

# Technical Terms



## A

- absorb:** to take in.
- accounting:** the area in which financial affairs employees keep records of the financial transactions of the company.
- active collectors:** solar collectors that use pumps to circulate the water that collects, stores, and distributes the heat they convert from solar energy.
- activist:** an individual who uses public opinion to shape practices and societal values.
- actuating:** initiating the work related to an action plan.
- adhesive bonding:** a bonding technique that uses substances with high adhesive forces to hold parts together.
- adjusting devices:** devices that modify a system to produce better outputs.
- adjustment:** the step in the repair process in which misaligned parts are adjusted.
- advertising:** an activity that includes the print and electronic messages that promote a company or its products.
- aerobic exercise:** exercise that uses oxygen to keep large muscle groups moving continuously.
- agricultural and related biotechnologies:** the technologies used in growing food and producing natural fibers.
- agriculture:** people using materials, information, and machines to produce food and natural fibers.
- agriculture technology:** a technology that uses machines and equipment to help plant, grow, and harvest crops and to raise livestock.
- air transportation:** systems that use airplanes and helicopters to lift passengers and cargo into the air so that they can be moved from place to place.
- airfoil:** an object designed to produce some directional motion when in movement relative to the air.
- altering:** extending the useful life of a product.
- alternating current:** the flow of electrons in both directions along a conductor, reversing at regular intervals.
- alumina:** aluminum oxide. It is the input to the second phase of making aluminum.
- amplitude:** the height of a wave. It measures the strength of the wave.
- amplitude modulation:** a system that merges a message onto a carrier wave by changing the strength of the carrier signal.
- anaerobic digestion:** a controlled decaying process that takes place without oxygen.
- anaerobic exercise:** exercise that involves heavy work by a limited number of muscles.
- analytical systems:** systems that mathematically or scientifically make comparisons.
- animal husbandry:** the type of agriculture that involves breeding, feeding, and training animals.
- annealing:** a process used to soften and remove internal stress in a part.
- antibiotics:** substances derived from microorganisms that are able to kill other microorganisms.
- apogee:** the farthest distance away from the earth.
- appearance:** a factor to consider before buying a product.
- applied research:** a type of research that seeks to reach a commercial goal by selecting, using, and adapting knowledge gathered during basic research.
- apprenticeship training:** a program through which highly skilled workers are developed.
- aquaculture:** growing and harvesting water organisms in controlled conditions.
- aquifers:** underground water-bearing layers of rock, sand, or gravel.
- arbors:** spindles or shafts used to hold table saw blades and milling cutters.
- arch bridges:** bridges that use curved members to support the deck.
- architectural drawings:** documents used to specify characteristics of buildings and other structures.
- area:** the size of the surface an object covers.
- armature:** the inner magnet in an electric motor. It is an electromagnet that can rotate.

**articles of incorporation:** an application for a corporate charter.

**artifacts:** objects made by humans.

**artificial intelligence (AI):** intelligence exhibited by a manufactured device or system.

**aseptic packaging:** a process that uses heat to separately sterilize a food and its package.

**assembling:** the manufacturing process in which materials and parts are brought together to make a finished product.

**assembling processes:** processes that connect parts together to make assemblies and products.

**assembly drawings:** engineering drawings that show how parts fit together.

**audience assessment:** actions that study audience needs and wants. It is the first step in the process of communication design.

**audio:** sound.

**authority:** the right to direct actions.

**automatic control systems:** systems that can monitor, compare, and adjust a system without human interference.

**automatic transmissions:** transmissions that use valves to change hydraulic pressure so the transmission shifts its input and output ratios.

**avionics:** the instruments that help pilots monitor and properly control aircraft.

## B

**backbones:** fiber-optic communication lines built by large communications companies to connect regions in their systems.

**balance:** the design principle of having the information on both sides of a centerline appear equal in visual weight.

**baler:** a machine used to gather, compact, and contain hay.

**ballast:** extra weight added to a locomotive to give it better traction.

**band saw:** a saw that uses a blade made of a continuous strip or band of metal. These bands usually have teeth on one edge.

**barbed-wire fences:** fences consisting of wood or steel posts with strands of barbed wire attached to them.

**basic research:** a type of research that seeks knowledge for its own sake.

**bauxite:** aluminum ore.

**beam bridges:** bridges that use concrete or steel beams to support the deck.

**benefit:** a type of reward provided by a company.

**berries:** plants grown in many parts of the country and cultivated for their edible parts.

**bill of materials:** a document containing information regarding the materials and hardware needed to complete a project.

**billets:** long, square pieces of steel.

**biochemical processes:** processes that use chemical reactions caused by fungi, enzymes, or other microorganisms.

**biofuels:** organic material that can be burned or converted into methane.

**biogas:** a mixture of methane and carbon dioxide produced by the bacterial decomposition of organic wastes and used as a fuel.

**biological future:** a type of future that deals with the sorts of plant and animal life we want.

**biomass:** a type of resource having a living origin.

**biomass resource:** vegetable and animal waste generated through biological actions. It is a source of renewable energy being actively considered as an alternate energy supply.

**biotechnology:** 1. practices that improve propagation, growing, and harvesting activities. 2. using biological agents in processes to produce goods or services.

**blast furnace:** a furnace commonly used in iron smelting.

**blimp:** a lighter-than-air nonrigid airship.

**blooms:** short, rectangular pieces of steel used to produce structural shapes and rails.

**blow molding:** a process using mated dies to make bottles and jars from plastic and glass.

**blowout:** a dangerous and wasteful occurrence in which oil surges out of a well.

**board of directors:** a group of people elected to represent the interests of stockholders.

**bonding:** an assembling process that uses cohesive or adhesive forces to hold parts together.

**bonding agent:** a material used to achieve bonding.

**bonds:** debt securities sold by corporations in large denominations.

**bow thrusters:** maneuvering propellers mounted at right angles to the keels on large ships.

**brainstorming:** seeking creative solutions to an identified problem.

**broadcast frequencies:** frequencies above audible sound.

**broadcast systems:** systems that send radio waves through the air carrying the signal from the sender to the receiver.

**Bronze Age:** the stage in human history that took place after the Stone Age. During this time, farming developed, villages and towns started to appear, and copper and copper-based metal tools replaced stone tools.

**browser:** a software program that acts as an interface between a user and the World Wide Web.

**bucket:** a worker who removes the limbs and tops of trees.

**buildings:** structures erected to protect people, materials, and equipment from the outside environment.

**buoyancy:** the upward force exerted on an object immersed in a fluid.

**buttress dam:** a dam that uses its structure to hold back water.

**bylaws:** general rules under which an incorporated company will operate.

## C

**cable-wire fences:** fences that consist of 3/8-inch steel wire cables stretched from one anchor post to another.

**cam:** a pear-shaped disk with an off-center pivot point, used to change rotating motion into reciprocating motion.

**canning:** a preservation method that puts food into glass jars or metal cans.

**cant:** the square center section of a log.

**cantilever bridges:** bridges that use trusses extending out like arms.

**capacity:** the amount of a substance an object can hold.

**carrier frequency:** a frequency used by radio broadcast systems that radiates from the transmitter.

**casting:** a process through which on-camera performers are employed.

**casting and molding processes:** processes in which a liquid material is poured into a cavity in a mold, where it solidifies into the proper shape and size.

**catalyst:** a chemical agent used to cause a reaction.

**ceiling:** the inside surface at the top of a room.

**ceiling joists:** beams, resting on the outside walls and some interior walls, that support the weight of the ceiling.

**center lines:** lines that pass through the center of holes.

**central processing unit (CPU):** the heart of a computer.

**ceramic minerals:** fine-grained minerals that are formable when wet and become hard when dried or fired.

**channel:** a carrier.

**charge-coupled device (CCD):** an image-capture sensor used in most digital cameras.

**charging:** the first step in the process of making steel in a basic oxygen furnace. When being charged, the furnace tilts to one side to receive pig iron, scrap steel, and flux.

**charts:** graphic models that show relationships between people, actions, or operations.

**chemical action:** a change (for example, changing a material from a liquid to a solid) caused by adding chemicals.

**chemical conditioning:** a type of conditioning process that uses chemical actions to change the properties of a material.

**chemical energy:** energy stored within a chemical substance.

**chemical machining:** a nontraditional machining process using chemical reactions to remove material from a workpiece.

**chemical processes:** processes that break down or build up materials by changing their chemical compositions.

**chief executive officer (CEO):** the top manager in a company.

**chip removal:** a separating process using a tool to cut away excess material in the form of small pieces, or chips.

**chop saw:** a circular saw used to cut narrow strips of material to length.

**chucks:** attachments used to hold and rotate drills and router bits.

**circular saws:** saws that use a blade in the shape of a disk with teeth arranged around the edge.

- civil engineering structures:** structures such as bridges, airports, or highways that are designed by civil engineers.
- civilized conditions:** societies in which humans make tools, grow crops, engineer materials, and develop transportation systems.
- classification:** the division of a problem into major segments.
- classroom training:** a program in which specialized skills may be developed.
- clear cutting:** a logging method in which all trees, regardless of species or size, are removed from a plot of land.
- closed-loop control:** a type of control system that uses feedback.
- coal:** a combustible solid composed mostly of carbon.
- cold bonding:** a joining technique that uses extreme pressure to squeeze two parts to create a bond.
- combine:** a machine that can be used to harvest a wide range of grains and other seed crops.
- commercial aviation:** industry that makes money by transporting people and cargo in airplanes.
- commercial buildings:** buildings used for business and government purposes.
- commercial ships:** large ships used for transporting people and cargo for a profit.
- commercial structures:** buildings used to conduct business.
- commercial transportation:** enterprises that move people and goods for money.
- commission:** a salesperson's pay, consisting of a percentage of the total dollar value of goods sold by that person.
- communication and information technologies:** the technologies used in processing data into information and communicating ideas and information.
- communication processes:** processes used to produce graphic and electronic media.
- communication technology:** a system that uses technical means to transmit information or data from one place to another or from one person to another.
- composed:** designed.
- composite materials:** combinations of natural and synthetic materials that are used to create items with other desirable properties.
- compounding:** the act of mixing the parts of a fluid for casting.
- comprehensive layout:** a layout for a final design.
- computer:** an information-processing machine that has changed the way we handle information. It can store information, and its programs can be changed.
- computer models:** models produced by computers that help designers to test the effects of color on a product's appearance and acceptance, to test strengths of materials and structures, and to observe the product during normal operation.
- computer-aided design (CAD):** a computer-based system used to create, modify, and communicate a plan or product design. It reduces product design and engineering costs.
- computer-controlled machining:** a process that adds automatic control, provided by a computer program, to basic machines.
- computerized tomography:** a type of scanning that produces cross-sectional images of any part of the body without using dyes.
- conceptual models:** models that show a general view of the components and their relationships.
- conditioning processes:** those in which heat, chemicals, or mechanical forces are used to change the internal structure of a material.
- conduction:** the movement of heat through a solid material or between two solid materials that touch each other.
- conductor:** a metal that conducts an electrical current.
- constraints:** the limits on a design.
- construction processes:** the type of activities that produces structures using technological actions.
- construction technologies:** the technologies used in building structures for housing, business, transportation, and energy transmission.
- consumer:** a person who financially supports a technological system by spending money on products or services.
- consumer products:** outputs developed for end users in the product cycle.
- contact printing:** a simple procedure used to produce prints in which a negative is

placed directly on top of a piece of light-sensitive photographic paper.

**container ships:** ships that carry quantities of goods sealed in large, box-like metal containers.

**continuous manufacturing:** a manufacturing system in which a production line assembles products continuously.

**contrast:** the design principle used to emphasize portions of a message.

**control:** 1. the feedback loop that causes management and production activities to change through evaluation, feedback, and corrective action. 2. the system that makes changes in speed and direction of a vehicle possible.

**control system:** a vehicular system that controls the speed and direction of the vehicle.

**controlling:** the function of comparing system outputs to the goals.

**convection:** the transfer of heat between or within fluids.

**convergent thinking:** a type of thinking that seeks to narrow and focus ideas until the most feasible solution is found.

**conversion:** a process that changes hydrocarbon molecules into different sizes, both smaller and larger.

**conversion/processing:** the final step in agricultural practices that changes a food product into a foodstuff for human use.

**converted surface finish:** a finish on the surface of a metal that has been chemically changed to protect the metal.

**copy:** text.

**core:** the center layer of plywood.

**corporate charter:** an operating permit.

**corporate participation:** the spirit of cooperation in developing and operating a technological system.

**corporation:** a legal entity people form to own an operation. It is a business in which investors have purchased partial ownership in the form of shares of stock.

**cracking:** the process of breaking heavier hydrocarbons into smaller ones.

**crank:** a pivot pin near the outside edge of a wheel or disk that changes reciprocating motion into rotating motion.

**creative personnel:** in the theater, film, and television fields, a group of people who develop scripts and design scenery.

**creativity:** the ability to see a need or a way of making life easier and design systems and products to meet the need or desire.

**criteria:** the features a product or system must have in order to meet the expectations of the customer.

**crop production:** the type of agriculture that grows large quantities of plants for food or other uses.

**crossbands:** the layers between the faces in plywood.

**cultivator:** a machine used to control weeds. It is a series of hoe-shaped blades that are pulled through the ground.

**curing:** a technique used to preserve meat that involves adding a combination of natural ingredients to the meat.

**current technologies:** the range of techniques used to produce most products and services today.

**custom manufacturing:** a manufacturing system that involves producing a limited quantity of a product to a customer's specifications.

**cutting motion:** an action that causes material to be removed from a workpiece.

**cutting tool:** a tool used in cutting actions.

**cycle:** a complete set of motions needed to produce a surge of power.

**cylindrical grinders:** grinders that use the lathe principle to machine a material. A workpiece is held in a chuck or between centers and rotated. A grinding wheel is rotated in the opposite direction.

## D

**data:** the raw, unorganized facts and figures collected by people and machines.

**debt financing:** raising money by borrowing money from a financial institution or private investors.

**decode:** to change coded information back into a recognizable form.

**dedicated access:** a system in which a subscriber's computer is directly connected to the Internet at all times.

**degrees of freedom:** the limited number of ways or directions a vehicle can move.

**delayed outputs:** various chemicals that have accumulated over decades and are harmful to the environment.

- dental hygienists:** individuals who clean teeth and assist dentists.
- dentists:** individuals who diagnose, treat, and help prevent diseases of the teeth and gums.
- depth of field:** the range of distances in which a camera will capture objects in focus.
- descriptive methods:** methods designers use to record observations of present conditions.
- design:** the stage in which a message is developed.
- desirable outputs:** the outputs from agricultural and related biotechnology, communication and information, construction, energy and power, manufacturing, medicine, and transportation technologies that benefit people.
- desktop publishing:** a computer system that produces type and line illustration layouts for printed messages.
- detail drawings:** drawings that communicate the designer's specifications and contain all the information needed to manufacture a particular part.
- detailed sketches:** sketches that communicate the information needed to build a model of a product or structure.
- developing:** the first step in developing film in which chemicals are used to alter light-sensitive crystals in an emulsion.
- development:** the work technologists do by building products and structures to make lives better.
- diagnosis:** 1. the area of medicine that involves using knowledge, technological devices, and other means to determine the causes of abnormal body conditions. It is performed by conducting interviews, physical examinations, and medical tests. 2. the step in the repair process in which the cause of a problem is determined.
- diagrams:** graphic models that show the relationships between components in a system.
- dial-up access:** a system in which computers are connected to the Internet through a modem.
- diaphragm:** the aperture control on a camera. It regulates the amount of light that can enter at any given moment.
- dies:** forming tools made of hardened steel.
- dimension lines:** the lines between extension lines that have arrows pointing to the extension lines, indicating the range of a dimension.
- dipping:** a technique in which stock is run through a vat of molten metal.
- direct active solar system:** a type of active collector system that does not have a heat exchanger.
- direct current:** the flow of electrons in one direction through a conductor.
- direct gain solar system:** a system that allows radiant energy to enter a home through windows, heating inside surfaces.
- direct waves:** waves used by television and FM stations.
- direction:** the path that a light wave travels.
- direction control:** a type of control system that makes a vehicle change its direction.
- direct-reading measurement tools:** measurement tools an operator manipulates and reads.
- dirigibles:** rigid airships with metal frames covered with skins of fabric.
- disease:** any change that interferes with the appearance, structure, or function of the body.
- distance:** the separation between two points. It is also called *length*.
- distance multiplier:** a simple machine that increases the amount of movement applied to the work at hand.
- distribution:** physically moving a product from a producer to a consumer.
- divergent thinking:** broad thinking that lets the mind soar and seeks to create as many different solutions as possible.
- dividend:** a periodic payment to stockholders from a company's profits.
- domain name:** the address of a site on the Internet.
- domestic transportation:** transportation that takes place within the geographic boundaries of one country.
- drawing machines:** machines that pull materials through die openings to form them.
- drift mining:** a type of underground mining used when a coal vein extends to the surface of the earth. Miners dig a horizontal shaft directly into the vein.
- drilling:** the process of obtaining materials by pumping them through holes drilled into the earth.

**drilling machines:** separating machines that produce or enlarge holes using a rotating cutter for the cutting motion.

**drip irrigation:** a type of irrigation that delivers water slowly to the base of plants.

**drug:** a substance used to prevent, diagnose, or treat a disease.

**dry-cargo ships:** ships used to haul both crated and bulk cargo.

**drying:** 1. a common thermal conditioning process that removes excess moisture from materials. 2. a method used to preserve food that involves removing water from the material.

**drywall:** gypsum wallboard. It is used as an interior wall covering.

**duplex systems:** basic systems used in mobile communication that use two channels.

**dynamic process:** a process that is constantly changing or causing change.

## E

**earth orbit travel:** a type of space travel represented by communication satellites and space shuttles.

**economic activity:** an activity including all trade in goods and services paid for with money.

**economic enterprises:** institutions that design, produce, and deliver the basic goods and services required by a society.

**edger saw:** a machine that has a number of blades on a shaft.

**education:** an institution that communicates information, ideas, and skills from one person to another and from one generation to another.

**edutainment:** creating a situation in which people want to gain information.

**elastic range:** the range between a material at rest and the material's yield point.

**electric fences:** fences that use electrical charges to contain animals in a field.

**electrical and electronic controllers:** devices that control other devices to adjust operation of machines.

**electrical discharge machining:** a nontraditional process that uses electrical sparks to make a cavity in a piece of metal.

**electrical energy:** energy associated with electrons moving along a conductor.

**electrical or electronic sensors:** a type of monitoring device that can be used to determine the frequency of or changes in electric current or electromagnetic waves.

**electrocardiograph:** a type of machine that produces a visual record of the heart's electrical activity.

**electrochemical processes:** processes that break down or build up materials by changing their chemical compositions.

**electromechanical controllers:** adjusting devices that use electromagnetic coils and forces to move control linkages and operate switches to adjust machines or other devices.

**electronic commerce:** a type of commerce involving selling products and services over the Internet.

**electronic mail:** a computer-based communication tool that allows messages to move over the Internet.

**electronic publishing:** complex systems that can function as typesetting and layout systems. They produce and combine text and illustrations into one layout.

**electrostatic printing:** a process for printing that uses a machine with a special drum. A strong light is reflected off an image and onto the drum, creating an electrically charged likeness of the image on the drum's surface. It is also called *copying* or *photocopying*.

**emergency medicine:** an area that deals with unexpected illnesses and injuries.

**emerging technologies:** new technologies that are not widely employed today, but might be commonly used in a later period of time.

**emotions:** feelings that can be communicated.

**employee relations:** programs that recruit, select, develop, and reward a company's employees.

**employment:** the task that involves determining a company's need for qualified workers. It is the first action in the employee relations process.

**enamel:** a varnish that has color pigment added.

**encoding:** the step in the communication process that involves changing a message into a format that can be transmitted.

**endoscope:** a narrow, flexible tube containing a number of fiber-optic fibers that allows a physician to look inside the body.

**energy:** the ability to do work.

**energy and power technologies:** the technologies used in converting and applying energy to power devices and systems.

**energy-processing converters:** converters that process energy in various ways.

**engineer:** a person who conducts research and applies scientific and technological knowledge to the design and development of products, structures, and systems.

**engineering:** an activity that develops the specifications for products, structures, processes, and services.

**engineering drawings:** documents that communicate the basic information needed to construct a manufactured product or structure.

**entertain:** the goal of communication to amuse people as they participate in or observe events and performances.

**entrepreneurs:** people with very special talents who look beyond present practices and products and create businesses.

**entrepreneurship:** searching for opportunities for change and responding to them.

**equity financing:** raising money by selling a portion of ownership in a company.

**ergonomics:** the science of designing products and structures around the people who use them. It is also called *human factors analysis*.

**ethical drugs:** drugs prescribed by physicians and dispensed by pharmacists.

**ethical information:** information that describes the values people have regarding devices and systems.

**evaporation:** a way to extract minerals from the oceans using solar energy.

**exhaustible:** capable of being entirely used up.

**exhaustible energy resources:** materials that cannot be replaced.

**exhaustible materials:** materials that, once depleted, cannot be replaced by human action or nature.

**exosphere:** the last layer of space above the earth that blends directly into outer space.

**expendable molds:** molds that are destroyed to remove the cast item.

**expenses:** money that pays for resources.

**experimental methods:** methods designers use to compare different conditions.

**exploded views:** drawings that show the parts that make up a product, as if it were taken apart.

**extension lines:** lines that indicate the points from which measurements are taken.

**external combustion engines:** engines powered by steam.

**external storage devices:** devices on which data can be stored outside the basic computer circuitry.

**extrusion:** a process in which material is pushed through a hole in a die.

## F

**faces:** the outside layers of plywood.

**family:** an institution that provides a foundation for social and economic actions.

**fares:** the costs of tickets.

**fascia:** a type of board used to finish the ends of rafters and an overhang.

**fasteners:** devices used to hold parts together.

**feed motion:** an action that brings new material in contact with a cutting tool and allows the cutting action to be continuous.

**feedback:** the process of using information about the output of a system to regulate the inputs to the system.

**feller:** a logger who uses a chain saw to cut down appropriate trees.

**fermentation:** a technology that uses microorganisms to break down complex organic compounds into simpler substances.

**fertilizer:** a liquid, powder, or pellet that contains important chemicals that will encourage and support plant growth.

**fiberglass:** strands of glass used as the matrix for composite materials and insulation.

**fiber-optic cables:** strands of glass used to transmit voice, television, and computer data at high speeds.

**field magnet:** the stationary outer magnet used in electric motors.

**filmstrips:** a series of transparencies designed to be viewed one at a time.

**finances:** the money and credit necessary for the economic system to operate.

**financial affairs:** the activities that obtain, account for, and disburse the money and

- physical resources and maintain the financial records needed to manage a system.
- finishing:** the process in which the surface of parts and products are coated or modified to protect them or make them more appealing to consumers.
- finishing processes:** secondary processes that protect products and enhance their appearance.
- finite:** having a limited quantity.
- firing:** a thermal conditioning process used for ceramic products.
- first-class levers:** the class of levers in which the fulcrum is between the load and the effort.
- fission:** the process of splitting atoms to release vast quantities of energy.
- fixed-wing aircraft:** passenger and cargo aircraft. See *rotary-wing aircraft*.
- fixing:** the step in developing film that removes unexposed silver halide crystals remaining in the emulsion.
- flame cutting:** cutting material to size and shape using burning gases.
- flexible manufacturing:** a computer-based manufacturing system that combines the advantages of intermittent manufacturing with the advantages of continuous manufacturing.
- flexography:** an adaptation of letterpress. It uses a plastic or rubber image carrier.
- float glass:** glass that is changed into sheets for windows and similar products by floating the molten glass on a bed of molten tin.
- flood irrigation:** systems that use large quantities of water advancing across fields.
- floor joists:** beams that carry the weight of the floor.
- flow bonding:** a method of joining materials that uses a metal alloy as a bonding agent.
- flow coating:** a process that passes a product under a flowing stream of finishing material.
- fluid mining:** a mining method in which hot water is pumped down a well into a mineral deposit. The water dissolves the mineral and is forced up a second well.
- fluidic controllers:** adjusting devices that use fluids to adjust machines or other devices.
- foot-pounds:** a measurement of the amount of energy needed to move an object from one location to another.
- forage crops:** plants grown for animal feed.
- force multiplier:** a simple machine that increases the force applied to the work at hand.
- forced-air heating:** a type of system in which furnaces heat air as a conduction medium.
- forming processes:** those in which force applied by a die or roll is used to reshape materials.
- Forstner bits:** two-lipped woodcutters that produce flat-bottomed round holes.
- fossil fuels:** exhaustible resources that are mixtures of carbon and hydrogen.
- foundation:** the base of a structure.
- fractional distillation:** a process in which petroleum is pumped through tubes and heated until it becomes a series of hot liquids and vapors.
- fractionating tower:** a tower that is used to separate the different liquids and vapors in petroleum.
- fracture point:** the point at which a material cannot withstand any more force.
- freezing:** a low-temperature preservation technique that keeps foods at or below 32°F.
- frequency:** the number of cycles that pass some point in one second.
- frequency division multiplexing:** multiplexing that uses a separate frequency to transmit each message.
- frequency modulation:** a system that encodes a message on a carrier wave by changing its frequency.
- fruits:** plants grown in many areas of the country and cultivated for their edible parts.
- f-stop numbers:** numbers that identify the sizes of the openings in a camera's diaphragm.
- fuel converters:** devices that convert fuel into energy.
- fulcrum:** the support on a lever on which the lever arm rests and turns.
- function:** a factor to consider before buying a product.
- furrow irrigation:** a system that uses small ditches created between rows of plants.
- fuselage:** the body of an aircraft that contains the flight crew, passenger, and cargo units.
- fusion:** the process of combining two atoms into a new, larger atom to release large amounts of energy.
- fusion bonding:** a bonding technique that uses heat or solvents to melt the edges of a joint.

**futuring:** a research technique that helps people select the best of many possible courses of action. It is also called *futures research*.

## G

**galvanized steel:** zinc-coated steel used for automobile parts and containers.

**gases:** materials that easily disperse and expand to fill any space.

**gasification:** a process in which a material is heated in the absence of oxygen.

**gear and rack:** a rotating gear that meshes with a bar that has gear teeth along its length. It changes rotating motion into linear motion.

**gears:** wheels with teeth on their circumference that change the direction of a rotating force.

**gems:** stones that are cut, polished, and prized for their beauty and hardness.

**gene splicing:** the process of producing an organism with a new set of traits.

**general aviation:** travel for pleasure or business in an aircraft owned by a person or business.

**genetic engineering:** a process that produces new pest-resistant and chemical-tolerant crops that help combat diseases.

**genetic materials:** organic materials that have life cycles and can be regenerated. They are obtained during the normal life cycles of plants or animals.

**geometry dimensions:** dimensions that indicate the shapes of features and the angles at which surfaces meet.

**geosynchronous orbit:** a type of orbit in which a satellite travels the same speed the earth is turning.

**germination:** birth.

**glass:** a material produced using thermal processes by solidifying molten silica in an amorphous state.

**global impacts:** effects the actions of a small percentage of the world's population have on the world as a whole.

**goals:** the reasons or purposes for a system.

**grain:** a widely grown crop that has large edible seeds. It is a member of the grass family.

**grain drill:** a seed planter that is pulled behind a tractor.

**graphic communications:** communications processes in which messages are visual and have two dimensions.

**graphic models:** models used to explore ideas for components and systems.

**graphs:** graphic models that allow designers to organize and plot data. They display numerical information that can be used to design products and assess testing results.

**gravity dam:** a dam in which the lake side is vertical, while the other side slopes outward.

**gravure printing:** a type of process that prints finely detailed items.

**green chain:** the area of a sawmill where lumber is sorted and stacked prior to drying.

**greenhouse effect:** the problem in which ultraviolet rays, combined with increased levels of carbon dioxide and other gases, will cause the earth to retain more heat.

**green-sand casting:** a casting process that uses expendable molds and sand held together with a binder.

**grievance:** a dispute that arises over a contract's interpretation.

**grinding machines:** machines that use bonded abrasives to cut material.

**growth:** a major step in agricultural practices that involves providing feed and water for animals or cultivating and watering crops.

**guidance:** the system that gathers and displays information so a vehicle can be kept on course.

**guidance system:** a vehicular system that provides information.

## H

**hammers:** devices that deliver force to complete a forming action. They drop or drive a ram down with a quick action.

**hand tools:** simple, handheld artifacts that require human muscle power, air, or electric power to make them work.

**hardening:** a process used to increase the hardness of a material.

**hard-wired system:** a system that sends its signals through a physical channel.

**hardwood lumber:** a type of lumber produced from trees that lose their leaves at the end of each growing season.

- harmony:** the design principle achieved by blending the parts of a design to create a pleasing message.
- harvesting:** a step in agricultural practices that involves removing edible parts of plants from trees and stocks and butchering animals to produce meat and other products for consumption. It is the process of gathering genetic materials from the earth or bodies of water at the proper stage of their life cycles.
- head rig:** a very large band saw that cuts narrow slabs from a log.
- headers:** parts of a building framework that carry the weight from the roof and ceiling across the door and window openings. They are held up by trimmer studs.
- heat pump:** a unit used in climate control that works as a cooling and heating system by capturing heat in the atmosphere.
- heat treating:** the thermal conditioning processes used on metals.
- heavy engineering structures:** structures, such as bridges, highways, and airports, that help our economy function effectively.
- hertz:** the unit of measurement for the number of cycles per second.
- hidden lines:** light, dotted lines used to show details that are hidden in one or more of the views in a drawing.
- high technology (high tech):** new technologies that are not in wide use today, but may become common in time. They are also called *emerging technologies*.
- historical information:** information about devices and systems that were developed to solve problems similar to the current problem to be solved.
- historical methods:** methods designers use to gather information from existing records.
- horsepower:** a measurement used to describe the power output of mechanical systems.
- hot water heating:** an indirect climate control system that uses water to carry heat.
- hovercraft:** a special type of boat suspended on a cushion of air.
- hub-and-spoke system:** a route pattern airlines use.
- human information:** information that will affect the acceptance and use of a device or system.
- humanities:** a type of knowledge that describes the relationships between and among groups of people.
- human-psyche future:** a type of future that deals with the mental condition of people.
- human-to-human communication:** a type of communication used to inform, persuade, and entertain other people.
- human-to-machine communication:** a type of communication system that starts, changes, or ends a machine's operations.
- hydraulic systems:** systems that use liquids as the transfer medium.
- hydroelectric generating plant:** a water-powered plant that uses a dam to develop a water reservoir.
- hydrofoil:** a type of special boat that has a normal hull and a set of underwater wings.
- hydroponics:** the growing of plants in nutrient solutions without soil.
- hyperlinks:** connections between one web page and other pages and web sites through URLs.
- hypertext markup language:** a type of coding that tells a receiving computer how a page should look.
- I**
- idea:** a mental image of what a person thinks something should be.
- ideation:** a process in which designers create many possible answers by letting their minds create solutions.
- illness:** a state of poor health.
- illustration preparation:** an activity required for useful communication. It includes sizing and converting line art and photographs.
- illustrations:** pictures and symbols that add interest and clarity to printed communication.
- image carrier:** a printing block.
- immediate outputs:** products or services that have been designed and produced for immediate use.
- inclined plane:** an application of the principle that it is easier to move up a slope than a vertical surface.
- income:** money that is the end result of sales or employment.

- indirect active solar system:** a system that has a series of collectors that absorb solar energy.
- indirect gain solar system:** a system that uses a black concrete wall with glass panels in front of it.
- indirect-reading measurement tools:** systems that bring sensors and computers together to automate measurement.
- induction:** the process in which magnetic lines of force increase and decrease in strength, causing electrons to flow in an adjacent wire.
- industrial buildings:** buildings that house the machines that make products.
- industrial materials:** materials that are the inputs to secondary manufacturing activities.
- industrial products:** items used by companies in conducting their businesses.
- industrial relations:** the activities that develop and manage programs, ensuring an efficient work force and positive relations among the company, its workers, and the public.
- Industrial Revolution:** the historical period from 1750 to 1850, when tremendous changes in technology occurred. Many machines and devices were invented, including the steam engine and the telegraph.
- industrial structure:** a building housing machines that make products, or used to store raw materials or finished products.
- industry:** an economic enterprise that uses resources and systems to produce products, structures, and services with intent to make a profit.
- inexhaustible:** unable to be entirely used up or consumed.
- inexhaustible energy resource:** a part of the solar weather system that exists on earth.
- inexhaustible resources:** resources that are incapable of being used up.
- inform:** the goal of communication to provide information about people, events, or relationships.
- information:** facts and figures, called *data*, that have been sorted and arranged for human use. It is vital to taking an active part in society.
- Information Age:** occurring after the Industrial Revolution, this time period places most importance on information processing and cooperative working relations between production workers and managers.
- information processing:** gathering, storing, manipulating, and retrieving information that can be found in books and photographs and on tape and film.
- information skills:** the abilities to locate, select, and use information.
- infotainment:** providing information in an entertaining way.
- ink-jet printing:** a printing process in which a computer generates a printed message made up of tiny ink dots.
- inland waterway transportation:** transportation on rivers, on lakes, and along coastal waterways.
- inorganic materials:** materials that do not come from living organisms.
- input devices:** devices that allow an operator to enter data into a computer's operating system.
- input unit:** a device used to enter data into a system.
- inputs:** materials that flow into the system and are consumed or processed by the system.
- inside directors:** top managers of a company who serve on the company's board of directors.
- insolation:** the solar energy available in a specific location at any given time.
- inspection:** the part of a quality control program that compares materials and products with set quality standards.
- intended outputs:** products or services designed and produced with a specific goal in mind.
- interference:** anything that impairs the accurate communication of a message.
- intermittent manufacturing:** a manufacturing system in which a group of products is manufactured to a company's or customer's specification.
- intermodal shipping:** cargo traveling on two or more modes of transport before reaching its destination.
- internal combustion engines:** common power sources in land vehicles in which fuel is burned inside the engine to convert energy from one form to another.
- international transportation:** a level of transportation that moves passengers and cargo between nations.

**Internet:** interconnected networks of computers that share information.

**Internet protocol address:** the identifying number assigned to each computer connected to the Internet.

**Internet service provider:** a company that forms a network into which home computers are connected.

**interstate commerce:** business dealings that extend across state lines.

**intervention radiology:** a technique that uses images produced by radiology for non-surgical treatment of ailments.

**intrapreneurship:** the application of entrepreneurial spirit and action within an existing company structure.

**invasive diagnostic equipment:** a type of diagnostic device used when drawing and testing a blood sample.

**investment casting:** a casting process that uses expendable molds made from plaster.

**ionosphere:** the region lying just above the mesosphere. It is also called the *thermosphere*.

**Iron Age:** the historical period beginning around 1200 B.C. During this period, iron and steel became the primary materials for tools. Trade, transportation, and communication all improved, and civilization expanded.

**irradiation:** a technology that uses gamma rays or X rays to kill most molds and bacteria that may be in food.

**irrigation:** artificial watering to maintain plant growth.

**isolated solar system:** a system that uses solar collectors separate from the house.

**isometric sketches:** sketches in which the angles formed by the lines in the upper-right corner are equal.

**iterative:** repetitious.

## J

**jet engines:** engines that power businesses and commercial aircraft.

**joints:** places where parts meet.

**joules:** newtons per meter.

**judgmental systems:** systems that use human opinions and values to enter into the control process.

**just-in-time (JIT):** a type of inventory control system that schedules materials to arrive at manufacturing sites when needed.

## K

**kilohertz:** a basic unit of measurement in telecommunication. It equals 1000 cycles per second.

**kilowatt hour:** the work that 1000 watts will complete in one hour.

**kinetic energy:** energy involved in moving something.

**knowledge:** information learned and applied to a task.

## L

**labor agreements:** contracts negotiated between a company and a union to establish pay rates, hours, and working conditions for all employees covered by the contracts.

**labor relations:** programs that deal with employees' labor unions.

**lacquer:** a solvent-based, synthetic coating that dries through solvent evaporation.

**landscaping:** the activities that help prevent erosion and improve the appearance of a site.

**language and communication skills:** the abilities to read, write, and speak the language.

**laser machining:** a nontraditional process that uses the intense light generated by a laser to cut material.

**lathes:** machines that produce a cutting motion by rotating the workpiece.

**layout:** the stage in which a message is put together. It is the physical act of designing a message.

**legal information:** information about the laws and regulations that will control the installation and operation of a device or system.

**length:** the separation between two points. It is also called *distance*.

**lens:** the part of a camera that focuses light on the film.

**letterpress:** a type of relief printing that uses metal plates or type as the image carrier.

**lever:** a simple machine that multiplies the force applied to it. It changes the direction of a linear force.

**lever arm:** a rod or bar on a lever that rests and turns on the fulcrum.

**lifestyle:** what a person does with business and family life.

**lift:** the force that holds or lifts a craft in the air. It is critical for all flight.

**light meter:** the part of a camera that measures the amount of light available for a photo.

**lighter-than-air vehicles:** air vehicles that use either a light gas or hot air to produce lift.

**limited liability:** the feature of a corporation that limits an owner's loss, if the company fails, to the amount of money he or she had invested.

**linear motion:** a cutting and feed motion in which the cutter or work moves in one direction along a straight line.

**links:** connections between one web page and other pages and web sites through URLs.

**liquefaction:** a process in which a biofuel is heated at moderate temperatures under high pressure.

**liquid fuel rockets:** rockets with two tanks. One contains the fuel, and the other contains oxygen.

**liquidification:** a process in which a material is heated in the absence of oxygen.

**liquids:** visible, fluid materials that will not normally hold their size and shape.

**lithographic printing:** a method of printing that uses a flat-surface image carrier. It is also called *offset lithography*.

**local area network:** a system used in a single building or site to connect several personal computers or workstations to a central server.

**location dimensions:** dimensions that indicate the position of features on an object.

**locomotive:** in rail systems, the vehicle in which the power and operator units are placed.

**logging:** the activity of cutting down, trimming, and hauling off timber.

**lumber:** wood used to make frameworks in residences or other types of structures.

**lumber core plywood:** a type of core used for plywood that is made from pieces of solid lumber that have been glued to form a sheet.

## M

**machine tools:** machines used to make other machines.

**machines:** artifacts that amplify the speed, amount, or direction of a force. They transmit or change the application of power, force, or motion.

**machine-to-human communication:** a type of communication system used to display machine operating conditions.

**machine-to-machine communication:** the type of communication computer-controlled operations use.

**machining:** a separating process based on the motion of a tool against a workpiece.

**magnetic (electromagnetic) sensors:** monitoring devices that can be used to determine whether changes are occurring in the amount of current flowing in a circuit.

**magnetic resonance imaging:** an imaging technique that can produce computer-developed cross-sectional images of any part of the body very quickly.

**maintenance:** a type of program that strives to keep products or structures in good condition and in good working order.

**management:** the act of planning, directing, and evaluating any activity.

**management processes:** the actions people use to ensure that production processes operate efficiently and appropriately. These processes are also designed and used to guide and direct the design, development, production, and marketing of the technological device, service, structure, or system.

**manager:** a person who organizes and directs the work of others in a business, by setting goals, structuring tasks to be completed, assigning work, and monitoring results.

**manned space flight:** a space flight that carries human beings into space and returns them safely to the earth.

**manual control systems:** systems that require humans to adjust the process.

**manufactured home:** a special type of building mostly built in a factory.

**manufacturing processes:** processes used to change the size, shape, combination, and composition of materials.

- manufacturing technologies:** the technologies used in converting materials into industrial and consumer products.
- maritime shipping:** water transportation on oceans and large inland lakes.
- market research:** an activity that gathers information about a product's market.
- marketing:** the stage of promoting, selling, and delivering a product, structure, or service.
- mass:** the quantity of matter present in an object.
- mated dies:** dies that have the desired shape machined into one or both halves of the die set.
- material processing:** changing the form of materials using tools and machines.
- materials:** natural, synthetic, or composite substances from which artifacts are made.
- mathematical models:** models that show relationships in terms of formulas.
- maturity:** the period of time in the life cycles of plants and animals when growth slows down as they reach older age.
- measurement:** the practice of comparing the qualities of an object to a standard.
- mechanical:** in graphics, a sheet that looks exactly like the finished message.
- mechanical conditioning:** a type of conditioning process that uses mechanical forces to change the internal structure of a material.
- mechanical controllers:** adjusting devices that use cams, levers, and other types of linkages to adjust machines or other devices.
- mechanical energy:** energy produced by motion of technological devices.
- mechanical fastening:** an assembling process that uses mechanical forces to hold parts together.
- mechanical processes:** processes that use mechanical forces to change the form of natural resources.
- mechanical processing:** a way food can be processed using machines to change the form of the food product physically.
- mechanical sensors:** monitoring devices that can be used to determine position of components, force applied, or movement of parts.
- mechanical transmissions:** transmissions that have a clutch between the engine and the transmission.
- mechanics:** skilled workers in service operations.
- medical technologies:** the technologies used in maintaining health and curing illnesses.
- medical technologists:** individuals who gather and analyze specimens to assist physicians in diagnosis and treatment.
- medicine:** an area that involves diagnosing, treating, and preventing diseases and injuries.
- megahertz:** a basic unit of measurement in telecommunication. It equals 1 million cycles per second.
- memory:** a major part of a computer where data and operating instructions are stored.
- memory unit:** the section of the computer that holds information and instructions.
- merchant ships:** cargo-carrying ships.
- mesosphere:** the layer that extends from 22 to 50 miles (35 to 80 km) above the earth.
- metric system:** a measurement standard based on a unit of length called a *meter*.
- microgravity:** very low gravity.
- micrometer:** a measuring device used to establish precise diameters.
- Middle Ages:** the historical period beginning around 400 A.D. It is known for its various upheavals, as tribes continually fought each other for territory, but technology still progressed. One of the major inventions of this time was printing from movable type, developed by Johann Gutenberg in 1445.
- middle management:** the level of management below the president and vice presidents of a company, but above operating management.
- military ships:** vessels owned by a government that provide for the defense of the country.
- milling:** grinding or processing.
- milling machines:** separating machines that use a rotating cutter for the cutting motion.
- minerals:** any substances with a specific chemical composition that occur naturally.
- mining:** the process of obtaining materials from the earth through shafts or pits.
- mock-up:** an appearance model designed to show people how a product or structure will look.
- modeling:** the process of simulating expected conditions to test design ideas.
- molding:** a process that gives size and shape to pieces of material.

**motion pictures:** a series of transparencies, shot over a span of time, that create the illusion of motion.

**mud:** a mixture of water, clay, and chemicals.

**multiple-point tool:** a cutting device on which a series of single-point tools are arranged.

**multiplex systems:** basic systems used in mobile communication that use multiple frequencies to accommodate different types of units.

**multiplexing:** a system used to increase the capacity of a waveguide.

**multiview method:** a drawing method that places one or more views of the object in one drawing.

## N

**natural gas:** a combustible gas that occurs in porous rock.

**natural material:** a material that occurs naturally on earth.

**negative film:** film that produces a reverse image of the photographed scene.

**network access points:** points that allow a customer of one company to connect with a customer of another company.

**networks:** connections through which computers can communicate with other computers.

**noise:** unwanted sounds or signals that become mixed in with desired information.

**nonfood crops:** plants grown on farms (such as cotton) that are not for human consumption.

**noninvasive diagnostic equipment:** a type of diagnostic device that gathers information about a patient without entering the body.

**nonmetallic minerals:** substances that do not have metallic qualities.

**nonrenewable resources:** exhaustible energy resources.

**nontraditional machining:** processes that use electrical, sound, chemical, and light energy to size and shape materials.

**nuclear energy:** energy produced by the fusion of atoms.

**nurse practitioners:** individuals who perform some of the basic duties that physicians once provided.

**nurses:** individuals who help physicians diagnose and treat illnesses and injuries.

**nuts:** crops grown in selected parts of the world for their hard-shelled seeds.

## O

**object lines:** the solid, dark lines in a drawing that outline an object and its major details.

**oblique sketches:** pictorial sketches that show the front view as if a person were looking directly at it.

**obsolete technologies:** technologies that can no longer efficiently meet human needs for products and services.

**ocean mechanical energy conversion systems:** systems that use the mechanical energy in the oceans to generate power.

**ocean thermal energy conversion systems:** systems that use the differences in temperature between the various depths of the ocean to generate power.

**offset lithography:** a method of printing that uses a flat-surface image carrier.

**one-view drawings:** drawings used to show the layout of flat, sheet metal parts.

**on-the-job training:** a program through which simple skills are taught at a workstation by an experienced worker.

**open dies:** simple dies consisting of two flat die halves.

**open-loop control:** a type of control system in which output information is not used to adjust the process.

**open-pit mining:** a type of mining used when a coal vein is not very deep underground.

**operating management:** the managers closest to the people producing a company's products and services.

**optical sensors:** a type of monitoring device that can be used to determine the level of light or changes in the intensity of light.

**ores:** minerals that have a metal chemically combined with other elements.

**organic materials:** materials that come from living organisms.

**organizing:** a function that involves dividing tasks into major segments and structuring a work force so goals can be met and resources can be assigned to complete each task.

**orthographic assembly drawings:** assembly drawings that use a single view to show the mating of parts.

**orthographic projection:** the projection of a single view of an object onto a drawing surface in which the lines of projection are perpendicular to the drawing surface.

**outboard motor:** a type of power source attached to the stern of a boat.

**output devices:** devices on which data can be viewed.

**output unit:** a device used to display and record the results of the processing unit's actions.

**outputs:** the results, good and bad, of the operation of any system.

**outside directors:** people outside of the managerial structure who are selected to serve on a company's board of directors. They provide a different view of the company's operation.

**owners:** individuals who have final authority over company activities.

**owners' manual:** manuals that contain information needed to complete periodic servicing of a device.

**ozone layer:** the upper part of the stratosphere.

## P

**packaging:** an activity that deals with designing, producing, and filling containers.

**page:** a text file someone creates to share information or ideas.

**pagination systems:** complex and expensive computer systems that allow the operator to merge text and illustrations very accurately.

**paints:** coatings that dry through polymerization.

**panchromatic:** a type of black-and-white film that reacts to all colors of visible light and records them as shades of gray.

**particleboard core plywood:** plywood that has a core made of particleboard.

**partnership:** a form of private ownership in which businesses are owned and operated by two or more people.

**passenger ships:** vessels that carry people.

**passive collectors:** solar collectors that directly collect, store, and distribute the heat they convert from solar energy.

**pasteup:** a sheet that looks exactly like the finished message.

**pasteurization:** a technology that uses heat to kill harmful microorganisms.

**pathways:** the structures along which vehicles travel.

**people skills:** the abilities needed to work with people in a cooperative way.

**performers:** a group of people who deliver a message.

**perigee:** the point at which an orbit comes closest to earth.

**permanent molds:** molds that withstand repeated use.

**personal skills:** the abilities to grow and manage personal actions on a job.

**personal transportation:** travel using a vehicle owned by one person.

**perspective sketches:** sketches that show an object as the human eye or a camera would see it.

**persuade:** the goal of communication to convince people to act in a certain way.

**petroleum:** an oily, flammable, nonuniform mixture of a large number of different solid and liquid hydrocarbons.

**pharmacists:** individuals who dispense prescription drugs and advise people on their use.

**photograph:** a picture made on light-sensitive material using a camera.

**photographic communication:** the process of using photographs to communicate an idea or information.

**photography:** the act of producing a photograph.

**photovoltaic cell:** a converter that generates an electrical current when struck by light.

**physical models:** three-dimensional representations of reality.

**physician assistants:** individuals who deliver basic health services under the supervision of a physician.

**physicians:** individuals who diagnose diseases and injuries.

**pickling:** dipping a material in a solvent to remove unwanted materials. Also called *chemical cleaning*.

**pictorial assembly drawings:** assembly drawings that show an assembly using oblique, isometric, or perspective views.

**pig iron:** the basic input for steelmaking that results from thermal and chemical actions.

**pile foundations:** types of foundations used on wet, marshy, or sandy soils.

- pivot sprinkler:** a type of sprinkler system that uses one long line attached at one end to a water source.
- place utility:** a value provided by the movement of people and cargo from one place to another.
- planing machines:** machine tools that produce flat surfaces. They move the workpiece back and forth under the tool to generate the cutting motion.
- planning:** the process of setting goals and developing courses of action for a company or parts of the company to reach the goals.
- plastic range:** the range in which a material can be stretched, compressed, or bent.
- plating:** an electrolytic process.
- pleasure craft:** vessels owned by private citizens for recreation.
- plow:** a piece of tilling equipment that breaks, raises, and turns soil.
- pneumatic systems:** systems that use air as the transfer medium.
- point of interest:** the place to which your eye is drawn.
- point of presence:** a connection point that lets local users access a company's network.
- political/legal:** institutions that establish and enforce society's rules of behavior and conduct.
- political power:** the ability of a person or organization to gain the attention and cooperation of elected officials.
- pollution:** a product of human activity that diminishes air or water quality.
- polymerization:** a conversion process that causes small hydrocarbon molecules to join together.
- positive transparencies:** slides.
- potable water:** water safe for drinking.
- potential energy:** stored energy.
- potential field:** an area that has never produced oil or gas.
- power:** the rate at which work is done.
- power generation system:** a system that uses an engine as an energy converter.
- power transmission system:** a system that controls and directs the power of an engine to do work.
- precision measurement:** a type of measurement used when exact size is critical to the function of a device.
- preservatives:** chemicals added to food in small amounts to delay spoilage and ensure the food retains its quality.
- president:** the top manager in a company.
- press fit:** a fit in which friction between parts will cause them to remain together.
- presses:** devices in which force is delivered to complete a forming action. They slowly close die halves by lowering a ram to produce a squeezing action.
- pressure bonding:** a bonding technique that applies heat and pressure to a bond area.
- prevention:** the area of medicine that involves using knowledge, technological devices, and other means to help people maintain healthy bodies.
- preventive maintenance:** maintenance designed to prevent breakdowns.
- price:** what someone must pay to buy or use a product or service.
- primary food-processing technology:** a type of process that produces the basic ingredients for food.
- primary processing:** the step in which material resources are converted into industrial materials.
- prime interest rate:** the low interest rate banks and insurance companies charge their safest customers.
- prime mover:** a device that changes a natural source of energy into mechanical power.
- primitive conditions:** conditions determined by nature. Primitive societies were dependent on nature to provide food, shelter, and clothing.
- printed graphic communication:** a mass communication system that uses technology to communicate through a printed medium.
- printing:** a communication system that places the images of written words on a material.
- private enterprises:** enterprises owned by individuals or groups of people.
- problem-solving/design process:** the procedure used to develop technology that will attempt to satisfy people's technological needs and wants.
- process development:** a type of development that devises new or improved ways of completing tasks in manufacturing, construction, communication, or transportation.

**processes:** the steps needed to complete a series of identifiable tasks within a system.

**processing unit:** the part of the computer, also called a *central processing unit (CPU)* or *microprocessor*, that manipulates the data.

**producer:** an individual who oversees every element of a show.

**product development:** an area of development that applies knowledge to design new or improved products, structures, and services.

**production:** the stage of developing and operating systems for producing a product, structure, or service.

**production personnel:** In the film and television industries, a group of people who record the sights and sounds of a performance.

**production processes:** the actions completed to perform the function of the technological system.

**production workers:** people who process materials, build structures, operate transportation vehicles, service products, or produce and deliver communication products.

**profit:** the amount of money left over after all the expenses of a business have been paid.

**program:** the instructions a computer uses to process data and produce output.

**programmable logic controller (PLC):** a device that uses a microprocessor to control machines or processes.

**projection printing:** a basic technique used to produce prints by shining light through a negative onto a piece of photographic paper.

**propagation:** a step in agricultural practices that allows a biological organism to reproduce.

**proportion:** the design principle that deals with the relative sizes of the parts of a design.

**proprietary drugs:** drugs that are considered safe for unsupervised use by consumers.

**propriatorship:** a type of business ownership in which the business has a single owner.

**propulsion:** the system in a vehicle that generates motion through energy conversion and transmission.

**propulsion system:** a vehicular system that produces a force to propel the vehicle from its starting point to its destination.

**prosthesis:** an artificial body part developed through biomechanical engineering.

**prototype:** a working model of a system, assembly, or product that is built to test the operation, maintenance, and safety of the item.

**proven reserves:** producing oil or gas fields.

**public enterprises:** enterprises controlled by the government or a special form of corporation.

**public relations:** programs that communicate a company's policies and practices to governmental officials, community leaders, and the general population.

**pulleys:** grooved wheels attached to an axle that can be used to change the direction of a force, multiply force, or multiply distance.

**pulleys and V-belt:** a technique in which two pulleys with a V-belt stretched between them change the speed or power of a motion.

**pyrolysis:** a thermochemical process in which materials are heated in the absence of oxygen.

## Q

**quality control:** a process that includes all the systems and programs that ensure the outputs of technological systems will meet engineering standards and customer expectations.

## R

**radial saw:** a circular saw that moves a rotating blade across the workpiece.

**radiant energy:** energy in the form of electromagnetic waves.

**radiation:** heat transfer by using electromagnetic waves.

**radiation therapy:** a treatment that uses high-energy radiation to treat cancer cells.

**radio waves:** a series of frequencies within the electromagnetic spectrum extending from around 30 hertz to 300 gigahertz.

**radiology:** methods that use electromagnetic waves and ultrasonics to diagnose diseases and injuries.

**rafters:** angled boards that extend from the top plate of exterior walls to the ridge of the roof.

- rail fences:** fences used as border fences around farm buildings or homes.
- random-access memory:** memory that can be read or changed by both the computer and the user.
- read-only memory:** memory that can be read by the computer, but cannot be changed.
- receiver:** the end of the communication channel that gathers and decodes a message.
- receiving:** recognizing and accepting information.
- reciprocating motion:** a back-and-forth movement.
- recruiting:** a searching process through which job applicants are acquired.
- recycling:** a choice of disposal method in which the materials in a product or structure are reclaimed.
- refined sketch:** a sketch that merges ideas from two or more rough sketches.
- refining:** the second step in the process of making steel in a basic oxygen furnace.
- reflect:** to prevent passage of and cause to change direction.
- reflected waves:** waves used in a broadcast system in which a signal is bounced off the ionosphere.
- refrigeration:** a preservation technique that maintains foods at temperatures from 32°F to 40°F.
- regulation:** an order issued by an executive authority.
- reinforced concrete:** a material used in the frameworks of industrial and commercial buildings.
- relief printing:** a printing process that uses an image on a raised surface.
- religion:** an institution that develops and communicates values and beliefs about life and appropriate ways of living.
- Renaissance:** the historical period that began in the early 1300s in Italy and lasted until 1600. This period is known for new ideas in art, literature, history, and political science, but technological developments, such as the calculator and the telescope, also occurred.
- renewable:** capable of being used up, but replaceable with the normal life cycle of the energy source.
- renewable energy resource:** a biological material that can be grown and harvested.
- renewable resources:** resources that have a life cycle.
- repair:** the process of putting a broken, damaged, or defective product or building back into good working order.
- replacement:** the step in the repair process in which worn or broken parts are replaced.
- resaw:** a machine that uses a group of evenly spaced circular or scroll saw-type blades to cut many boards at once.
- research:** the work scientists do by gathering information to try to explain why something exists or happens in a certain way.
- research and development:** the stage of designing, developing, and specifying the characteristics of a product, structure, or service. These activities might result in new or improved products and processes.
- residential buildings:** structures in which people live.
- responsibility:** accountability for actions.
- retained earnings:** profits held by a company and used to enlarge its operations.
- retrieving:** a process that allows information to be brought back.
- rewards:** something received for some service or attainment.
- rhythm:** the design principle dealing with the flow of a communication.
- risks:** possibilities of loss.
- robot:** a mechanical device that can perform tasks automatically or with varying degrees of direct human control.
- rolling machines:** machines that use two rolls rotating in opposing directions to form a material.
- rotary motion:** a cutting and feed motion in which the work or the tool rotates.
- rotary-wing aircraft:** an aircraft that develops lift by spinning an airfoil. See *fixed-wing aircraft*.
- rotating motion:** a motion that uses round cutters or spins a workpiece around an axis.
- rough sketches:** drawings that show only basic ideas of the size, shape, and appearance of a product. They integrate and refine ideas generated in the thumbnails.
- route:** the path a vehicle follows.
- routers:** specialized computers that determine how to send information from one computer to another.

**routine diagnostic equipment:** a type of device used to gather general information about a patient.

**rudder:** a large flat plate at the stern of a ship, used to guide the vessel.

**rule:** a strip of metal, wood, or plastic with measuring marks on its face. It is the most common linear measurement device.

## S

**salary:** payment based on work over a period of time, such as a month or year.

**sales:** the activity that involves the physical exchange of products for money.

**sawing machines:** machines that use blades with teeth to cut materials to desired sizes and shapes.

**schedules:** lists of departure and arrival times for trips.

**science:** knowledge of the natural world.

**scientific information:** information about natural laws and principles that must be considered in developing a solution.

**scientists:** people who generally develop a basic knowledge of physics, materials science, geology, or chemistry to help create products and processes.

**scope:** panorama.

**screen printing:** a printing process that uses stencils with openings the shape of the message.

**screening:** a type of process that allows qualified people to be selected from an applicant pool.

**screw:** an inclined plane wrapped around a shaft.

**script:** a document that identifies characters, develops a situation, and communicates a story.

**scroll saws:** saws with a blade that is a strip of metal with teeth on one edge.

**search engines:** special sites on the Internet that operate on the principle of key words.

**secondary food-processing technology:** a type of process used to make finished food products.

**secondary manufacturing processes:** the actions used to change industrial materials into products.

**secondary processes:** manufacturing processes that change industrial materials into industrial equipment and consumer products.

**secondary processing:** a type of activity that changes industrial materials into products.

**second-class levers:** levers in which the load is between the effort and the fulcrum.

**seed-tree cutting:** a logging method in which all trees, regardless of species, are removed from a large area except three or four per acre. These trees are used to reseed the area.

**seismographic study:** an accurate way to explore for petroleum and natural gas using shock waves.

**selective cutting:** a logging method in which mature trees of a desired species are selected and cut from a plot of land.

**separating processes:** processes in which tools or machines are used to remove excess material to make an object of the correct size and shape.

**separation:** a process used in petroleum refineries that breaks petroleum into major hydrocarbon groups.

**server:** a special computer used to store programs and data for a network.

**service:** routine tasks that keep a product operating.

**servicing:** maintenance, repair, and reconditioning. It is the scheduled adjustment, lubrication, or cleaning required to keep a product or structure operating properly.

**shaft mining:** a type of underground mining that requires a vertical shaft to reach a coal deposit.

**shaped dies:** dies used to form plastic objects.

**shaping machines:** metalworking machine tools that produce flat surfaces. They move a single-point tool back and forth over the workpiece to produce the cutting motion.

**shearing:** a separating process that uses opposing edges of blades, knives, or dies to fracture unwanted material away from a workpiece.

**sheathing:** covering.

**shell molding:** a casting process that uses expendable molds and a sand and resin mixture.

**shutter:** the device that opens and closes to permit or prevent light from entering a camera.

- silk screening:** a printing process that uses stencils mounted on silk fabric. It is also called *screen printing*.
- sill:** wood piece attached to the top of a foundation.
- simplex systems:** basic systems used in mobile communication that use the same channel for both base and mobile transmissions.
- simulation:** the process of imitating expected conditions to test design ideas.
- single-point tool:** a simple cutting device with a cutting edge on the end or along the edge of a rod, bar, or strip.
- site preparation:** the step in a construction project that involves removing existing buildings, structures, brush, and trees that will interfere with locating the new structure.
- size dimensions:** dimensions that indicate the size and major features of an object.
- skelps:** strips of steel used to form pipes.
- slab foundation:** a type of foundation used for structures erected on soft soils.
- slabs:** wide, flat pieces of steel.
- slides:** single transparencies designed to be viewed independently.
- slope mining:** a type of underground mining used when a coal vein is not too deep under the ground. Miners dig a sloping shaft to reach the coal.
- smelting:** the thermal process using heat to extract metals from their ores.
- smith forging:** a common process using open dies.
- smoking:** a process that adds flavor to meat and fish, while preserving them.
- social future:** a type of future that suggests the type of relationships people want with each other.
- socioethical skills:** skills involving the understanding of the implications of actions on people, society, and the environment.
- soffit:** the underside of a building's roof edge.
- softwood lumber:** a type of lumber produced from needle-bearing trees. It is used for construction, for shipping containers and crates, and for railroad ties.
- solar converter:** an inexhaustible energy converter that uses the constant energy source of the sun.
- solar weather system:** the natural cycle that starts with solar energy.
- sole plate:** the strip at the bottom of a framed wall.
- sole proprietorship:** a business or operation owned by one person.
- solid fuel rockets:** rockets that use a powder or spongelike mixture of fuel and oxidizer.
- solid model:** a complex computer model that takes into account both the surface and the interior substance of an object.
- solids:** materials that hold their size and shape and can support loads.
- spade bits:** flat cutters on the end of a shaft, used to drill holes.
- specification sheets:** documents that communicate the properties a material must possess for a specific application.
- speed control:** a type of control system that makes a vehicle go faster through acceleration or slower by braking or coasting.
- spraying:** a process that uses air to carry fine particles of finishing materials to the surface of a product.
- spread foundations:** types of foundations used on rock and in hard soils.
- sprinkler irrigation:** an irrigation system that produces artificial rain to water crops.
- squares:** angle-measuring devices that have blades at right angles to the heads.
- stamping:** a process in which both forming and cutting are done.
- standard measurement:** a type of measurement in which the exact size of a part is not critical to the function of a product.
- standard views:** drawings that show a product in one piece, as it would be after it is assembled.
- steel:** an alloy of iron and carbon used for frameworks in industrial and commercial buildings.
- stock:** a portion of the ownership of a company.
- Stone Age:** the earliest period in history. First, simple stone tools were used to cut and pound vegetables and cut meat from animal carcasses; later, pointed stone hunting tools were developed. Humans also learned how to harness fire for heating, cooking, and protection.
- stop bath:** an acidic solution that neutralizes developers.
- stopping:** a step in developing film that stops the chemical action of a developer.

**storing:** processes that allow information to be retained for later use.

**stratosphere:** the region above the troposphere.

**stroke:** the movement of a piston from one end of a cylinder to another.

**structural system:** a vehicular system that helps people arrive safely and in comfort and protects cargo.

**structure:** the system that provides spaces for devices in vehicles.

**studs:** uprights nailed to a sole plate.

**subfloor:** a base, usually made from plywood or particleboard, that goes under tile, carpeting, or other flooring materials.

**submersible:** a type of special boat that can travel on the surface of or under water.

**substrate:** a material on which a printing is applied.

**superstructure:** the framework of a building or tower constructed on a foundation. It also includes the pipes for pipelines, surfaces for roads and airport runways, and tracks for railroads.

**supervisors:** the managers closest to the people producing a company's products and services.

**support staff:** nonmanagerial workers who carry out such tasks as keeping financial records, maintaining sales documents, and developing personnel systems.

**surface grinders:** grinding machines that work on the metal planer principle.

**surface mining:** a type of coal mining used when the coal vein is not very deep underground.

**surface model:** a three-dimensional computer model that is a wire frame with a sheet.

**surgery:** a way to treat diseases and injuries with operations.

**suspension bridges:** bridges that use cables to carry loads.

**suspension system:** a vehicular system that produces proper support for the weight of the vehicle and cargo.

**swather:** a machine that cuts and windrows hay in one pass over a field.

**synergism:** the concept that solutions proposed by one or more individuals in a group will often cause other members of the group to think of more ideas. The number of ideas generated by the group is more than the number they could develop if everyone worked alone.

**synthetic materials:** human-made materials.

**system:** a group of parts working together in a predictable way, designed to achieve a goal.

**systems drawings:** drawings used to show how parts in a system relate to each other and work together.

**T**

**table saw:** a circular saw that uses a linear feed of the material. The workpiece is pushed into the rotating blade to generate the cut.

**tail assembly:** a structure that provides steering capability for an aircraft.

**tankers:** large vessels used to move liquids across oceans.

**tapping:** the final step in the process of making steel in a basic oxygen furnace.

**technical data sheets:** documents that communicate the specifications for manufactured products.

**technical graphic communication:** a type of system that prepares and reproduces engineering drawings and technical illustrations.

**technicians:** skilled workers in laboratories and product-testing facilities. They work closely with production workers, but do more specialized jobs.

**technological assessment:** an evaluation that involves groups of people evaluating the impacts of technology on people, society, and the environment.

**technological future:** a type of future that looks at the type of human-built world we desire.

**technological knowledge:** knowledge of the human-built world used to design, produce, and use tools and materials.

**technological opportunity:** a "nonproblem" condition that can be improved with technology.

**technological problem:** a problem that can affect individuals and groups of people. These problems can be solved with devices or systems.

**technological product:** an artifact built by people.

**technological service:** outputs we use, but do not own.

**technologically literate:** having the understanding and ability to direct new technology.

- technologist:** a highly trained technical employee.
- telecommunication:** a communication process that depends on electromagnetic waves to carry a message over a distance.
- temperature:** the measurement of how hot or cold a material is.
- tempering:** a process used to relieve internal stress in a part.
- terminals:** the structures where transportation activities begin and end. They house passenger and cargo storage and loading facilities.
- testing:** the step in the repair process in which a repaired product is checked to ensure it works properly.
- thermal conditioning:** conditioning processes using heat.
- thermal energy:** heat energy.
- thermal processes:** the types of processes that use heat to melt and reform natural resources.
- thermal processing:** food-processing method that uses heat as the primary energy to convert the food.
- thermal sensors:** monitoring devices that can be used to determine changes in temperature.
- thermochemical conversion:** a basic process that produces a chemical reaction by applying heat.
- thinking skills:** skills involving the ability to use mental processes to address problems and issues.
- third-class levers:** levers in which the effort is placed between the load and the fulcrum.
- three-view drawings:** multiview drawings used to show the size and shape of rectangular and complex parts.
- thumbnail sketches:** sketches that allow a graphic designer to experiment with various arrangements of copy and illustrations.
- tillage:** the process of breaking and pulverizing soil to condition a seedbed.
- timber cruising:** a process in which foresters measure the diameter and height of trees to find stands of trees that can be economically harvested.
- time:** the measurement of how long an event lasts. It is a key resource in developing and operating technological systems.
- time division multiplexing:** multiplexing that divides time into very brief segments.
- tin plate:** tin-coated steel used to make food cans.
- tolerance:** a number indicating the amount of deviation that will be allowed in a dimension.
- tools:** artifacts humans use to expand their capabilities.
- top management:** presidents and vice presidents.
- top plate:** a double ribbon of 2 x 4s.
- tractor:** **1.** the part of a long-distance truck where the power and operator units are placed. **2.** a power source that provides power to pull all types of farm equipment.
- trailers:** cargo units attached to a tractor.
- transducers:** technological devices that change energy of one form into energy of another form.
- transmitter:** a sender.
- transmitting:** **1.** to send a coded message from a sender to a receiver. **2.** to pass through a material.
- transportation:** all activities that relocate humans or their possessions.
- transportation processes:** processes used to move people and cargo.
- transportation technology:** the technology used in moving people and cargo from one place to another.
- treating:** a petroleum-refining process that adds or removes chemicals to change the properties of petroleum products.
- treatment:** the area of medicine that involves using knowledge and technological devices and applying medical procedures to fight diseases, heal injuries, or ease symptoms.
- trim saw:** a machine that has a series of spaced blades.
- troposphere:** the lowest region of space above the earth in which spacecraft and satellites operate.
- truss:** a triangle-shaped structure that includes both the rafter and ceiling joist in one unit.
- truss bridges:** bridges that use small parts arranged in triangles to support the deck.
- turbofan engine:** an engine used in most commercial aircraft in use today. It operates at lower speeds than a turbojet engine.
- turbojet engine:** a type of jet engine that was developed during World War II.
- turboprop engine:** a variation of the jet engine that operates efficiently at low speeds.

**turning machines:** separating machines that rotate a workpiece against a single-point tool to produce a cutting motion.

**twist drills:** shafts of steel with points on the ends to produce chips.

**two-view drawings:** multiview drawings used to show the size and shape of cylindrical parts.

**typesetting:** an activity that produces the words of a message.

## U

**UHF:** ultrahigh frequency.

**ultrasound:** an imaging technique that uses high-frequency sound waves and their echoes to develop an image of the body.

**underground mining:** a type of mining that requires shafts in the earth to reach the coal deposits.

**undesirable outputs:** outputs that are not wanted.

**uniform resource locator:** a code that is a method of naming documents or sites on the World Wide Web.

**unintended outputs:** outputs that were not considered when the system was designed.

**unlimited liability:** a disadvantage in which a proprietor cannot separate business income and liabilities from his personal finances.

**unmanned space flights:** space flights that use rockets to place payloads into orbit.

**U.S. customary:** a type of system used as a measurement standard in the United States today.

**utilities:** the systems of a structure that provide water, electricity, heat, cooling, and communications.

## V

**value:** a measure of the functional worth a customer sees in a product. It is a factor to consider before buying a product.

**variety:** the design principle that makes a message unique and interesting.

**varnish:** a clear finish made from a mixture of oil, resin, solvent, and a drying agent.

**vegetables:** an important farm crop. They have edible leaves, stems, roots, and seeds that

provide important vitamins and minerals for the daily diet.

**vehicle:** a technological artifact designed to carry people and cargo on a pathway.

**vehicular systems:** the onboard technical systems that make a vehicle work.

**veneer:** a thin sheet of wood that is sliced, sawed, or peeled from a log.

**veneer core plywood:** the most common type of core used for plywood.

**VHF:** very high frequency.

**vice presidents:** managers who report to the president or CEO of a company.

**video:** visual.

**volume:** the amount of space an object occupies or encloses.

## W

**wage:** a set rate paid for each hour worked.

**wastewater:** the water from sinks, showers, tubs, toilets, and washing machines. It is drained away by part of the plumbing system.

**water cycle:** a cycle powered partially by solar energy.

**water transportation systems:** systems that use water to support a vehicle.

**waterwheel:** a series of paddles that extend into flowing water, which produces a rotating mechanical motion.

**watt:** one joule of work per second.

**wavelength:** the distance from the beginning to the end of one wave cycle.

**wedge:** a device used to split and separate materials and to grip parts.

**weight:** the force of the earth's pull on a mass.

**wellness:** a state of physical well-being.

**“what if” scenarios:** outrageous proposals that could lead to solutions after their good and bad points have been investigated.

**wheel and axle:** a shaft attached to a disk.

**wide area network:** a type of computer network that covers large geographic areas.

**windmill:** a wind-driven wheel that produces a rotating mechanical motion.

**windrows:** bands of hay.

**wing:** the part of an aircraft that separates the air into two streams, providing lift.

**wire frame model:** three-dimensional computer model developed by connecting all the edges of an object.

**work:** applying a force that moves a mass a distance in the direction of the applied force.

**World Wide Web:** a computer-based network of information resources.

**woven-wire fences:** fences that use posts with a special wire product attached to them.

## X

**x-ray machine:** a diagnostic imaging machine that essentially is a camera.

## Y

**yarding:** the process of gathering logs in a central location.

**yield point:** the point at which a material will not return to its original shape after being stretched.