.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	<p>Building Analyst/Supervisor, Director of Housing and Energy Services, Energy Administrator, Energy Assistant, Energy Auditor, Energy Conservation Director, Housing Director, Lead Weatherization Installer-Technician, Weatherization Director, Weatherization Installer</p>

## Energy Trading Jobs

Energy trading careers focus on the financial services surrounding the buying and selling of energy as a commodity on the open market. It is within this sector that carbon trading initiatives, renewable energy certificates and offsets are also covered.

title	characterstics	Skills	key word
Energy Brokers	Buy or sell energy products on the behalf of residential or commercial customers or utilities. Negotiate and oversee contracts for energy sales.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Economics and Accounting — Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.</li> <li>• English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p>Education: Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p>Related Experience: A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p>Job Training: Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Broker, Commodities Broker, Electricity Trader, Energy Scheduler, Energy Trader, Real Time Trader, Senior Energy Market Coordinator, Senior Energy Trader, Senior Power Scheduler, Supply Manager
Securities and Commodities Traders	Buy and sell securities and commodities to transfer debt, capital, or risk. Establish and negotiate unit prices and terms of sale.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Economics and Accounting — Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p>Education: Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p>Related Experience: A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p>Job Training: Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Broker, Corporate Bond Trader, Equity Trader, Fixed Income Director, Fixed Income Trading Vice President, Investment Trader, Option Trader, Options Trader, Securities Lending Trader, Trader

## Green Construction Jobs

With the focus on sustainable construction methods, this sector focuses on the key areas of building or retro fitting buildings to optimize for human and environmental health, sustainable site development, water savings, energy efficiency, renewable materials selection and indoor environmental quality.

title	characteristics	Skills	key word
Architects, Except Landscape and Naval	Plan and design structures, such as private residences, office buildings, theaters, factories, and other structural property.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Architect; Architectural Project Manager; Design Architect; Principal Architect; Principal, Architectural Firm; Project Architect; Senior Architect/Design Manager; Senior Architectural Designer; Senior Planner; Specifications Writer
Architectural Drafters	Prepare detailed drawings of architectural designs and plans for buildings and structures according to specifications provided by architect.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education :</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Architect, Architectural Designer, Architectural Drafter, Architectural Draftsman, Architectural Intern, CAD Technician (Computer-Aided Design Technician), Drafter, Draftsman, Intern Architect, Project Manager
Boilermakers	Construct, assemble, maintain, and repair stationary steam boilers and boiler house auxiliaries. Align structures or plate sections to assemble boiler frame tanks or vats, following blueprints. Work involves use of hand and power tools, plumb bobs, levels, wedges, dogs, or turnbuckles. Assist in testing assembled vessels. Direct cleaning of boilers and boiler furnaces. Inspect and repair boiler fittings, such as safety valves, regulators, automatic-control mechanisms, water columns, and auxiliary machines.	<ul style="list-style-type: none"> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations</p>	Boiler Maker, Boiler Mechanic, Boiler Repairman, Boiler Service Technician, Boiler Technician, Boilermaker, Boilermaker Mechanic, Boilermaker Pipe Fitter, Boilermaker Welder, Service Technician
Cement Masons and Concrete Finishers	Smooth and finish surfaces of poured concrete, such as floors, walks, sidewalks, roads, or curbs using a variety of hand and power tools. Align forms for sidewalks, curbs, or gutters; patch voids; and use saws to cut expansion joints.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p><b>Education</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Cement Finisher, Cement Mason, Concrete Finisher, Concrete Mason, Finisher, Mason
Civil Engineers	Perform engineering duties in planning, designing, and overseeing construction and maintenance of building structures, and facilities, such as roads, railroads, airports, bridges, harbors, channels, dams, irrigation projects, pipelines, power plants, and water and sewage systems. <ul style="list-style-type: none"> <li>• Inspect project sites to monitor progress and ensure conformance to design specifications and safety or sanitation standards.</li> <li>• Compute load and grade requirements, water flow rates, or material stress factors to determine design specifications.</li> <li>• Provide technical advice to industrial or managerial personnel regarding design, construction, or program modifications or structural repairs.</li> <li>• Test soils or materials to determine the adequacy and strength of foundations, concrete, asphalt, or steel.</li> <li>• Manage and direct the construction, operations, or maintenance activities at</li> </ul>	<p><b>Tools used in this occupation:</b></p> <ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p><b>Education:</b> Bachelor's degree , Master's degree, Post-baccalaureate certificate This occupation may require a background in the following science, technology, engineering, and mathematics educational disciplines: Engineering — Civil Engineering; Transportation and Highway Engineering; Water Resources Engineering</p>	ridge/Structure Inspection Team Leader, City Engineer, Civil Engineer, Civil Engineering Manager, County Engineer, Design Engineer, Project Engineer, Railroad Design Consultant, Structural Engineer, Traffic Engineer

## Green Construction Jobs

With the focus on sustainable construction methods, this sector focuses on the key areas of building or retro fitting buildings to optimize for human and environmental health, sustainable site development, water savings, energy efficiency, renewable materials selection and indoor environmental quality.

title	characterstics	Skills	key word
Construction and Building Inspectors	Inspect structures using engineering skills to determine structural soundness and compliance with specifications, building codes, and other regulations. Inspections may be general in nature or may be limited to a specific area, such as electrical systems or plumbing.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Building Code Administrator, Building Inspection Engineer, Building Inspector, Building Official, Combination Building Inspector, Construction Inspector, Construction Materials Testing Technician, Elevator Inspector, Inspector, Plumbing Inspector
Construction Carpenters	Construct, erect, install, and repair structures and fixtures of wood, plywood, and wallboard, using carpenter's hand tools and power tools.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Assembler, Cabinet Maker, Carpenter Foreman, Carpentry Foreman, Concrete Carpenter, Construction Superintendent, Construction Worker, Foreman, Framer, Production Worker
Construction Laborers	Perform tasks involving physical labor at construction sites. May operate hand and power tools of all types: air hammers, earth tampers, cement mixers, small mechanical hoists, surveying and measuring equipment, and a variety of other equipment and instruments. May clean and prepare sites, dig trenches, set braces to support the sides of excavations, erect scaffolding, and clean up rubble, debris and other waste materials. May assist other craft workers.	<ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training :</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Construction Laborer, Construction Worker, Curb and Gutter Laborer, Drain Layer, Drop Crew Laborer, Helper, Laborer, Post Framer, Skill Labor, Union Laborer
Construction Managers	Plan, direct, or coordinate, usually through subordinate supervisory personnel, activities concerned with the construction and maintenance of structures, facilities, and systems. Participate in the conceptual development of a construction project and oversee its organization, scheduling, budgeting, and implementation. Includes managers in specialized construction fields, such as carpentry or plumbing.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> </ul> <p><b>Education</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Concrete Foreman, Construction Area Manager, Construction Foreman, Construction Manager, Construction Superintendent, General Contractor, Job Superintendent, Project Executive, Project Manager, Project Superintendent
Electrical Engineers	Research, design, develop, test, or supervise the manufacturing and installation of electrical equipment, components, or systems for commercial, industrial, military, or scientific use.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Circuits Engineer, Design Engineer, Electrical Controls Engineer, Electrical Design Engineer, Electrical Engineer, Electrical Project Engineer, Instrumentation and Electrical Reliability Engineer (I&E Reliability Engineer), Power Systems Engineer, Project Engineer, Test Engineer

## Green Construction Jobs

With the focus on sustainable construction methods, this sector focuses on the key areas of building or retro fitting buildings to optimize for human and environmental health, sustainable site development, water savings, energy efficiency, renewable materials selection and indoor environmental quality.

title	characteristics	Skills	key word
Electricians	Install, maintain, and repair electrical wiring, equipment, and fixtures. Ensure that work is in accordance with relevant codes. May install or service street lights, intercom systems, or electrical control systems.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Chief Electrician; Control Electrician; Electrician; Industrial Electrician; Inside Wireman; Journeyman Electrician; Journeyman Wireman; Maintenance Electrician; Mechanical Trades Specialist, Electrician; Qualified Craft Worker, Electrician (QCW, Electrician)
Energy Engineers	Design, develop, or evaluate energy-related projects or programs to reduce energy costs or improve energy efficiency during the designing, building, or remodeling stages of construction. May specialize in electrical systems; heating, ventilation, and air-conditioning (HVAC) systems; green buildings; lighting; air quality; or energy procurement.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Distributed Generation Project Manager, Energy Efficiency Engineer, Energy Engineer, Energy Manager, Environmental Solutions Engineer, Industrial Energy Engineer, Measurement And Verification Engineer, Test and Balance Engineer
Financial Analysts	Conduct quantitative analyses of information affecting investment programs of public or private institutions.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Economics and Accounting — Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.</li> <li>• English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Credit Products Officer, Equity Research Analyst, Financial Analyst, Investment Analyst, Operational Risk Analyst, Planning Analyst, Real Estate Analyst, Research Analyst, Securities Analyst
Hazardous Materials Removal Workers	Identify, remove, pack, transport, or dispose of hazardous materials, including asbestos, lead-based paint, waste oil, fuel, transmission fluid, radioactive materials, or contaminated soil. Specialized training and certification in hazardous materials handling or a confined entry permit are generally required. May operate earth-moving equipment or trucks.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Abatement Worker, Asbestos Abatement Worker, Asbestos Hazard Abatement Worker, Asbestos Remover, Asbestos Worker, Decontamination / Decommissioning Operator (D & D Operator), Field Technician, Hazmat Technician (Hazardous Materials Technician), Site Worker, Waste Handling Technician
Heating and Air Conditioning Mechanics and Installers	Install, service, or repair heating and air conditioning systems in residences or commercial establishments.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	A/C Tech (Air Conditioning Technician); HVAC Installer (Heating, Ventilation, Air Conditioning Installer); HVAC Mechanic (Heating, Ventilation, Air Conditioning Mechanic); HVAC Service Tech (Heating, Ventilation, Air Conditioning Service Technician); HVAC Service Technician (Heating, Ventilation, Air Conditioning Service Technician); HVAC Specialist (Heating, Ventilation, and Air Conditioning Specialist); HVAC Technician (Heating, Ventilation, Air Conditioning Technician); HVAC Technician (Heating, Ventilation, and Air Conditioning Technician); Service Technician; Systems Mechanic

## Green Construction Jobs

With the focus on sustainable construction methods, this sector focuses on the key areas of building or retro fitting buildings to optimize for human and environmental health, sustainable site development, water savings, energy efficiency, renewable materials selection and indoor environmental quality.

title	characteristics	Skills	key word
Insulation Workers, Floor, Ceiling, and Wall	Line and cover structures with insulating materials. May work with batt, roll, or blown insulation materials.	<ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> </ul> Education : These occupations usually require a high school diploma. Related Experience: Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public. Job Training : Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.	Attic Blower, Installer, Insulation Estimator, Insulation Installer, Insulation Mechanic, Insulation Worker, Insulator, Retrofit Installer, Spray Foam Installer, Warehouse Insulation Worker
Landscape Architects	Plan and design land areas for projects such as parks and other recreational facilities, airports, highways, hospitals, schools, land subdivisions, and commercial, industrial, and residential sites.	Knowledge: <ul style="list-style-type: none"> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> </ul> Education: Most of these occupations require a four-year bachelor's degree, but some do not. Related Experience : A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified. Job Training Employees: in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.	Designer, Director of Landscape Architecture and Planning, Golf Course Architect, Land Planner, Landscape Architect, Landscape Architect and Planner, Landscape Designer, Planner, Project Landscape Architect, Senior Landscape Architect
Maintenance and Repair Workers, General	Perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of an establishment in repair. Duties may involve pipe fitting; boiler making; insulating; welding; machining; carpentry; repairing electrical or mechanical equipment; installing, aligning, and balancing new equipment; and repairing buildings, floors, or stairs.	Knowledge: <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> </ul> Education : Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Related Experience : Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job. Job Training: Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.	Building Maintenance Mechanic, Building Mechanic, Equipment Engineering Technician, Facilities Manager, Maintenance Engineer, Maintenance Man, Maintenance Mechanic, Maintenance Supervisor, Maintenance Technician, Maintenance Worker
Mechanical Engineers	Perform engineering duties in planning and designing tools, engines, machines, and other mechanically functioning equipment. Oversee installation, operation, maintenance, and repair of equipment such as centralized heat, gas, water, and steam systems.	Knowledge: <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> </ul> Education Most of these occupations require a four-year bachelor's degree, but some do not. Related Experience A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified. Job Training Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.	Application Engineer, Design Engineer, Design Maintenance Engineer, Equipment Engineer, Mechanical Design Engineer, Mechanical Engineer, Process Engineer, Product Engineer, Project Engineer, Test Engineer
Operating Engineers and Other Construction Equipment Operators	Operate one or several types of power construction equipment, such as motor graders, bulldozers, scrapers, compressors, pumps, derricks, shovels, tractors, or front-end loaders to excavate, move, and grade earth, erect structures, or pour concrete or other hard surface pavement. May repair and maintain equipment in addition to other duties.	Knowledge: <ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> </ul> Education: These occupations usually require a high school diploma. Related Experience: Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public. Job Training : Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.	Back Hoe Operator, Engineering Equipment Operator, Equipment Operator, Heavy Equipment Operator, Loader Operator, Machine Operator, Motor Grader Operator, Operating Engineer, Operator, Track Hoe Operator
Pipe Fitters and Steamfitters	Lay out, assemble, install, or maintain pipe systems, pipe supports, or related hydraulic or pneumatic equipment for steam, hot water, heating, cooling, lubricating, sprinkling, or industrial production or processing systems.	Knowledge: <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> Education: Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Related Experience: Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job. Job Training : Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.	Equipment Service Associate (ESA), Fire Sprinkler Service Technician, Journeyman Pipe Fitter, Journeyman Pipefitter, Machine Repairman, Pipe Fitter, Pipe Welder, Pipefitter, Sprinkler Fitter, Steamfitter

## Green Construction Jobs

With the focus on sustainable construction methods, this sector focuses on the key areas of building or retro fitting buildings to optimize for human and environmental health, sustainable site development, water savings, energy efficiency, renewable materials selection and indoor environmental quality.

title	characteristics	Skills	key word
Plumbers	Assemble, install, or repair pipes, fittings, or fixtures of heating, water, or drainage systems, according to specifications or plumbing codes.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Commercial Plumber; Drain Cleaner, Plumber; Drain Technician; Journeyman Plumber; Master Plumber; Plumber; Plumber Gasfitter; Plumbing and Heating Mechanic; Residential Plumber; Service Plumber
Power Plant Operators	Control, operate, or maintain machinery to generate electric power. Includes auxiliary equipment operators.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Auxiliary Operator, Control Operator, Control Room Operator, Multicraft Operator (MCO), Operations and Maintenance Technician (O & M Technician), Plant Control Operator, Power Plant Operator, Senior Power Plant Operator, Station Operator, Unit Operator
refrigeration Mechanics and Installers	Install and repair industrial and commercial refrigerating systems.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Ammonia Refrigeration Technician; Heating, Ventilation, Air Conditioning / Refrigeration Technician (HVAC / R Technician); Heating, Ventilation, Air Conditioning Service Technician (HVAC Service Technician); Heating, Ventilation, Air Conditioning Technician (HVAC Technician); HVAC/R Service Technician (Heating, Ventilation, and Air Conditioning/Refrigeration Service Technician); Refrigeration Mechanic; Refrigeration Operator; Refrigeration Technician; Service Technician; Transportation
Roofers	Cover roofs of structures with shingles, slate, asphalt, aluminum, wood, or related materials. May spray roofs, sidings, and walls with material to bind, seal, insulate, or soundproof sections of structures.	<ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• Education and Training — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Commercial Roofer, Industrial Roofer, Metal Roofing Mechanic, Residential Roofer, Roof Mechanic, Roof Service Technician, Roofer, Roofing Foreman, Roofing Technician, Sheet Metal Roofer
Rough Carpenters	Build rough wooden structures, such as concrete forms, scaffolds, tunnel, bridge, or sewer supports, billboard signs, and temporary frame shelters, according to sketches, blueprints, or oral instructions.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Apprentice Carpenter, Bridge Carpenter, Bridge Repair Crew Person, Carpenter, Form Carpenter, Journeyman Carpenter, Rough Carpenter, Union Carpenter
Sheet Metal Workers	abricate, assemble, install, and repair sheet metal products and equipment, such as ducts, control boxes, drainpipes, and furnace casings. Work may involve any of the following: setting up and operating fabricating machines to cut, bend, and straighten sheet metal; shaping metal over anvils, blocks, or forms using hammer; operating soldering and welding equipment to join sheet metal parts; or inspecting, assembling, and smoothing seams and joints of burred surfaces. Includes sheet metal duct installers who install prefabricated sheet metal ducts used for heating, air conditioning, or other purposes.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Field Installer; HVAC Sheet Metal Installer (Heating, Ventilation, and Air Conditioning Sheet Metal Installer); Journeyman Sheet Metal Worker; Sheet Metal Apprentice; Sheet Metal Fabricator; Sheet Metal Foreman; Sheet Metal Installer; Sheet Metal Layout Mechanic; Sheet Metal Mechanic; Sheet Metal Worker

## Green Construction Jobs

**With the focus on sustainable construction methods, this sector focuses on the key areas of building or retro fitting buildings to optimize for human and environmental health, sustainable site development, water savings, energy efficiency, renewable materials selection and indoor environmental quality.**

title	characteristics	Skills	key word
Solderers and Brazers	Braze or solder together components to assemble fabricated metal parts, using soldering iron, torch, or welding machine and flux.	<p><b>Knowledge:</b>            Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods</p> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	: Assembly Line Brazers, Brazer, Connector, Electronic Technician, Fabricator, Production Technician, Refrigeration Brazer/Solderer, Refrigeration Specialist, Solderer, Wirer
Structural Iron and Steel Workers	Raise, place, and unite iron or steel girders, columns, and other structural members to form completed structures or structural frameworks. May erect metal storage tanks and assemble prefabricated metal buildings.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Fitter, Fitter / Welder, Iron Worker, Iron Worker Foreman, Ironworker, Rigger, Steel Fabricator, Steel Worker, Structural Steel Erector, Tower Hand
Structural Metal Fabricators and Fitters	Fabricate, position, align, and fit parts of structural metal products.	<ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Fabricator; Fitter; Fitter, Welder; Layout Man; Mill Beam Fitter; Ship Fitter; Structural Steel Fitter; Tack Welder; Weld Technician; Welder-Fabricator
Training and Development Specialists	Design and conduct training and development programs to improve individual and organizational performance. May analyze training needs.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Education and Training — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Personnel and Human Resources — Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Computer Training Specialist, Corporate Trainer, E-Learning Developer, Job Training Specialist, Management Development Specialist, Senior Instructor, Supervisory Training Specialist, Technical Trainer, Training Specialist
Urban and Regional Planners	Develop comprehensive plans and programs for use of land and physical facilities of jurisdictions, such as towns, cities, counties, and metropolitan areas.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Geography — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.</li> <li>• Communications and Media — Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	City Planner, Community Development Director, Community Development Planner, Housing Development Specialist, Housing Grant Analyst, Neighborhood Planner, Planner, Planning Director, Regional Planner, Urban Design Consultant
Welders, Cutters, and Welder Fitters	Use hand-welding or flame-cutting equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Use hand-welding or flame-cutting equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products.

## Green Manufacturing Jobs

Green products must first be created and it is this sector that focuses on the green manufacturing careers. It will also cover the creation of green technologies and efforts associated to the energy efficient manufacturing processes that help reduce waste and lowers costs. Green or "sustainable" manufacturing companies make products that reduce or fix pollution and/or use processes that do not pollute, conserve energy and natural resources, are safe for employees, communities and customers, and make a profit for the company. This sector covers activities related to industrial manufacturing of green technology as well as energy efficient manufacturing processes. Sustainable manufactured products improve energy efficiency, produce renewable energy and reduce pollution. Examples of sustainable products are photovoltaic (PV) solar panels, wind turbines, electric or hybrid vehicles, and all of the parts used to build these products. Sustainable manufactured products also include every-day products like toilet paper made from recycled paper, dish detergent made with non-toxic ingredients and printer-ink made from soy.

title	characteristics	Skills & Knowledge	Key word
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	Assemble, fit, fasten, and install parts of airplanes, space vehicles, or missiles, such as tails, wings, fuselage, bulkheads, stabilizers, landing gear, rigging and control equipment, or heating and ventilating systems.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Education and Training — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	A&P Technician (Airframe and Powerplant Technician), Aircraft Line Assembler, Assembler, Assembly Riveter, Fabricator, Helicopter Technician, Sheet Metal Assembler and Riveter (SMAR), Sheet Metal Mechanic, Structures Mechanic, Structures Technician
Biochemical Engineers	Develop usable, tangible products, using knowledge of biology, chemistry, or engineering. Solve problems related to materials, systems, or processes that interact with humans, plants, animals, microorganisms, or biological materials	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Biology — Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Engineering Director, Process Engineer
Chemical Equipment Operators and Tenders	Operate or tend equipment to control chemical changes or reactions in the processing of industrial or consumer products. Equipment used includes devulcanizers, steam-jacketed kettles, and reactor vessels.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Chemical Operator, Chlorination Operator, Multiskill Operator, Operator, Outside Operator, Process Operator, Production Operator, Production Technician, Spray Dry Operator, Vessel Operator
Chemical Plant and System Operators	Control or operate entire chemical processes or system of machines.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Chemical Operator, Loader Technician, Machine Operator, Operations Technician, Operator, Process Control Operator, Process Development Associate, Process Operator, Process Technician, Production Technician
Chemical Technicians	Conduct chemical and physical laboratory tests to assist scientists in making qualitative and quantitative analyses of solids, liquids, and gaseous materials for research and development of new products or processes, quality control, maintenance of environmental standards, and other work involving experimental, theoretical, or practical application of chemistry and related sciences.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Chemical Analyst, Chemical Technician, Formulation Technician, Laboratory Analyst (Lab Analyst), Laboratory Technician (Lab Tech), Laboratory Tester (Lab Tester), Organic Preparation Analyst (Organic Prep Analyst), Quality Control Technician (QC Technician), Research Technician, Water Quality Technician
Chemists	Conduct qualitative and quantitative chemical analyses or experiments in laboratories for quality or process control or to develop new products or knowledge.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Air Quality Chemist, Analytical Chemist, Chemical Laboratory Scientist, Chemist, Forensic Chemist, Forensic Scientist, Quality Control Chemist (QC Chemist), Research Chemist, Scientist, Senior Chemist

## Green Manufacturing Jobs

Green products must first be created and it is this sector that focuses on the green manufacturing careers. It will also cover the creation of green technologies and efforts associated to the energy efficient manufacturing processes that help reduce waste and lowers costs. Green or "sustainable" manufacturing companies make products that reduce or fix pollution and/or use processes that do not pollute, conserve energy and natural resources, are safe for employees, communities and customers, and make a profit for the company. This sector covers activities related to industrial manufacturing of green technology as well as energy efficient manufacturing processes. Sustainable manufactured products improve energy efficiency, produce renewable energy and reduce pollution. Examples of sustainable products are photovoltaic (PV) solar panels, wind turbines, electric or hybrid vehicles, and all of the parts used to build these products. Sustainable manufactured products also include every-day products like toilet paper made from recycled paper, dish detergent made with non-toxic ingredients and printer-ink made from soy.

title	characteristics	Skills & Knowledge	Key word
Commercial and Industrial Designers	Develop and design manufactured products, such as cars, home appliances, and children's toys. Combine artistic talent with research on product use, marketing, and materials to create the most functional and appealing product design.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Design Engineer, Designer, Engineer, Industrial Designer, Mechanical Designer, Product Design Engineer, Product Designer, Product Development Engineer, Product Engineer, Project Engineer
Computer-Controlled Machine Tool Operators, Metal and Plastic	Operate computer-controlled machines or robots to perform one or more machine functions on metal or plastic work pieces.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Brake Press Operator; Computer Numerical Control Lathe Operator (CNC Lathe Operator); Computer Numerical Control Machine Operator (CNC Machine Operator); Computer Numerical Control Machinist (CNC Machinist); Computer Numerical Control Mill Operator (CNC Mill Operator); Computer Numerical Control Operator (CNC Operator); Computer Numerical Control Set-Up and Operator (CNC Set-Up and Operator); Machine Operator; Machine Set-Up, Operator; Machinist
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	Set up, operate, or tend machines to saw, cut, shear, slit, punch, crimp, notch, bend, or straighten metal or plastic material.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Die Setter, Fabrication Operator, Machine Operator, Machine Setter, Operator, Press Operator, Punch Press Operator, Saw Operator, Set-Up Operator, Silter Operator
Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic	Set up, operate, or tend drilling machines to drill, bore, ream, mill, or countersink metal or plastic work pieces.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Bore Mill Operator, Computer Numerical Control Drilling Operator (CNC Drilling Operator), Drill Operator, Drill Press Operator, Drill Setup Operator, Driller, Machine Operator, Machinist, Punch Operator, Radial Drill Operator
Electrical and Electronics Repairers, Commercial and Industrial Equipment	Repair, test, adjust, or install electronic equipment, such as industrial controls, transmitters, and antennas.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Control Technician, Electrical and Instrument Mechanic, Electrical and Instrument Technician (E&T Tech), Electrical Maintenance Technician, Electrical Technician, I&C Tech (Instrument and Control Technician), Instrument and Electrical Technician (I&E Tech), Repair Technician, Service Technician, Technical Support Specialist
Electrical Engineering Technicians	Test or modify developmental or operational electrical machinery or electrical control equipment and circuitry in industrial or commercial plants or laboratories. Usually work under direction of engineers or technologists.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Electrical Engineering Technician, Electrical Technician, Engineering Assistant, Engineering Technician, Generation Technician, Instrument and Controls Technician (I & C Technician), Relay Tester, Results Technician, Test Specialist, Test Technician
Electrical Engineering Technologists	Assist electrical engineers in such activities as process control, electrical power distribution, or instrumentation design. May prepare layouts of electrical transmission or distribution systems, supervise the flow of work, estimate project costs, or participate in research studies.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Design Tech; Electrical Tech/Project Manager; Engineering Tech; Engineering Technologist; Senior Analysis Specialist; Senior Engineering Tech; Senior Process Control Tech; Technologist; Technologist Electronic Design or Technical Director; Technologist, Development

## Green Manufacturing Jobs

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title	characteristics	Skills & Knowledge	Key word
Electromechanical Engineering Technologists	Assist electromechanical engineers in such activities as computer-based process control, instrumentation, or machine design. May prepare layouts of machinery or equipment, plan the flow of work, conduct statistical studies, or analyze production costs.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Sample of reported job titles: Designer, Engineering Specialist, Engineering Tech, Instrumentation and Electrical Preventive Maintenance Inspector IE PM Inspector, Process Control Tech, R&D Lab Technician, Senior Design Engineering Specialist, Senior Designer, Senior Mechanical Designer, Senior Tech Manufacturing Engineering
Electronics Engineering Technicians	Lay out, build, test, troubleshoot, repair, and modify developmental and production electronic components, parts, equipment, and systems, such as computer equipment, missile control instrumentation, electron tubes, test equipment, and machine tool numerical controls, applying principles and theories of electronics, electrical circuitry, engineering mathematics, electronic and electrical testing, and physics. Usually work under direction of engineering staff.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Digital Tech (Digital Technician), Electrical Technician, Electronics Engineering Technician, Electronics Technician, Engineering Technician (Engineering Tech), Failure Analysis Technician (FA Technician), Refurbish Technician (Refurb Tech), Senior Electronics Technician, Technician, Test Technician
Engine and Other Machine Assemblers	Construct, assemble, or rebuild machines, such as engines, turbines, and similar equipment used in such industries as construction, extraction, textiles, and paper manufacturing.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Assembler, Assembly Line Worker, Cell Technician, Engine Assembler, Engine Builder, Field Service Technician, Fitter, Large Engine Assembler, Machine Assembler, Mechanical Assembler
First-Line Supervisors of Mechanics, Installers, and Repairers	Directly supervise and coordinate the activities of mechanics, installers, and repairers.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Crew Leader, Electrical Foreman, Facilities Manager, Facility Maintenance Supervisor, Maintenance Foreman, Maintenance Manager, Maintenance Planner, Maintenance Supervisor, Production Crew Supervisor, Superintendent
First-Line Supervisors of Production and Operating Workers	Directly supervise and coordinate the activities of production and operating workers, such as inspectors, precision workers, machine setters and operators, assemblers, fabricators, and plant and system operators.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Personnel and Human Resources — Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Supervisor, Department Manager, Manufacturing Supervisor, Molding Supervisor, Plant Manager, Production Manager, Production Supervisor, Shift Supervisor, Supervisor, Team Leader
Industrial Engineering Technicians	Apply engineering theory and principles to problems of industrial layout or manufacturing production, usually under the direction of engineering staff. May perform time and motion studies on worker operations in a variety of industries for purposes such as establishing standard production rates or improving efficiency.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Sample of reported job titles: Engineering Technician, Industrial Engineering Analyst, Industrial Engineering Technician, Manufacturing Technician, Methods Engineer, Process Documentation and Methods Analyst, Process Engineer, Process Technician, Production Staff Worker, Quality Control Engineering Technician (QC Engineering Technician)

## Green Manufacturing Jobs

Green products must first be created and it is this sector that focuses on the green manufacturing careers. It will also cover the creation of green technologies and efforts associated to the energy efficient manufacturing processes that help reduce waste and lowers costs. Green or "sustainable" manufacturing companies make products that reduce or fix pollution and/or use processes that do not pollute, conserve energy and natural resources, are safe for employees, communities and customers, and make a profit for the company. This sector covers activities related to industrial manufacturing of green technology as well as energy efficient manufacturing processes. Sustainable manufactured products improve energy efficiency, produce renewable energy and reduce pollution. Examples of sustainable products are photovoltaic (PV) solar panels, wind turbines, electric or hybrid vehicles, and all of the parts used to build these products. Sustainable manufactured products also include every-day products like toilet paper made from recycled paper, dish detergent made with non-toxic ingredients and printer-ink made from soy.

title	characteristics	Skills & Knowledge	Key word
Industrial Engineering Technologists	Assist industrial engineers in such activities as quality control, inventory control, or material flow methods. May conduct statistical studies or analyze production costs.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resource</li> </ul> <p>Education : Most of these occupations require a four-year bachelor's degree, but some do not.            Related Experience: A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.            Job Training: Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Associate Product Integrity Engineer; Head of Operation and Logistics; Liaison Engineer; Manager, Asset Management; Materials Planner/Production Planner; Planner/Scheduler; Production Control Supervisor; Quality Management Coordinator; Quality Tech; Senior Quality Methods Specialist
Industrial Machinery Mechanics	Repair, install, adjust, or maintain industrial production and processing machinery or refinery and pipeline distribution systems.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p>Education : Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.            Related Experience: Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.            Job Training: Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Fixer, Industrial Machinery Mechanic, Industrial Mechanic, Loom Fixer, Machine Adjuster, Maintenance Mechanic, Maintenance Technician, Master Mechanic, Mechanic, Overhauler
Industrial Production Managers	Plan, direct, or coordinate the work activities and resources necessary for manufacturing products in accordance with cost, quality, and quantity specifications.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Personnel and Human Resources — Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.</li> </ul> <p>Education : Most of these occupations require a four-year bachelor's degree, but some do not.            Related Experience : A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.            Job Training: Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Area Plant Manager, General Production Manager, Manufacturing Coordinator, Manufacturing Manager, Plant Manager, Plant Senior Manager, Product Line Manager, Production Control Manager, Production Manager, Sub Plant Manager  Also see: Quality Control Systems Managers, Geothermal Production Managers, Biofuels Production Managers, Biomass Power Plant Managers, Methane/Landfill Gas Collection System Operators, Hydroelectric Production Managers
Industrial Safety and Health Engineers	Plan, implement, and coordinate safety programs, requiring application of engineering principles and technology, to prevent or correct unsafe environmental working conditions.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> </ul> <p>Education : Most of these occupations require a four-year bachelor's degree, but some do not.            Related Experience: A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.            Job Training: Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Chief Security and Safety Officer (CSO); Corporate Health, Safety, and Occupational Toxicology Director; Corporate Health, Safety, and Security Manager; Environmental Affairs, Safety, and Security Manager; Environmental Health and Safety Director (EHS Director); Environmental Safety Specialist; Health and Safety Manager; Health, Safety, and Environment Manager; Safety and Health Consultant; Safety, Health, and Environment Vice President
Inspectors, Testers, Sorters, Samplers, and Weighers	Inspect, test, sort, sample, or weigh nonagricultural raw materials or processed, machined, fabricated, or assembled parts or products for defects, wear, and deviations from specifications. May use precision measuring instruments and complex test equipment.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p>Education : These occupations usually require a high school diploma.            Related Experience: Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.            Job Training: Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Inspector, Picker / Packer, Quality Assurance Auditor, Quality Assurance Inspector, Quality Assurance Technician, Quality Auditor, Quality Control Inspector, Quality Control Technician, Quality Inspector, Quality Technician
Logistics Analysts	Analyze product delivery or supply chain processes to identify or recommend changes. May manage route activity including invoicing, electronic bills, and shipment tracing.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p>Education : Most of these occupations require a four-year bachelor's degree, but some do not.            Related Experience: A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.            Job Training: Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Global Logistics Analyst, Logistics Analyst, Supply Chain Analyst
Logistics Engineers	Design or analyze operational solutions for projects such as transportation optimization, network modeling, process and methods analysis, cost containment, capacity enhancement, routing and shipment optimization, or information management.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models</li> </ul> <p>Education : Most of these occupations require a four-year bachelor's degree, but some do not.            Related Experience : A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.            Job Training: Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Logistics Engineer, Reliability Engineer, Systems Engineer

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title	characteristics	Skills & Knowledge	Key word
Logistics Managers	Plan, direct, or coordinate purchasing, warehousing, distribution, forecasting, customer service, or planning services. Manage logistics personnel and logistics systems and direct daily operations.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Global Logistics Manager, Integrated Logistics Programs Director, Logistics Manager, Logistics Solution Manager, Supply Chain Logistics Manager
Machinists	Set up and operate a variety of machine tools to produce precision parts and instruments. Includes precision instrument makers who fabricate, modify, or repair mechanical instruments. May also fabricate and modify parts to make or repair machine tools or maintain industrial machines, applying knowledge of mechanics, mathematics, metal properties, layout, and machining procedures.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Gear Machinist, Journeyman Machinist, Machine Operator, Machine Repair Person, Machinist, Maintenance Machinist, Maintenance Specialist, Production Machinist, Set-Up Machinist, Tool Room Machinist
Maintenance and Repair Workers, General	Perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of an establishment in repair. Duties may involve pipe fitting; boiler making; insulating; welding; machining; carpentry; repairing electrical or mechanical equipment; installing, aligning, and balancing new equipment; and repairing buildings, floors, or stairs.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Building Maintenance Mechanic, Building Mechanic, Equipment Engineering Technician, Facilities Manager, Maintenance Engineer, Maintenance Man, Maintenance Mechanic, Maintenance Supervisor, Maintenance Technician, Maintenance Worker
Manufacturing Engineers	Design, integrate, or improve manufacturing systems or related processes. May work with commercial or industrial designers to refine product designs to increase productivity and decrease costs.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Facility Engineer, Manufacturing Director, Manufacturing Engineer, Manufacturing Engineering Manager, Plant Engineer, Process Engineer
Manufacturing Production Technicians	Set up, test, and adjust manufacturing machinery or equipment, using any combination of electrical, electronic, mechanical, hydraulic, pneumatic, or computer technologies.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Research and Development Machinist
Materials Scientists	Research and study the structures and chemical properties of various natural and synthetic or composite materials, including metals, alloys, rubber, ceramics, semiconductors, polymers, and glass. Determine ways to strengthen or combine materials or develop new materials with new or specific properties for use in a variety of products and applications. Includes glass scientists, ceramic scientists, metallurgical scientists, and polymer scientists.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Materials Scientist, Micro Electrical/Mechanical Systems Device Scientist (MEMS Device Scientist), Polymer Materials Consultant, Research and Development Scientist (R and D Scientist), Research Scientist, Senior Materials Scientist, Staff Research Scientist, Staff Scientist, Technology Officer, Vice President Research

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title	characteristics	Skills & Knowledge	Key word
Mechanical Engineering Technologists	Assist mechanical engineers in such activities as generation, transmission, or use of mechanical or fluid energy. Prepare layouts of machinery or equipment or plan the flow of work. May conduct statistical studies or analyze production costs.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	AD Designer (Computer Aided Design Designer), Engineer Technical Staff, Engineering Tech, Engineering Technologist, Mechanical Designer, Mechanical Designer/Wind-Chill Administrator, Senior Designer, Senior Process Analyst, Technical Staff Engineer, Tooling Engineering Tech
Mechatronics Engineers	Research, design, develop, or test automation, intelligent systems, smart devices, or industrial systems control.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Automation Engineer, Automation Specialist, Controls Engineer, Development Engineer, Equipment Engineer, Principal Engineer, Process Engineer, Project Engineer, Senior Design Engineer, Senior Project Engineer
Millwrights	Install, dismantle, or move machinery and heavy equipment according to layout plans, blueprints, or other drawings.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Sample of reported job titles: Maintenance Mechanic, Maintenance Millwright, Millwright, Millwright Instructor, Precision Millwright
Mixing and Blending Machine Setters, Operators, and Tenders	Set up, operate, or tend machines to mix or blend materials, such as chemicals, tobacco, liquids, color pigments, or explosive ingredients.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Blender, Blending Technician, Coater Operator, Ink Blender, Ink Maker, Issuing Operator, Machine Operator, Mixer, Mixer Operator, Stock Preparation Operator (Stock Prep Operator)
Nanosystems Engineers	Design, develop, or supervise the production of materials, devices, or systems of unique molecular or macromolecular composition, applying principles of nanoscale physics and electrical, chemical, or biological engineering.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Advanced Research Programs Director, Microarray Operations Vice President, Research Scientist, Scientist, Technical Programs Manager
Occupational Health and Safety Specialists	Review, evaluate, and analyze work environments and design programs and procedures to control, eliminate, and prevent disease or injury caused by chemical, physical, and biological agents or ergonomic factors. May conduct inspections and enforce adherence to laws and regulations governing the health and safety of individuals. May be employed in the public or private sector. Includes environmental protection officers.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Education and Training — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Certified Industrial Hygienist; Chief Safety Officer; Corporate Safety Director; Director Employee Safety and Health; Environmental Health and Safety Manager; Environmental, Health, and Safety EHS Officer; Health and Safety Manager; Risk Control Consultant; Safety Consultant; Safety Specialist

## Green Manufacturing Jobs

Green products must first be created and it is this sector that focuses on the green manufacturing careers. It will also cover the creation of green technologies and efforts associated to the energy efficient manufacturing processes that help reduce waste and lowers costs. Green or "sustainable" manufacturing companies make products that reduce or fix pollution and/or use processes that do not pollute, conserve energy and natural resources, are safe for employees, communities and customers, and make a profit for the company. This sector covers activities related to industrial manufacturing of green technology as well as energy efficient manufacturing processes. Sustainable manufactured products improve energy efficiency, produce renewable energy and reduce pollution. Examples of sustainable products are photovoltaic (PV) solar panels, wind turbines, electric or hybrid vehicles, and all of the parts used to build these products. Sustainable manufactured products also include every-day products like toilet paper made from recycled paper, dish detergent made with non-toxic ingredients and printer-ink made from soy.

title	characteristics	Skills & Knowledge	Key word
Occupational Health and Safety Technicians	Collect data on work environments for analysis by occupational health and safety specialists. Implement and conduct evaluation of programs designed to limit chemical, physical, biological, and ergonomic risks to workers.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Education and Training — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Construction Safety Consultant; Consultant; Director of Safety; Environmental, Health, and Safety EHS Leader; Health and Safety Tech; Plant Safety Leader; Project Manager, Senior; Safety Professional, Industrial Hygiene Consultant; Safety Specialist; Senior Environmental, Health and Safety Professional
Photonics Engineers	Design technologies specializing in light information or light energy, such as laser or fiber optics technology.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Laser Engineer, Optical Design Engineer, Optical Engineer, Optical Engineering Manager, Optical Scientist, Optical Systems Engineer, Optoelectronics Engineer, Process Engineering and Metrology Manager, System Engineer, Technology Director
Photonics Technicians	Build, install, test, or maintain optical or fiber optic equipment, such as lasers, lenses, or mirrors, using spectrometers, interferometers, or related equipment.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Sample of reported job titles: Coating Manager, Engineering Technician (Engineering Tech), Engineering Technologist, Fiber Optics Technician, Laser Technician, Lead Technician, Optomechanical Technician, Photonic Laboratory Technician (Photonic Lab Tech), Photonics Technician, Ruling Technicia
Production, Planning, and Expediting Clerks	Coordinate and expedite the flow of work and materials within or between departments of an establishment according to production schedule. Duties include reviewing and distributing production, work, and shipment schedules; conferring with department supervisors to determine progress of work and completion dates; and compiling reports on progress of work, inventory levels, costs, and production problems.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Master Scheduler, Material Coordinator, Materials Planner, Planner, Production Assistant, Production Clerk, Production Controller, Production Planner, Production Scheduler, Scheduler
Robotics Engineers	Research, design, develop, or test robotic applications.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Associate Professor of Automation, Automation Engineer, Engineer, Plant Floor Automation Manager
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Sell goods for wholesalers or manufacturers where technical or scientific knowledge is required in such areas as biology, engineering, chemistry, and electronics, normally obtained from at least 2 years of post-secondary education.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Sales and Marketing — Knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Account Development Manager, Account Executive, Account Manager, Channel Sales Director, Distribution Sales Manager, Inside Sales Representative, Marketing Representative, Sales Director, Sales Manager, Sales Representative
Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	Set up, operate, or tend continuous flow or vat-type equipment; filter presses; shaker screens; centrifuges; condenser tubes; precipitating, fermenting, or evaporating tanks; scrubbing towers; or batch stills. These machines extract, sort, or separate liquids, gases, or solids from other materials to recover a refined product. Includes dairy processing equipment operators.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Blender / Cook, Brewer, Cellar Worker, Cheese Maker, Digester Cook, Machine Tender, Paper Machine Tender, Plant Operator, Pulper Operator, Winemaker

## Green Manufacturing Jobs

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title	characteristics	Skills & Knowledge	Key word
Sheet Metal Workers	abricate, assemble, install, and repair sheet metal products and equipment, such as ducts, control boxes, drainpipes, and furnace casings. Work may involve any of the following: setting up and operating fabricating machines to cut, bend, and straighten sheet metal; shaping metal over anvils, blocks, or forms using hammer; operating soldering and welding equipment to join sheet metal parts; or inspecting, assembling, and smoothing seams and joints of burred surfaces. Includes sheet metal duct installers who install prefabricated sheet metal ducts used for heating, air conditioning, or other purposes.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Field Installer; HVAC Sheet Metal Installer (Heating, Ventilation, and Air Conditioning Sheet Metal Installer); Journeyman Sheet Metal Worker; Sheet Metal Apprentice; Sheet Metal Fabricator; Sheet Metal Foreman; Sheet Metal Installer; Sheet Metal Layout Mechanic; Sheet Metal Mechanic; Sheet Metal Worker
Solderers and Brazers	Braze or solder together components to assemble fabricated metal parts, using soldering iron, torch, or welding machine and flux.	<p><b>Knowledge:</b></p> <p>Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</p> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Assembly Line Brazer, Brazer, Connector, Electronic Technician, Fabricator, Production Technician, Refrigeration Brazer/Solderer, Refrigeration Specialist, Solderer, Wirer
Structural Metal Fabricators and Fitters	Fabricate, position, align, and fit parts of structural metal products.	<ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Fabricator; Fitter; Fitter, Welder; Layout Man; Mill Beam Fitter; Ship Fitter; Structural Steel Fitter; Tack Welder; Weld Technician; Welder-Fabricator
Supply Chain Managers	Direct or coordinate production, purchasing, warehousing, distribution, or financial forecasting services or activities to limit costs and improve accuracy, customer service, or safety. Examine existing procedures or opportunities for streamlining activities to meet product distribution needs. Direct the movement, storage, or processing of inventory.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Global Supply Chain Director, Supply Chain Director, Supply Chain Manager, Supply Chain Vice President
Team Assemblers	Work as part of a team having responsibility for assembling an entire product or component of a product. Team assemblers can perform all tasks conducted by the team in the assembly process and rotate through all or most of them rather than being assigned to a specific task on a permanent basis. May participate in making management decisions affecting the work. Includes team leaders who work as part of the team.	<p><b>Knowledge:</b></p> <p>Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</p> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Assembler, Assembly Associate, Assembly Line Machine Operator, Assembly Line Worker, Assembly Operator, Certified Composites Technician (CCT), Fabricator, Machine Operator, Operator Technician, Production Associate
Validation Engineers	Design or plan protocols for equipment or processes to produce products meeting internal and external purity, safety, and quality requirements.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	orporate Quality Engineer, Corporate Quality Manager, Quality and Reliability Engineer, Quality Assurance Engineer, Quality Coordinator, Quality Director, Quality Engineer, Quality Specialist, Supplier Quality Engineer, Validation Specialist
Welders, Cutters, and Welder Fitters	Use hand-welding or flame-cutting equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Use hand-welding or flame-cutting equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products.

## Green Transportation Jobs

Transportation is critical in moving goods and people from point to point. The green job sector of transportation focuses on lessening the environmental impact and increasing efficiency of the different types of transportation such as trucking, shipping, mass transit, air and rail.

title	characterstics	Skills	key word
Aerospace Engineers	Perform engineering duties in designing, constructing, and testing aircraft, missiles, and spacecraft. May conduct basic and applied research to evaluate adaptability of materials and equipment to aircraft design and manufacture. May recommend improvements in testing equipment and techniques.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Aeronautical Engineer, Aerospace Engineer, Aerospace Stress Engineer, Avionics Engineer, Design Engineer, Flight Controls Engineer, Flight Test Engineer, Structural Analysis Engineer, Systems Engineer, Test Engineer
Automotive Engineers	Develop new or improved designs for vehicle structural members, engines, transmissions, or other vehicle systems, using computer-assisted design technology. Direct building, modification, or testing of vehicle or components.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Chief Engineer; Development System Efficiency Manager; Dimensional Integration Engineer; Director of Engineering, Quality & Program Management; Director, Product Safety; Product Engineer; Senior Engineering Team Leader; Senior Project Engineer; Technical Services Manager; Technical Specialist
Automotive Specialty Technicians	Repair only one system or component on a vehicle, such as brakes, suspension, or radiator.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	A/C Technician (Air Conditioning Technician), Automobile Mechanic (Auto Mechanic), Automobile Technician, Automotive Technician (Auto Technician), Drivability Technician, Heavy Line Technician, Lube Technician, Oil Bay Technician, Quick Service Technician, Service Technician
Bus and Truck Mechanics and Diesel Engine Specialists	Diagnose, adjust, repair, or overhaul buses and trucks, or maintain and repair any type of diesel engines. Includes mechanics working primarily with automobile or marine diesel engines.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Bus Mechanic, Diesel Mechanic, Diesel Technician, Fleet Mechanic, General Repair Mechanic, Mechanic, Service Technician, Trailer Mechanic, Transit Mechanic, Truck Mechanic
Electronics Engineers, Except Computer	Research, design, develop, or test electronic components and systems for commercial, industrial, military, or scientific use employing knowledge of electronic theory and materials properties. Design electronic circuits and components for use in fields such as telecommunications, aerospace guidance and propulsion control, acoustics, or instruments and controls.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Design Engineer, Electronics Design Engineer, Engineering Manager, Evaluation Engineer, Integrated Circuit Design Engineer (IC Design Engineer), Product Engineer, Radio Frequency Engineer (RF Engineer), Research and Development Engineer (R&D Engineer), Test Engineer, Test Engineering Manager

## Green Transportation Jobs

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title	characterstics	Skills	key word
Freight Forwarders	Research rates, routings, or modes of transport for shipment of products. Maintain awareness of regulations affecting the international movement of cargo. Make arrangements for additional services, such as storage or inland transportation.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Clerical — Knowledge of administrative and clerical procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and other office procedures and terminology.</li> </ul> <p><b>Education :</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Account Manager, Air Export Agent, Air Export Coordinator, Export Coordinator, GSA Coordinator, Ocean Export Coordinator, Ocean Forwarder, Relocation Coordinator, Route Specialist, Special Services Agent
Fuel Cell Engineers	Design, evaluate, modify, or construct fuel cell components or systems for transportation, stationary, or portable applications.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and model</li> </ul> <p><b>Education.</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Director, Hydrogen Storage Engineering; Division Director; Engineering Professor; Professor of Chemical Engineering; Research Engineer; Scientist/Engineer; Senior Engineer; Senior Research Engineer; Senior Scientist; Senior Stack Engineer
Fuel Cell Technicians	Install, operate, or maintain integrated fuel cell systems in transportation, stationary, or portable applications.	n.a.	n.a.
Locomotive Engineers	Drive electric, diesel-electric, steam, or gas-turbine-electric locomotives to transport passengers or freight. Interpret train orders, electronic or manual signals, and railroad rules and regulations.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• Education and Training — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p><b>Education :</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Conductor, Conductor/Engineer, Engineer/Conductor, Locomotive Engineer, Passenger Locomotive Engineer, Railroad Engineer, Through Freight Engineer, Train Engineer, Trainmaster, Transportation Specialist
Logistics Analysts	Analyze product delivery or supply chain processes to identify or recommend changes. May manage route activity including invoicing, electronic bills, and shipment tracing.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Global Logistics Analyst, Logistics Analyst, Supply Chain Analyst
Logistics Engineers	Design or analyze operational solutions for projects such as transportation optimization, network modeling, process and methods analysis, cost containment, capacity enhancement, routing and shipment optimization, or information management.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience :</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Logistics Engineer, Reliability Engineer, Systems Engineer

## Green Transportation Jobs

Transportation is critical in moving goods and people from point to point. The green job sector of transportation focuses on lessening the environmental impact and increasing efficiency of the different types of transportation such as trucking, shipping, mass transit, air and rail.

title	characterstics	Skills	key word
Logistic Manager	Plan, direct, or coordinate purchasing, warehousing, distribution, forecasting, customer service, or planning services. Manage logistics personnel and logistics systems and direct daily operations.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• <b>Transportation</b> — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• <b>Administration and Management</b> — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• <b>Production and Processing</b> — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• <b>Customer and Personal Service</b> — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Global Logistics Manager, Integrated Logistics Programs Director, Logistics Manager, Logistics Solution Manager, Supply Chain Logistics Manager
Mechanical Engineers	Perform engineering duties in planning and designing tools, engines, machines, and other mechanically functioning equipment. Oversee installation, operation, maintenance, and repair of equipment such as centralized heat, gas, water, and steam systems.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• <b>Engineering and Technology</b> — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• <b>Mathematics</b> — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• <b>Design</b> — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• <b>Mechanical</b> — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• <b>Physics</b> — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Application Engineer, Design Engineer, Design Maintenance Engineer, Equipment Engineer, Mechanical Design Engineer, Mechanical Engineer, Process Engineer, Product Engineer, Project Engineer, Test Engineer
Rail-Track Laying and Maintenance Equipment Operators	Lay, repair, and maintain track for standard or narrow-gauge railroad equipment used in regular railroad service or in plant yards, quarries, sand and gravel pits, and mines. Includes ballast cleaning machine operators and railroad bed tamping machine operators.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• <b>Transportation</b> — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• <b>Mechanical</b> — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• <b>Building and Construction</b> — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• <b>Public Safety and Security</b> — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• <b>Administration and Management</b> — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Machine Operator, Rail Maintenance Worker, Track Equipment Operator (TEO), Track Inspector, Track Laborer, Track Maintainer, Track Repairer, Track Supervisor, Track Walker, Trackman
Railroad Conductors and Yardmasters	Coordinate activities of switch-engine crew within railroad yard, industrial plant, or similar location. Conductors coordinate activities of train crew on passenger or freight trains. Yardmasters review train schedules and switching orders and coordinate activities of workers engaged in railroad traffic operations, such as the makeup or breakup of trains and yard switching.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• <b>Public Safety and Security</b> — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• <b>Transportation</b> — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• <b>Education and Training</b> — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.</li> <li>• <b>Law and Government</b> — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Agent; Conductor; Conductor and Engineer; Conductor, Freight; Conductor/Brakeman; Freight Conductor; Railroad Conductor; Train Master; Trainman; Yardmaster
Supply Chain Managers	Direct or coordinate production, purchasing, warehousing, distribution, or financial forecasting services or activities to limit costs and improve accuracy, customer service, or safety. Examine existing procedures or opportunities for streamlining activities to meet product distribution needs. Direct the movement, storage, or processing of inventory.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• <b>Production and Processing</b> — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• <b>Administration and Management</b> — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• <b>Transportation</b> — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• <b>Customer and Personal Service</b> — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Global Supply Chain Director, Supply Chain Director, Supply Chain Manager, Supply Chain Vice President
Transportation Engineers	Develop plans for surface transportation projects, according to established engineering standards and state or federal construction policy. Prepare designs, specifications, or estimates for transportation facilities. Plan modifications of existing streets, highways, or freeways to improve traffic flow.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• <b>Engineering and Technology</b> — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• <b>Design</b> — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• <b>Transportation</b> — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• <b>Mathematics</b> — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Project Manager, Traffic Operations Engineer, Transportation Engineer

## Green Transportation Jobs

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title	characterstics	Skills	key word
Transportation Managers	Plan, direct, or coordinate the transportation operations within an organization or the activities of organizations that provide transportation services.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• <b>Transportation</b> — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• <b>Administration and Management</b> — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• <b>Customer and Personal Service</b> — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• <b>Public Safety and Security</b> — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• <b>Personnel and Human Resources</b> — Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Director of Operations, Fleet Manager, Freight Coordinator, Global Transportation Manager, Traffic Manager, Train Operations Manager, Trainmaster, Transportation Director, Transportation Manager, Transportation Supervisor
Transportation Planners	Prepare studies for proposed transportation projects. Gather, compile, and analyze data. Study the use and operation of transportation systems. Develop transportation models or simulations.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• <b>Transportation</b> — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• <b>Law and Government</b> — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• <b>Customer and Personal Service</b> — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• <b>Geography</b> — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Planner, Planning Director, Seaport Planning Manager, Transit Planning Director, Transportation Planner
Transportation Vehicle, Equipment and Systems Inspectors, Except Aviation	Inspect and monitor transportation equipment, vehicles, or systems to ensure compliance with regulations and safety standards.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• <b>Mechanical</b> — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• <b>Transportation</b> — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• <b>Public Safety and Security</b> — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Car Inspector, Carman, Chief Mechanical Officer (CMO), Emissions Inspector, Inspector, Quality Assurance Inspector, Railroad Track Inspector, Safety Officer, Smog Technician, Transit Vehicle Inspector

## Research design and consulting

This green career sector places the focus on indirect jobs of the green economy. These careers would include activities such as green business services, energy consulting and research jobs that focus on creating new solutions for a sustainable lifestyle.

title	characterstics	Skills	key word
Aerospace Engineers	Perform engineering duties in designing, constructing, and testing aircraft, missiles, and spacecraft. May conduct basic and applied research to evaluate adaptability of materials and equipment to aircraft design and manufacture. May recommend improvements in testing equipment and techniques.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Aeronautical Engineer, Aerospace Engineer, Aerospace Stress Engineer, Avionics Engineer, Design Engineer, Flight Controls Engineer, Flight Test Engineer, Structural Analysis Engineer, Systems Engineer, Test Engineer
Arbitrators, Mediators, and Conciliators	Facilitate negotiation and conflict resolution through dialogue. Resolve conflicts outside of the court system by mutual consent of parties involved.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Psychology — Knowledge of human behavior and performance; individual differences in ability, personality, and interests; learning and motivation; psychological research methods; and the assessment and treatment of behavioral and affective disorders.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Alternative Dispute Resolution Coordinator (ADR Coordinator), Alternative Dispute Resolution Mediator (ADR Mediator), Arbitrator, Commissioner, Family Mediator, Federal Mediator, Labor Arbitrator, Mediator, Public Employment Mediator
Architects, Except Landscape and Naval	Plan and design structures, such as private residences, office buildings, theaters, factories, and other structural property.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Architect; Architectural Project Manager; Design Architect; Principal Architect; Principal, Architectural Firm; Project Architect; Senior Architect/Design Manager; Senior Architectural Designer; Senior Planner; Specifications Writer
Architectural and Engineering Managers	Plan, direct, or coordinate activities in such fields as architecture and engineering or research and development in these fields.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Chief Engineer, Civil Engineering Manager, Director of Engineering, Engineering Group Manager, Engineering Manager, Engineering Program Manager, Principal Engineer, Project Engineer, Project Engineering Manager, Project Manager
Atmospheric and Space Scientists	Investigate atmospheric phenomena and interpret meteorological data, gathered by surface and air stations, satellites, and radar to prepare reports and forecasts for public and other uses. Includes weather analysts and forecasters whose functions require the detailed knowledge of meteorology.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Geography — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Broadcast Meteorologist, Chief Meteorologist, Forecaster, General Forecaster, Hydrometeorological Technician, Meteorologist, Meteorologist-in-Charge, Science and Operations Officer (SOO), Warning Coordination Meteorologist, Weather Forecaster
Automotive Engineers	Develop new or improved designs for vehicle structural members, engines, transmissions, or other vehicle systems, using computer-assisted design technology. Direct building, modification, or testing of vehicle or components.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Chief Engineer; Development System Efficiency Manager; Dimensional Integration Engineer; Director of Engineering, Quality & Program Management.; Director, Product Safety; Product Engineer; Senior Engineering Team Leader; Senior Project Engineer; Technical Services Manager; Technical Specialist

## Research design and consulting

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title	characterstics	Skills	key word
Biochemical Engineers	Develop usable, tangible products, using knowledge of biology, chemistry, or engineering. Solve problems related to materials, systems, or processes that interact with humans, plants, animals, microorganisms, or biological materials	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Biology — Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Engineering Director, Process Engineer
Chemical Engineers	Design chemical plant equipment and devise processes for manufacturing chemicals and products, such as gasoline, synthetic rubber, plastics, detergents, cement, paper, and pulp, by applying principles and technology of chemistry, physics, and engineering.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Chemical Engineer, Development Engineer, Engineer, Engineering Scientist, Process Control Engineer, Process Development Engineer, Process Engineer, Project Engineer, Refinery Process Engineer, Scientist
Chemists	Conduct qualitative and quantitative chemical analyses or experiments in laboratories for quality or process control or to develop new products or knowledge.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software</li> </ul> <p><b>Education :</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Air Quality Chemist, Analytical Chemist, Chemical Laboratory Scientist, Chemist, Forensic Chemist, Forensic Scientist, Quality Control Chemist (QC Chemist), Research Chemist, Scientist, Senior Chemist
Civil Engineers	Perform engineering duties in planning, designing, and overseeing construction and maintenance of building structures, and facilities, such as roads, railroads, airports, bridges, harbors, channels, dams, irrigation projects, pipelines, power plants, and water and sewage systems.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	ridge/Structure Inspection Team Leader, City Engineer, Civil Engineer, Civil Engineering Manager, County Engineer, Design Engineer, Project Engineer, Railroad Design Consultant, Structural Engineer, Traffic Engineer
Commercial and Industrial Designers	Develop and design manufactured products, such as cars, home appliances, and children's toys. Combine artistic talent with research on product use, marketing, and materials to create the most functional and appealing product design.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Design Engineer, Designer, Engineer, Industrial Designer, Mechanical Designer, Product Design Engineer, Product Designer, Product Development Engineer, Product Engineer, Project Engineer
Customer Service Representatives	Interact with customers to provide information in response to inquiries about products and services and to handle and resolve complaints.	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Clerical — Knowledge of administrative and clerical procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and other office procedures and terminology.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience :</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Account Manager, Account Representative, Call Center Representative, Client Services Representative, Customer Care Representative (CCR), Customer Service Agent, Customer Service Representative (Customer Service Rep), Customer Service Specialist, Member Services Representative, Sales Facilitator

## Research design and consulting

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title	characterstics	Skills	key word
Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	Inspect, test, repair, or maintain electrical equipment in generating stations, substations, and in-service relays.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Apparatus Lineman, Electrical and Instrumentation Technician (E & I Technician), Heavy Equipment Technician, Instrument and Control Technician (I & C Technician), Meter / Relay Technician, Relay Technician, Substation Electrician, Substation Mechanic, Substation Technician, Wireman
Electrical Engineering Technologists	Assist electrical engineers in such activities as process control, electrical power distribution, or instrumentation design. May prepare layouts of electrical transmission or distribution systems, supervise the flow of work, estimate project costs, or participate in research studies.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training :</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Design Tech; Electrical Tech/Project Manager; Engineering Tech; Engineering Technologist; Senior Analysis Specialist; Senior Engineering Tech; Senior Process Control Tech; Technologist; Technologist Electronic Design or Technical Director; Technologist, Development
Electrical Engineers	Research, design, develop, test, or supervise the manufacturing and installation of electrical equipment, components, or systems for commercial, industrial, military, or scientific use.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Circuits Engineer, Design Engineer, Electrical Controls Engineer, Electrical Design Engineer, Electrical Engineer, Electrical Project Engineer, Instrumentation and Electrical Reliability Engineer (I&E Reliability Engineer), Power Systems Engineer, Project Engineer, Test Engineer
Electromechanical Engineering Technologists	Assist electromechanical engineers in such activities as computer-based process control, instrumentation, or machine design. May prepare layouts of machinery or equipment, plan the flow of work, conduct statistical studies, or analyze production costs.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education :</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Designer, Engineering Specialist, Engineering Tech, Instrumentation and Electrical Preventive Maintenance Inspector IE PM Inspector, Process Control Tech, R&D Lab Technician, Senior Design Engineering Specialist, Senior Designer, Senior Mechanical Designer, Senior Tech Manufacturing Engineering
Electronics Engineering Technologists	Assist electronics engineers in such activities as electronics systems and instrumentation design or digital signal processing	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Telecommunications — Knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Electronics Department Manager, Electronics Technology Department Chair, Electronics Technology Instructor, Professor
Electronics Engineers, Except Computer	Research, design, develop, or test electronic components and systems for commercial, industrial, military, or scientific use employing knowledge of electronic theory and materials properties. Design electronic circuits and components for use in fields such as telecommunications, aerospace guidance and propulsion control, acoustics, or instruments and controls.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience.</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Design Engineer, Electronics Design Engineer, Engineering Manager, Evaluation Engineer, Integrated Circuit Design Engineer (IC Design Engineer), Product Engineer, Radio Frequency Engineer (RF Engineer), Research and Development Engineer (R&D Engineer), Test Engineer, Test Engineering Manager

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title	characterstics	Skills	key word
Energy Engineers	Design, develop, or evaluate energy-related projects or programs to reduce energy costs or improve energy efficiency during the designing, building, or remodeling stages of construction. May specialize in electrical systems; heating, ventilation, and air-conditioning (HVAC) systems; green buildings; lighting; air quality; or energy procurement.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Distributed Generation Project Manager, Energy Efficiency Engineer, Energy Engineer, Energy Manager, Environmental Solutions Engineer, Industrial Energy Engineer, Measurement And Verification Engineer, Test and Balance Engineer
Financial Analysts	Conduct quantitative analyses of information affecting investment programs of public or private institutions.	<ul style="list-style-type: none"> <li>• Economics and Accounting — Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Credit Products Officer, Equity Research Analyst, Financial Analyst, Investment Analyst, Operational Risk Analyst, Planning Analyst, Real Estate Analyst, Research Analyst, Securities Analyst
Fuel Cell Engineers	Design, evaluate, modify, or construct fuel cell components or systems for transportation, stationary, or portable applications.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and model</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Director, Hydrogen Storage Engineering; Division Director; Engineering Professor; Professor of Chemical Engineering; Research Engineer; Scientist/Engineer; Senior Engineer; Senior Research Engineer; Senior Scientist; Senior Stack Engineer
Geographic Information Systems Technicians	Assist scientists, technologists, or related professionals in building, maintaining, modifying, or using geographic information systems (GIS) databases. May also perform some custom application development or provide user support.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Geography — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Cartographer, Geographic Information Systems Analyst (GIS Analyst), Geographic Information Systems Coordinator (GIS Coordinator), Geographic Information Systems Specialist (GIS Specialist), Geographic Information Systems Technician (GIS Technician), Technical Support Specialist
Geological Sample Test Technicians	Test or analyze geological samples, crude oil, or minerals to detect presence of petroleum, gas, or mineral deposits indicating potential for exploration or production or to determine physical or chemical properties to ensure that products meet quality standards.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Core Inspector, Electron Microprobe Operator, Environmental Field Services Technician, Environmental Sampling Technician, Laboratory Technician, Materials Technician, Organic Section Technical Lead, Physical Science Technician, Quality Control Technician (QC Technician), Research Associate
Geophysical Data Technicians	Measure, record, or evaluate geological data, using sonic, electronic, electrical, seismic, or gravity-measuring instruments to prospect for oil or gas. May collect or evaluate core samples or cuttings.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Exploration Manager, Field Engineer, Geological E-Logger, Geological Technician, Geoscience Technician, Geoscientist, Geotechnician, Observer, Soils Technician, Technical Assistant
Geoscientists, Except Hydrologists and Geographers	Study the composition, structure, and other physical aspects of the Earth. May use geological, physics, and mathematics knowledge in exploration for oil, gas, minerals, or underground water; or in waste disposal, land reclamation, or other environmental problems. May study the Earth's internal composition, atmospheres, oceans, and its magnetic, electrical, and gravitational forces. Includes mineralogists, crystallographers, paleontologists, stratigraphers, geodesists, and seismologists.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Geography — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Engineering Geologist, Environmental Protection Geologist, Exploration Geologist, Geological Specialist, Geologist, Geophysicist, Geoscientist, Mine Geologist, Petroleum Geologist, Project Geologist

## Research design and consulting

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title	characterstics	Skills	key word
Geospatial Information Scientists and Technologists	Research or develop geospatial technologies. May produce databases, perform applications programming, or coordinate projects. May specialize in areas such as agriculture, mining, health care, retail trade, urban planning, or military intelligence.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Geography — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Geographic Information Systems Administrator (GIS Administrator), Geographic Information Systems Analyst (GIS Analyst), Geographic Information Systems Coordinator (GIS Coordinator), Geographic Information Systems Manager (GIS Manager), Geographic Information Systems Specialist (GIS Specialist), Geographical Information System Analyst (GIS Analyst), Geospatial Intelligence Subject Matter Expert, Geospatial Program Management Officer, Resource Analyst, Technical Leader
Hydrologists	Research the distribution, circulation, and physical properties of underground and surface waters; and study the form and intensity of precipitation, its rate of infiltration into the soil, movement through the earth, and its return to the ocean and atmosphere.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Assistant Groundwater Engineer, Environmental Consultant, Groundwater Consultant, Groundwater Programs Director, Hydraulic Engineer, Hydrogeologist, Hydrologic Engineer, Hydrologist, Professor, Research Hydrologist
Industrial Engineering Technologists	Assist industrial engineers in such activities as quality control, inventory control, or material flow methods. May conduct statistical studies or analyze production costs.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resource</li> </ul> <p><b>Education :</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Associate Product Integrity Engineer; Head of Operation and Logistics; Liaison Engineer; Manager, Asset Management; Materials Planner/Production Planner; Planner/Scheduler; Production Control Supervisor; Quality Management Coordinator; Quality Tech; Senior Quality Methods Specialist
Industrial Engineers	Design, develop, test, and evaluate integrated systems for managing industrial production processes, including human work factors, quality control, inventory control, logistics and material flow, cost analysis, and production coordination.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Engineer, Engineering Manager, Industrial Engineer, Manufacturing Specialist, Operations Engineer, Plant Engineer, Process Engineer, Production Engineer, Supply Chain Engineer, Tool Engineer
Industrial Safety and Health Engineers	Plan, implement, and coordinate safety programs, requiring application of engineering principles and technology, to prevent or correct unsafe environmental working conditions.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services. .</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Chief Security and Safety Officer (CSO); Corporate Health, Safety, and Occupational Toxicology Director; Corporate Health, Safety, and Security Manager; Environmental Affairs, Safety, and Security Manager; Environmental Health and Safety Director (EHS Director); Environmental Safety Specialist; Health and Safety Manager; Health, Safety, and Environment Manager; Safety and Health Consultant; Safety, Health, and Environment Vice President
Logistics Analysts	Analyze product delivery or supply chain processes to identify or recommend changes. May manage route activity including invoicing, electronic bills, and shipment tracing.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Global Logistics Analyst, Logistics Analyst, Supply Chain Analyst

## Research design and consulting

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Logistics Engineers	Design or analyze operational solutions for projects such as transportation optimization, network modeling, process and methods analysis, cost containment, capacity enhancement, routing and shipment optimization, or information management.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Logistics Engineer, Reliability Engineer, Systems Engineer
Logistics Managers	Plan, direct, or coordinate purchasing, warehousing, distribution, forecasting, customer service, or planning services. Manage logistics personnel and logistics systems and direct daily operations.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Global Logistics Manager, Integrated Logistics Programs Director, Logistics Manager, Logistics Solution Manager, Supply Chain Logistics Manager
Manufacturing Engineers	Design, integrate, or improve manufacturing systems or related processes. May work with commercial or industrial designers to refine product designs to increase producibility and decrease costs.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Facility Engineer, Manufacturing Director, Manufacturing Engineer, Manufacturing Engineering Manager, Plant Engineer, Process Engineer
Manufacturing Production Technicians	Set up, test, and adjust manufacturing machinery or equipment, using any combination of electrical, electronic, mechanical, hydraulic, pneumatic, or computer technologies.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Research and Development Machinist
Marketing Managers	Plan, direct, or coordinate marketing policies and programs, such as determining the demand for products and services offered by a firm and its competitors, and identify potential customers. Develop pricing strategies with the goal of maximizing the firm's profits or share of the market while ensuring the firm's customers are satisfied. Oversee product development or monitor trends that indicate the need for new products and services.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Sales and Marketing — Knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Communications and Media — Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Account Supervisor, Brand Manager, Business Development Director, Business Development Manager, Commercial Lines Manager, Market Development Executive, Marketing Coordinator, Marketing Director, Marketing Manager, Product Manager
Materials Scientists	Research and study the structures and chemical properties of various natural and synthetic or composite materials, including metals, alloys, rubber, ceramics, semiconductors, polymers, and glass. Determine ways to strengthen or combine materials or develop new materials with new or specific properties for use in a variety of products and applications. Includes glass scientists, ceramic scientists, metallurgical scientists, and polymer scientists.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Materials Scientist, Micro Electrical/Mechanical Systems Device Scientist (MEMS Device Scientist), Polymer Materials Consultant, Research and Development Scientist (R and D Scientist), Research Scientist, Senior Materials Scientist, Staff Research Scientist, Staff Scientist, Technology Officer, Vice President Research

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Mechanical Engineering Technologists	Assist mechanical engineers in such activities as generation, transmission, or use of mechanical or fluid energy. Prepare layouts of machinery or equipment or plan the flow of work. May conduct statistical studies or analyze production costs.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p>Education : Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Related Experience: Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job. Job Training: Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	AD Designer (Computer Aided Design Designer), Engineer Technical Staff, Engineering Tech, Engineering Technologist, Mechanical Designer, Mechanical Designer/Wind-Chill Administrator, Senior Designer, Senior Process Analyst, Technical Staff Engineer, Tooling Engineering Tech
Mechanical Engineers	Perform engineering duties in planning and designing tools, engines, machines, and other mechanically functioning equipment. Oversee installation, operation, maintenance, and repair of equipment such as centralized heat, gas, water, and steam systems.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> </ul> <p>Education Most of these occupations require a four-year bachelor's degree, but some do not. Related Experience A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified. Job Training Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Application Engineer, Design Engineer, Design Maintenance Engineer, Equipment Engineer, Mechanical Design Engineer, Mechanical Engineer, Process Engineer, Product Engineer, Project Engineer, Test Engineer
Mechatronics Engineers	Research, design, develop, or test automation, intelligent systems, smart devices, or industrial systems control.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p>Education: Most of these occupations require a four-year bachelor's degree, but some do not. Related Experience: A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified. Job Training: Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Automation Engineer, Automation Specialist, Controls Engineer, Development Engineer, Equipment Engineer, Principal Engineer, Process Engineer, Project Engineer, Senior Design Engineer, Senior Project Engineer
Nanosystems Engineers	Design, develop, or supervise the production of materials, devices, or systems of unique molecular or macromolecular composition, applying principles of nanoscale physics and electrical, chemical, or biological engineering.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p>Education: Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree). Related Experience: Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job. Job Training: Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Advanced Research Programs Director, Microarray Operations Vice President, Research Scientist, Scientist, Technical Programs Manager
Occupational Health and Safety Specialists	Review, evaluate, and analyze work environments and design programs and procedures to control, eliminate, and prevent disease or injury caused by chemical, physical, and biological agents or ergonomic factors. May conduct inspections and enforce adherence to laws and regulations governing the health and safety of individuals. May be employed in the public or private sector. Includes environmental protection officers.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Education and Training — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p>Education: Most of these occupations require a four-year bachelor's degree, but some do not. Related Experience: A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified. Job Training: Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Certified Industrial Hygienist; Chief Safety Officer; Corporate Safety Director; Director Employee Safety and Health; Environmental Health and Safety Manager; Environmental, Health, and Safety EHS Officer; Health and Safety Manager; Risk Control Consultant; Safety Consultant; Safety Specialist
Personal Financial Advisors	Advise clients on financial plans using knowledge of tax and investment strategies, securities, insurance, pension plans, and real estate. Duties include assessing clients' assets, liabilities, cash flow, insurance coverage, tax status, and financial objectives.	<p>Knowledge:</p> <ul style="list-style-type: none"> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Economics and Accounting — Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.</li> <li>• Sales and Marketing — Knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> </ul> <p>Education: Most of these occupations require a four-year bachelor's degree, but some do not. Related Experience: A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified. Job Training: Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Account Executive, Analyst, Certified Financial Planner (CFP), Financial Advisor, Financial Consultant, Financial Counselor, Financial Planner, Investment Advisor, Portfolio Manager, Registered Representative

## Research design and consulting

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title	characterstics	Skills	key word
Photonics Engineers	Design technologies specializing in light information or light energy, such as laser or fiber optics technology.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Laser Engineer, Optical Design Engineer, Optical Engineer, Optical Engineering Manager, Optical Scientist, Optical Systems Engineer, Optoelectronics Engineer, Process Engineering and Metrology Manager, System Engineer, Technology Director
Photonics Technicians	Build, install, test, or maintain optical or fiber optic equipment, such as lasers, lenses, or mirrors, using spectrometers, interferometers, or related equipment.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Sample of reported job titles: Coating Manager, Engineering Technician (Engineering Tech), Engineering Technologist, Fiber Optics Technician, Laser Technician, Lead Technician, Optomechanical Technician, Photonic Laboratory Technician (Photonic Lab Tech), Photonics Technician, Ruling Technicia
Precision Agriculture Technicians	Apply geospatial technologies, including geographic information systems (GIS) and Global Positioning System (GPS), to agricultural production or management activities, such as pest scouting, site-specific pesticide application, yield mapping, or variable-rate irrigation. May use computers to develop or analyze maps or remote sensing images to compare physical topography with data on soils, fertilizer, pests, or weather.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Biology — Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Crop Specialist, Nutrient Management Specialist, Precision Agriculture Department Manager, Precision Agronomist, Precision Farming Coordinator
Public Relations Specialists	Engage in promoting or creating an intended public image for individuals, groups, or organizations. May write or select material for release to various communications media.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Communications and Media — Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.</li> <li>• Sales and Marketing — Knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Account Executive, Communications Director, Communications Specialist, Corporate Communications Specialist, Media Relations Specialist, Public Affairs Specialist, Public Information Officer, Public Information Specialist, Public Relations Coordinator, Public Relations Specialist (PR Specialist)
Remote Sensing Scientists and Technologists	apply remote sensing principles and methods to analyze data and solve problems in areas such as natural resource management, urban planning, or homeland security. May develop new sensor systems, analytical techniques, or new applications for existing systems.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Geography — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Geospatial Intelligence Analyst, Remote Sensing Analyst, Remote Sensing Program Manager, Remote Sensing Scientist, Research Scientist, Scientist, Sensor Specialist
Remote Sensing Technicians	Apply remote sensing technologies to assist scientists in areas such as natural resources, urban planning, or homeland security. May prepare flight plans or sensor configurations for flight trips.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Geography — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Aerial Photo Lab Manager Digital Imaging/CAD Tech; Aerial Sensing Equipment/Camera and Lidar/Geospatial Extraction; Compiler; Digital Cartographic Technician; Geospatial Extractor, Analysis; IP/Mosaic Technician; Meteorologist Liaison; Production Manager; Project Manager; Research Associate

## Research design and consulting

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Reporters and Correspondents	Collect and analyze facts about newsworthy events by interview, investigation, or observation. Report and write stories for newspaper, news magazine, radio, or television.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Communications and Media — Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Telecommunications — Knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Anchor, General Assignment Reporter, News Director, News Reporter, Reporter, Sports Writer, Staff Writer, Television News Anchor (TV News Anchor), Television News Reporter, Television Reporter (TV Reporter)
Risk Management Specialists	Analyze and manage risk management issues by identifying, measuring, and making decisions on operational or enterprise risks for an organization.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Economics and Accounting — Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Chief Risk Officer, Credit Risk Management Director, Global Risk Management Director, Risk and Insurance Consultant, Risk Management Director, Risk Manager
Robotics Engineers	Research, design, develop, or test robotic applications.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Associate Professor of Automation, Automation Engineer, Engineer, Plant Floor Automation Manager
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Sell goods for wholesalers or manufacturers where technical or scientific knowledge is required in such areas as biology, engineering, chemistry, and electronics, normally obtained from at least 2 years of post-secondary education.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Sales and Marketing — Knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Account Development Manager, Account Executive, Account Manager, Channel Sales Director, Distribution Sales Manager, Inside Sales Representative, Marketing Representative, Sales Director, Sales Manager, Sales Representative
Securities and Commodities Traders	Buy and sell securities and commodities to transfer debt, capital, or risk. Establish and negotiate unit prices and terms of sale.	<ul style="list-style-type: none"> <li>• Economics and Accounting — Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Broker, Corporate Bond Trader, Equity Trader, Fixed Income Director, Fixed Income Trading Vice President, Investment Trader, Option Trader, Options Trader, Securities Lending Trader, Trader
Software Developers, Systems Software	Research, design, develop, and test operating systems-level software, compilers, and network distribution software for medical, industrial, military, communications, aerospace, business, scientific, and general computing applications. Set operational specifications and formulate and analyze software requirements. May design embedded systems software. Apply principles and techniques of computer science, engineering, and mathematical analysis.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Telecommunications — Knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Developer, Infrastructure Engineer, Network Engineer, Publishing Systems Analyst, Senior Software Engineer, Software Architect, Software Developer, Software Engineer, Systems Coordinator, Systems Engineer

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Supply Chain Managers	Direct or coordinate production, purchasing, warehousing, distribution, or financial forecasting services or activities to limit costs and improve accuracy, customer service, or safety. Examine existing procedures or opportunities for streamlining activities to meet product distribution needs. Direct the movement, storage, or processing of inventory.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Global Supply Chain Director, Supply Chain Director, Supply Chain Manager, Supply Chain Vice President
Training and Development Specialists	Design and conduct training and development programs to improve individual and organizational performance. May analyze training needs.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Education and Training — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Personnel and Human Resources — Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Computer Training Specialist, Corporate Trainer, E-Learning Developer, Job Training Specialist, Management Development Specialist, Senior Instructor, Supervisory Training Specialist, Technical Trainer, Trainer, Training Specialist
Transportation Planners	Prepare studies for proposed transportation projects. Gather, compile, and analyze data. Study the use and operation of transportation systems. Develop transportation models or simulations.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Geography — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Planner, Planning Director, Seaport Planning Manager, Transit Planning Director, Transportation Planner
Urban and Regional Planners	Develop comprehensive plans and programs for use of land and physical facilities of jurisdictions, such as towns, cities, counties, and metropolitan areas.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Geography — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.</li> <li>• Communications and Media — Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	City Planner, Community Development Director, Community Development Planner, Housing Development Specialist, Housing Grant Analyst, Neighborhood Planner, Planner, Planning Director, Regional Planner, Urban Design Consultant
Validation Engineers	Design or plan protocols for equipment or processes to produce products meeting internal and external purity, safety, and quality requirements.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Corporate Quality Engineer, Corporate Quality Manager, Quality and Reliability Engineer, Quality Assurance Engineer, Quality Coordinator, Quality Director, Quality Engineer, Quality Specialist, Supplier Quality Engineer, Validation Specialist
Wholesale and Retail Buyers, Except Farm Products	Buy merchandise or commodities, other than farm products, for resale to consumers at the wholesale or retail level, including both durable and nondurable goods. Analyze past buying trends, sales records, price, and quality of merchandise to determine value and yield. Select, order, and authorize payment for merchandise according to contractual agreements. May conduct meetings with sales personnel and introduce new products. Includes assistant wholesale and retail buyers of nonfarm products.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Sales and Marketing — Knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Buyer, Category Manager, Grocery Buyer, Merchandise Manager, Procurement Specialist, Product Manager, Purchaser, Purchasing Coordinator, Retail Buyer, Trader

## Government & Regulatory Jobs

Green careers in this sector will focus on activities from both private and public organizations associated with pollution control, enforcement of regulations, policy creation and analysis along with advocacy for new or modified regulations.

Title	Characterstics	Skills	Key word
Agricultural Inspectors	Inspect agricultural commodities, processing equipment, and facilities, and fish and logging operations, to ensure compliance with regulations and laws governing health, quality, and safety.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Clerical — Knowledge of administrative and clerical procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and other office procedures and terminology.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Brand Inspector; Consumer Safety Inspector (CSI); Deputy Brand Inspector; Food Inspector; Food Sanitarian; Grain Inspector; Inspector; Inspector, Food Safety and Inspection Service (Inspector, FSIS); Seed and Fertilizer Specialist; Shipping Point Inspector
Arbitrators, Mediators, and Conciliators	Facilitate negotiation and conflict resolution through dialogue. Resolve conflicts outside of the court system by mutual consent of parties involved.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Psychology — Knowledge of human behavior and performance; individual differences in ability, personality, and interests; learning and motivation; psychological research methods; and the assessment and treatment of behavioral and affective disorders.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Alternative Dispute Resolution Coordinator (ADR Coordinator), Alternative Dispute Resolution Mediator (ADR Mediator), Arbitrator, Commissioner, Family Mediator, Federal Mediator, Labor Arbitrator, Mediator, Public Employment Mediator
Chief Sustainability Officers	Communicate and coordinate with management, shareholders, customers, and employees to address sustainability issues. Enact or oversee a corporate sustainability strategy.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Corporate Sustainability Process Manager; Director of Sustainability; Director of Sustainability Programs; Director of Sustainable Design; Supply Chain Manager, Sustainability and Energy; Sustainability Coordinator; Sustainability Director; Vice President, Corporate Social Responsibility and Sustainability (VP CSR and Sustainability)
Compliance Managers	Plan, direct, or coordinate activities of an organization to ensure compliance with ethical or regulatory standards.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Business Practices Supervisor; Compliance Coordinator; Compliance Engineer-Products; Compliance Manager; Compliance Officer; Compliance Review Officer; Corporate Operations Compliance Manager; Director of Compliance; Director, Global Ethics & Compliance and Assistant General Counsel; Internal Review and Audit Compliance
Construction and Building Inspectors	Inspect structures using engineering skills to determine structural soundness and compliance with specifications, building codes, and other regulations. Inspections may be general in nature or may be limited to a specific area, such as electrical systems or plumbing.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Building Code Administrator, Building Inspection Engineer, Building Inspector, Building Official, Combination Building Inspector, Construction Inspector, Construction Materials Testing Technician, Elevator Inspector, Inspector, Plumbing Inspector

## Government & Regulatory Jobs

Green careers in this sector will focus on activities from both private and public organizations associated with pollution control, enforcement of regulations, policy creation and analysis along with advocacy for new or modified regulations.

Title	Characterstics	Skills	Key word
Energy Auditors	Conduct energy audits of buildings, building systems, or process systems. May also conduct investment grade audits of buildings or systems.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> </ul> <p><b>Education:</b> Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.</p> <p><b>Related Experience:</b> Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.</p> <p><b>Job Training:</b> Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.</p>	Building Performance Consultant, Energy Auditor, Energy Consultant, Energy Rater, Home Energy Rater, Home Performance Consultant
Environmental Engineers	Research, design, plan, or perform engineering duties in the prevention, control, and remediation of environmental hazards using various engineering disciplines. Work may include waste treatment, site remediation, or pollution control technology.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	Air Pollution Control Engineer; Chief, Pesticides and Toxic Substances Branch; Environmental Analyst; Environmental Engineer; Environmental Remediation Specialist; Global Director Air and Climate Change; Hazardous Substances Engineer; Marine Engineer CPVEC (Marine Engineer Commercial Passenger Vessel Environmental Compliance); Regulatory Environmental Compliance Manager; Sanitary Engineer
Financial Analysts	Conduct quantitative analyses of information affecting investment programs of public or private institutions.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Economics and Accounting — Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> <li>• Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Credit Products Officer, Equity Research Analyst, Financial Analyst, Investment Analyst, Operational Risk Analyst, Planning Analyst, Real Estate Analyst, Research Analyst, Securities Analyst
Inspectors, Testers, Sorters, Samplers, and Weighers	Inspect, test, sort, sample, or weigh nonagricultural raw materials or processed, machined, fabricated, or assembled parts or products for defects, wear, and deviations from specifications. May use precision measuring instruments and complex test equipment.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.</li> <li>• Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Inspector, Picker / Packer, Quality Assurance Auditor, Quality Assurance Inspector, Quality Assurance Technician, Quality Auditor, Quality Control Inspector, Quality Control Technician, Quality Inspector, Quality Technician
Regulatory Affairs Managers	Plan, direct, or coordinate production activities of an organization to ensure compliance with regulations and standard operating procedures.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Medicine and Dentistry — Knowledge of the information and techniques needed to diagnose and treat human injuries, diseases, and deformities. This includes symptoms, treatment alternatives, drug properties and interactions, and preventive health-care measures.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Biology — Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Clinical Trials Systems Administrator, Global Regulatory Affairs Manager, Regulatory Affairs Director, Regulatory Affairs Manager, Regulatory Affairs Portfolio Leader, Regulatory Consultant, Regulatory Leader, Regulatory Product Manager
Regulatory Affairs Specialists	Coordinate and document internal regulatory processes, such as internal audits, inspections, license renewals, or registrations. May compile and prepare materials for submission to regulatory agencies.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Clerical — Knowledge of administrative and clerical procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and other office procedures and terminology.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Drug Regulatory Affairs Specialist, Quality Assurance/Regulatory Affairs Specialist (QA/RA Specialist), Regulatory Affairs Analyst, Regulatory Affairs Associate, Regulatory Affairs Consultant, Regulatory Affairs Specialist, Regulatory Affairs Strategy Specialist, Regulatory Associate, Regulatory Services Consultant, Regulatory Submissions Associate

## Government & Regulatory Jobs

Green careers in this sector will focus on activities from both private and public organizations associated with pollution control, enforcement of regulations, policy creation and analysis along with advocacy for new or modified regulations.

Title	Characterstics	Skills	Key word
Soil and Water Conservationists	Plan or develop coordinated practices for soil erosion control, soil or water conservation, or sound land use.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Biology — Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> <li>• Geography — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Conservationist, Environmental Analyst, Erosion Control Specialist, Land Manager, Land Reclamation Specialist, Land Resource Specialist, Resource Conservation Specialist, Resource Conservationist, Soil Conservationist, Watershed Program Manager
Sustainability Specialists	Address organizational sustainability issues, such as waste stream management, green building practices, and green procurement plans.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.</li> <li>• Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Champion of Sustainable Design; Chief Specialist, LEED (Chief Specialist, Leadership in Energy and Environmental Design); Lead Sustainability Specialist; Senior Sustainability Advisor; Senior Sustainability Consultant; Sustainability Consultant; Sustainability Coordinator; Sustainability Specialist; Sustainable Design Consultant; Sustainable Design Coordinator
Transportation Planners	Prepare studies for proposed transportation projects. Gather, compile, and analyze data. Study the use and operation of transportation systems. Develop transportation models or simulations.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.</li> <li>• Geography — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life</li> </ul> <p><b>Education:</b> Most of these occupations require a four-year bachelor's degree, but some do not.</p> <p><b>Related Experience:</b> A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</p> <p><b>Job Training:</b> Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>	Planner, Planning Director, Seaport Planning Manager, Transit Planning Director, Transportation Planner
Transportation Vehicle, Equipment and Systems Inspectors, Except Aviation	Inspect and monitor transportation equipment, vehicles, or systems to ensure compliance with regulations and safety standards.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.</li> <li>• Transportation — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.</li> <li>• Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.</li> </ul> <p><b>Education:</b> These occupations usually require a high school diploma.</p> <p><b>Related Experience:</b> Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.</p> <p><b>Job Training:</b> Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.</p>	Car Inspector, Carman, Chief Mechanical Officer (CMO), Emissions Inspector, Inspector, Quality Assurance Inspector, Railroad Track Inspector, Safety Officer, Smog Technician, Transit Vehicle Inspector
Urban and Regional Planners	Develop comprehensive plans and programs for use of land and physical facilities of jurisdictions, such as towns, cities, counties, and metropolitan areas.	<p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Law and Government — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.</li> <li>• Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.</li> <li>• Geography — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.</li> <li>• Communications and Media — Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.</li> </ul> <p><b>Education:</b> Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).</p> <p><b>Related Experience:</b> Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.</p> <p><b>Job Training:</b> Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.</p>	City Planner, Community Development Director, Community Development Planner, Housing Development Specialist, Housing Grant Analyst, Neighborhood Planner, Planner, Planning Director, Regional Planner, Urban Design Consultant