

Simple Solutions.



Minutes a Day-Mastery for a Lifetime!

Level 8

Science

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Glossary

(The lesson number included in the definition refers to the first time a question or teaching on this topic appears in the book.)

Abiotic	not biotic; refers to things that are not and never were alive
Abrasion	also known as grinding; occurs when rocks rub against one another (Lesson #31)
Absolute Zero	the coldest point possible; temperature at which all motion stops
Acceleration	the rate at which velocity changes; acceleration can be a change in speed, a change in direction, or both (Lesson #91)
Acid Rain	rain that forms when water combines with compounds in the air to form nitric or sulfuric acid; acid rain is destructive to rocks and living things (Lesson #32)
Action-Reaction Forces	a pair of equal and opposite forces acting on two objects in contact with one another; the two forces are equal in magnitude, acting on opposing objects (Lesson #98)
Asthenosphere	the flowing portion of the Earth's mantle which lies beneath the lithosphere (Lesson #25)
Air Mass	a large body of air that forms over the Earth
Air Pressure	the weight of the atmosphere pressing toward the surface of the Earth
Alkali Metals	the first group (Group 1) of elements on the periodic table; very soft and reactive (Lesson #83)
Alkaline Earth Metals	the second group (Group 2) of elements on the periodic table; not quite as soft or reactive as the alkali metals (Lesson #83)
Alloy	a metal solution; a mixture of more than one type of metal (Lesson #74)
Amplitude	the amount of displacement (movement) observed in a wave; in a transverse wave, amplitude is measured from crest to resting place (Lesson #108)
Animals	in the Linnaean System, organisms that are multi-cellular, motile, and consume plants or other animals to survive
Aquifer	large underground body of water; underground lake (Lesson #34)
Asexual Reproduction	process by which new organisms are made requiring only one parent organism; offspring produced by asexual reproduction are usually genetically identical to the parent (Lesson #46)
Asteroid	a rock-like object made of stone and metal which orbits the sun (Lesson #17)
Astronomical Unit	a unit used to measure distances in outer space; the average distance between the sun and Earth (Lesson #20)
Atmosphere	the portions of Earth that relate to gases
Atom	the tiniest piece of an element which retains all the properties of that element (Lesson #77)
Atomic Mass	also called mass number; the sum of all the protons and neutrons in an atom
Atomic Number	the number of protons in a particular type of atom; each element has a unique atomic number (Lesson #78)

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Axis	an imaginary line which runs through a planet from the North Pole to the South Pole (Lesson #8)
Bacteria	see Monera
Balanced Forces	equal forces acting on the same object; when forces are balanced no change in motion occurs (Lesson #99)
Base Unit	a unit in the metric system which identifies a property such as length (meter), mass (gram), or time (second) (Lesson #56)
Beach	a type of landform found where water meets land (Lesson #35)
Big Bang Theory	a giant cosmological explosion that resulted in the creation of the universe (Lesson #7)
Binomial Nomenclature	the name given to an organism in the Linnaean classification system; binomial nomenclature consists of two names, genus and species (Lesson #51)
Biological Weathering	breaking down rock through the processes of living organisms, such as roots growing through rocks or animals burrowing underground (Lesson #31)
Biomes	regions of the world that have similar climates as well as similar types of vegetation and animals
Biosphere	the portions of Earth that relate to living organisms
Biotic	refers to components of an ecosystem that are living or are related to living organisms; biotic factors include migration, predators, disease, parasitism, and competition
Black Hole	object in space that is so massive that even light cannot escape its gravity (Lesson #23)
Bond	the force that holds atoms together
Budding	a type of asexual reproduction in which the parent organism forms small buds that eventually break off and form new organisms (Lesson #46)
Canyon	a deep valley with steep sides on the Earth's surface (Lesson #34)
Carat	a jewelry measurement once based on the size of a carob seed (Lesson #55)
Carnivores	consumers that eat only animals (Lesson #5)
Carrying Capacity	the population size that an ecosystem can support without damaging the ecosystem
Cave	a hole in the Earth with an underground or hillside opening (Lesson #34)
Cell	smallest unit of any living thing; all living things are made of cells
Cell Division	the way cells make more cells; the nucleus divides itself, and one cell becomes two cells
Cell Membrane	a protective covering that allows nutrients to be absorbed into a cell and allows waste to pass out of the cell

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Cell Theory	a scientific theory with three main parts: The cell is the building block of all living things. Cells are the smallest unit of life. All new cells are created from other living cells.
Cell Wall	found in plant cells only; surrounds the cell; helps to make the plant firm and protects it from injury or loss of water
Celsius	a scale used to measure temperature or average kinetic energy
Centripetal Acceleration	the continuous change in velocity that occurs when an object is travelling in a circle (Lesson #91)
Characteristics	properties; anything that describes a substance
Chemical Change	a change that alters the identity of a substance (Lesson #66)
Chemical Energy	the energy stored in the chemical bonds of a substance (Lesson #103)
Chemical Potential Energy	stored energy that can be converted to kinetic energy
Chemical Property	describes an object's ability to change; in order to observe a chemical property, the observer permanently changes the object (Lesson #65)
Chemical Reaction	a chemical change; a rearrangement of the atoms in one or more substances (Lesson #66)
Chemical Sedimentary Rock	a type of sedimentary rock that forms when dissolved minerals crystallize after water evaporates (Lesson #42)
Chemical Weathering	the break down of rock due to the change in the chemical composition of the rock; includes acid rain and oxidation (Lesson #32)
Chloroplasts	organelles that conduct photosynthesis
Chromosomes	small structures within the cell's nucleus which contain genes, the genetic material (Lesson #46)
Classification	a system that scientists use to organize living and non-living things
Clastic Rock	a type of sedimentary rock in which tiny pieces of rock and mineral are cemented together (Lesson #42)
Climate	established weather pattern over a long period of time for a certain area
Climatograph	a graph that illustrates patterns of precipitation and temperature over time; often used to study and classify biomes (Lesson #59)
Cold Front	weather condition that occurs when cold, dense air moves toward warmer air, bringing sudden, strong changes in weather
Comet	an object consisting of ice and dust which orbits the sun (Lesson #17)
Commensalism	an interaction between two organisms which is helpful to one, and does not harm the other
Community	all of the populations that live in an ecosystem at one time
Competition	struggle among organisms over limited food, air, or water supply in an ecosystem

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Compound	two or more elements joined together by a chemical bond to make a single unit
Compressional Wave	a wave in which the disturbance is in the same direction as the movement of the wave; also known as a longitudinal wave (Lesson #107)
Compressions	the portions of a longitudinal wave that are compacted (squished) together (Lesson #107)
Condensation	a change from the gas state to the liquid state (Lesson #68)
Condensation Point	the temperature at which a substance changes from gas to liquid; it is the same temperature as boiling point for that material
Conduction	a transfer of heat that occurs when a heat source comes into contact with something that is cooler
Conductor	substance which allows energy to easily flow through it; metals are conductors
Constant	any factor that must not vary during an experiment (Lesson #3)
Constructive Boundary	another term meaning divergent boundary, named constructive because new crust is created at this type of boundary (Lesson #26)
Consumer	an organism that cannot produce its own food; a consumer gets its food from other sources (Lesson #5)
Contact Metamorphism	changes in rock that occur when an area of rock is heated by nearby magma (Lesson #43)
Continental Crust	the surface of Earth's continents; continental crust is less dense than oceanic crust (Lesson #25)
Control Group	factors in an experiment that do not receive the experimental treatment
Convection	a transfer of heat through the circulation of a gas or liquid as it warms and then cools
Convergent Boundary	a boundary formed where two of the Earth's plates meet in a head-on collision (Lesson #27)
Core	Earth's deepest layer; consists of two parts, the inner and outer core (Lesson #25)
Corrosion	rust; a chemical reaction in which water and oxygen react with metal
Covalent Bond	the bond that occurs when the two elements involved share their electrons
Crest	the peak of a transverse wave (Lesson #107)
Crust	the Earth's outer layer; crust consists of two types, continental and oceanic (Lesson #25)
Data	facts; statistics and other information
Deceleration	a type of acceleration in which the object is slowing down (Lesson #113)
Deciduous	trees that shed their leaves at the end of the growing season or just before winter

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Decomposer	organism that breaks down the remains of dead plants and animals, returning vital nutrients to the soil; examples are bacteria, earthworms, and fungi
Deforestation	the permanent destruction of forests caused by cutting too many trees too quickly
Deformation	a change in the shape of the Earth's surface (Lesson #28)
Dense	physical property of an object in which its particles are tightly packed
Density	a physical property of matter which describes how tightly packed the particles are in an object; related to mass and volume (Lesson #70)
Density Column	a series of liquids layered atop one another because of differences in density (Lesson #72)
Dependent Variable	the factor that depends on what the experimenter manipulates; the dependent variable responds to the independent variable (Lesson #2)
Deposition	1.) leaving or depositing soil or rock in new locations (Lesson #33) 2.) a change from the gas state directly to the solid state (Lesson #68)
Dichotomous Key	a tool used by scientists (and others) to identify organisms based on a series of questions which have two possible answers (Lesson #52)
Divergent Boundary	a boundary in the Earth's surface created when two plates move away from each other (Lesson #26)
Domain	the broadest category in the Linnaean classification system (Lesson #50)
Dunes	tall ridges of sand created by wind deposition (Lesson #35)
Earthquake	a shaking and rolling that occurs through the Earth because of a disturbance to the lithosphere (Lesson #30)
Eclipse	an event that occurs when one object blocks the view of another (Lesson #16)
Ecosystem	all the living and nonliving entities interacting with and affecting one another in a certain area
Elastic Potential Energy	the type of stored energy that is in a stretched out rubber band or spring
Electricity	energy produced by the movement of electrons
Electromagnetic Spectrum	all the types of light rays including gamma, x-rays, ultraviolet, visible light, infrared, microwaves, and radio waves
Electromagnetic Wave	a type of wave that can travel through empty space (Lesson #106)
Electron	one type of subatomic particle; the negatively charged particle found orbiting (moving outside of and around) the nucleus of an atom (Lesson #77).

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Electron Cloud	the area surrounding the atom's nucleus; the electron cloud occupies most of the atom's volume; electrons are located here (Lesson #77)
Element	the simplest form of matter (Lesson #77)
Elliptical Galaxy	a galaxy in which the shape of the light is circular or oval (Lesson #19)
Embryo	the newly formed cell which is created when two sex cells fuse (Lesson #47)
Energy	the ability to do work (Lesson #102)
Energy Conversions	changes from one form of energy to another (Lesson #105)
Energy Pyramid	an illustration of how energy travels from producers to primary consumers, to secondary consumers, and so on
Energy Transformation	the changing of energy from one form to another
Environment	the natural world; everything around us
Epithelial Tissue	tissue that provides a protective lining to several organs and covers the entire outside of the body
Erosion	the removal of soil and rock from their original locations (Lesson #33)
Estivation	the "summer sleep" of animals; a method of coping with extremely hot temperatures
Eukaryotes	organisms whose cells contain a nucleus (Lesson #50)
Evaporation	a change from the liquid state to the gas state (Lesson #68)
Experiment	one of the steps of the scientific method; a procedure meant to test a hypothesis
Extensive Property	a property which is dependent on the size of the sample; an example is mass
Extinct	no longer in existence (Lesson #49)
Extrusive Igneous Rock	igneous rock that forms above the Earth's surface (Lesson #41)
Fahrenheit	scale used to measure temperature or average kinetic energy
Family (of Elements)	a column on the periodic table; elements found in the same family share similar properties; a family is also called a Group (Lesson #82)
Fault Block Mountains	mountains formed when blocks of the Earth's crust are forced upward (Lesson #28)
Faulting	changes in the Earth's surface where the Earth's crust breaks; typically forms jagged edges (Lesson #28)
Felsic Rock	a light-colored igneous rock containing aluminum, potassium, and silicon (Lesson #41)
Fertilization	a process in which two sex cells meet and fuse to form one cell (Lesson #47)

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Fission	a type of asexual reproduction in which the organism splits into two parts (Lesson #46)
Flammability	a substance's ability to burn
Floodplain	area beyond the banks of a river that repeatedly undergoes flooding (Lesson #35)
Folding	changes in the Earth's surface where the Earth is pushed upward or downward; typically forms smooth curves (Lesson #28)
Foliated Rock	a type of metamorphic rock that has lines or bands which were created when different types of minerals separated from each other, flattened, and formed layers (Lesson #43)
Food Chain	a process by which energy travels between organisms
Food Web	the flow of energy from organism to organism, resulting from the interconnection of several food chains
Force	a push or pull (Lesson #99)
Fragmentation	a type of asexual reproduction in which the body of the parent organism breaks into several pieces, each of which forms a new organism (Lesson #46)
Freezing	a change from the liquid state to the solid state (Lesson #68)
Freezing Point	the temperature at which a substance changes from liquid to solid; occurs at the same temperature as the melting point (Lesson #69)
Frequency	the number of wavelengths that pass a given point within a given time (Lesson #108)
Freshwater	water that does not have a large amount of salt in it; found in lakes, rivers, and streams
Friction	an opposing force caused by unevenness in the surface of an object (Lesson #100)
Front	a weather condition that occurs when two air masses meet; each air mass has a different density and temperature
Full Moon	a phase of the lunar cycle in which the entire visible surface of the moon is illuminated (Lesson #13)
Fusion	the process by which the nuclei of two atoms collide and stick together (Lesson #22)
Galaxy	a mixture of stars, gases and dust, held together by the force of gravity (Lesson #19).
Gas	state of matter in which a substance has no definite volume and no definite shape; gas will spread out to fill its container (Lesson #67)
Genes	pieces of DNA; the basic units of heredity
Geologic Event	an activity that shapes the Earth; these activities include mountain building, earthquakes, and volcanoes (Lesson #28)
Glacier	a large body of ice that plays an important role in erosion and deposition (Lesson #33)
Gram	the metric base unit for mass (Lesson #56)

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Gravitational Potential Energy	energy created by an attraction between two objects
Gravity	a force that is an attraction between one object and another based on the mass of each object and the distance between them (Lesson #6)
Groundwater	water found in openings underneath the Earth's surface (Lesson #34)
Group	a column on the periodic table; elements found in the same group have similar properties; a group is also called a Family (Lesson #82)
Halogens	Group 17 on the periodic table; these nonmetals are very reactive and often exist in pairs called diatomic molecules (Lesson #84)
Heat Energy	thermal energy created by the movement of atoms
Herbivores	consumers that eat only plants (Lesson #5)
Heredity	the passing on of traits from parent to offspring
Heterogeneous Mixture	also known as a suspension; in a heterogenous mixture, the individual substances can be seen or distinguished from one another (Lesson #74)
Homeostasis	the ability to maintain a stable internal environment
Homogeneous Mixture	a mixture in which the various parts are so evenly mixed that they cannot be individually distinguished; a homogeneous mixture is the same as a solution (Lesson #74)
Host	organism that is afflicted with parasites
Hydrogen	the element with the smallest atom; hydrogen contains only one proton and one electron and is a very reactive nonmetal (Lesson #84)
Hydropower	water power
Hydrosphere	the portions of Earth that relate to water; all the waters of the Earth
Hypothesis	a possible answer to a question being investigated during an experiment (Lesson #1)
Igneous	one of the three kinds of rock; formed by the cooling and hardening of molten rock
Independent Variable	the factor being controlled or manipulated by the experimenter (Lesson #2)
Inertia	an object's resistance to a change in motion unless acted upon by an outside force (Lesson #94)
Inner Core	the solid portion of Earth's deepest layer (Lesson #25)
Intensive Property	a property that does not depend on the size of the sample; an example is density (Lesson #71)
Intrusive Igneous Rock	Igneous rock that forms beneath the Earth's surface between layers of rock (Lesson #41)
Ionic Bond	the bond that results from a transfer of electrons from one atom to another

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Irregular Galaxy	a galaxy which does not have a definite shape (Lesson #19)
Isobar	a line on a weather map that connects areas with similar air pressure
Isotopes	two atoms of the same element which have different numbers of neutrons (Lessons #78 - 79)
Kelvin	a scale used to measure temperature, or average kinetic energy
Kinetic Energy	energy of motion (Lesson #102)
Kingdom	one of the major groupings in the Linnaean System of classification (see the Kingdom chart)
Landform	a natural formation on Earth's surface; made of rock and dirt (Lesson #34)
Law (Scientific)	a statement of an accepted scientific fact; a law does not attempt to explain "why" (Lesson #4)
Law of Conservation of Energy	energy is neither created nor destroyed but only changes in form
Law of Conservation of Matter	matter is neither created nor destroyed but may change in form
Law of Superposition	in any sequence of undisturbed rock, the youngest layers will be those at the top of the sequence (Lesson #44)
Law of Universal Gravitation	the law which states that all objects experience a gravitational attraction to the objects around them (Lesson #101)
Light Energy	energy carried by electromagnetic radiation (Lesson #104)
Light Year	a unit for measuring very large distances; the distance a light beam can travel in one year (Lesson #20)
Linnaean System	a system of classification of all living things; developed by Karl von Linne
Liquid	a state of matter in which a substance has a definite volume but no definite shape; a liquid takes the shape of its container (Lesson #67)
Lithosphere	the soil and rocks on Earth's surface; the crust and upper portion of the Earth's mantle (Lesson #25)
Longitudinal Wave	a wave in which the disturbance is in the same direction as the movement of the wave; also known as a compressional wave (Lesson #107)
Lunar Cycle	the pattern of the phases of the moon that goes through its cycle approximately every 30 days
Lunar Eclipse	an event that occurs when the Earth blocks the sun's rays from reaching the moon's surface (Lesson #16)
Mafic Rock	dark igneous rock containing calcium, iron, and magnesium (Lesson #41)
Magma	melted rock (Lesson #29)
Magma Plume	a large reservoir of magma (melted rock) found under the Earth's surface (Lesson #29)

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Main Sequence Star	the major portion of a star's life; includes many different types of stars which all give off light as a product of fusion (Lesson #22)
Malleable	having the ability to bend or be hammered without breaking (Lesson #85)
Mantle	Earth's second or middle layer; this is where most of the Earth's heat is found (Lesson #25)
Marsh	a wetland biome which consists predominantly of grasses and plants
Mass	the amount of matter that makes up an object; for any given object, mass does not change (Lesson #101)
Mass Extinction	an occurrence in which large numbers of species die during a single event (Lesson #49)
Mass Number	the sum of the protons and neutrons in an atom (Lesson #79)
Matter	anything that has volume and mass
Mechanical Energy	the energy of an object related to its motion (Lesson #103)
Mechanical Wave	a wave that can only travel through a medium; sound waves are a type of mechanical wave (Lesson #106)
Medium	any type of matter (solid, liquid, or gas) through which a wave may pass (Lesson #106)
Meiosis	the process by which reproductive cells make more cells; the original cell divides twice, resulting in four daughter cells
Melting	a change from the solid state to the liquid state (Lesson #68)
Melting Point	the temperature at which a substance changes from solid to liquid; occurs at the same temperature as the freezing point (Lesson #69)
Metalloid Line	a conceptual line on the periodic table which separates the metals from the nonmetals; elements that touch the metalloid line have some properties of metals and some properties of nonmetals (Lesson #82)
Metalloid	an element which has some of the characteristics of metals (semiconductors) as well as some characteristics of nonmetals (brittle)
Metal	an element which is a good conductor; they are shiny and malleable
Metamorphic Rock	a rock which forms from other rocks which undergo increases in temperature and pressure (Lesson #43)
Meteor	a meteoroid that enters the Earth's atmosphere (Lesson #17)
Meteorite	a meteoroid that travels through the atmosphere and reaches the Earth's surface (Lesson #17)
Meteoroid	a small piece of an asteroid or comet that has broken off during collisions in space (Lesson #17)
Meter	the metric base unit for length (Lesson #56)

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Metric System	also known as the System International; a unified system of measurement comprised of base units which can be modified by factors of ten (Lesson #55)
Mid-Oceanic Ridge	the largest divergent boundary; located on the ocean floor, it extends from Iceland to the tip of South America (Lesson #26)
Milky Way	the galaxy in which our solar system is found (Lesson #19)
Mitochondria	organelles that provide the energy that a cell needs
Mitosis	the process of cell division by which body cells make more body cells; each cell divides, resulting in two cells
Mixture	a substance made by combining materials in a way that no chemical change occurs; the composition of a mixture can vary (Lesson #74)
Molecule	the atoms of two or more different elements joined together
Monera (Bacteria)	the simplest organisms in the Linnaean System; bacteria are tiny and unicellular
Moon Phases	the appearance of the moon at different times during a thirty-day cycle; phases are caused by the sun's shadow blocking the light that is reflected off of the moon
Moraine	a hill or ridge formed from debris left by a glacier (Lesson #35)
Motion	movement; a change in distance between two points (Lesson #90)
Multi-Cellular	made up of many cells
Mutation	an event that occurs during meiosis, causing genes to be copied incorrectly; this results in differences that may be beneficial or harmful
Mutualism	an interaction between two organisms in which both organisms benefit
Net Force	the sum of all the forces acting on an object (Lesson #99)
Neutral Atom	an atom which has an equal number of protons and electrons and therefore, has no charge (Lesson #77)
Neutron	one type of subatomic particle; the neutral particle found in the nucleus of an atom (Lesson #77)
New Moon	a phase of the lunar cycle in which the visible surface of the moon is not illuminated (Lesson #13)
Newton	the scientific unit for force (Lesson #99)
Newton's First Law	the law which states that every object will remain at rest or in uniform motion unless an outside force acts upon it (Lesson #94)
Newton's Second Law	the law which states that acceleration occurs when a force acts upon a mass (Lesson #95)
Newton's Third Law	the law which states that for every action there is an equal but opposite reaction (Lesson #98)

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Noble Gases	Group 18 on the periodic table; these nonmetals are nonreactive and, therefore, don't typically form compounds with other elements; this is because they contain a full outer layer of electrons (Lesson #84)
Non-Conductor	a material that does not allow electricity to pass through it
Non-Foliated Rock	a type of metamorphic rock having no bands or layers; the minerals in non-foliated rocks re-crystallize or change shape as they undergo pressure and temperature changes (Lesson #43)
Nonmetal	an element which is a nonconductor; nonmetals are typically dull and brittle
Nuclear Energy	the energy found in the nucleus of an atom (Lesson #104)
Nucleus	1.) the organelle which is responsible for communication between cells and within the cell; the genetic material of an organism is found in the nucleus (Lesson #46) 2.) the very small, tightly packed, positively charged center of the atom (Lesson #77)
Nuclide Symbol	a shorthand symbol for identifying a particular isotope; it includes the atomic number, the mass number, and the element's symbol (Lesson #79)
Oceanic crust	the ocean floor; oceanic crust is more dense than continental crust (Lesson #25)
Oceanic-Continental Convergent Boundary	the result of oceanic crust colliding with continental crust; subduction occurs here (Lesson #27)
Omnivore	a consumer that eats both plants and animals (Lesson #5)
Opposing Force	a force that works against the direction of movement (Lesson #100)
Orbit	circular movement around an object
Organelles	small parts within a cell which perform specific functions (Lesson #46)
Organic Sedimentary Rock	a type of sedimentary rock formed from the fossils of dead organisms (Lesson #42)
Organism	a living thing
Outer core	the liquid portion of the Earth's deepest layer (Lesson #25)
Oxidation	a chemical reaction; occurs when oxygen combines with another element to form new compounds (Lesson #32)
Ozone Layer	the layer of atmosphere that protects life on Earth by absorbing the sun's harmful ultraviolet rays
Parasite	an organism that feeds off the flesh or body fluids of other living organisms, known as hosts
Parasitism	an interaction between two organisms in which one is helped (the parasite) and the other is harmed (the host)
Periodic	something that is repeated at regular intervals (Lesson #81)

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Periodic Table of Elements	a table of the elements which is organized based on similar, repeating characteristics of the elements (Lesson #81)
Period	a row on the periodic table; within each period, trends (or patterns) in the elements' properties may be observed (Lesson #82)
Permafrost	permanently frozen soil; most often associated with the tundra biome
Phase	a period of the lunar (moon) cycle; during different cycles of the moon, different portions of the moon's surface are illuminated (Lesson #12)
Phase Change	the change from one state of matter to another; example: liquid to solid (Lesson #68)
Photosynthesis	process by which green plants make their own food using sunlight, water, and carbon dioxide
Physical Change	a change in appearance which does not change the identity of the substance (lesson #66)
Physical Property	describes the appearance of an object; physical properties can be observed without permanently changing the object (Lesson #65)
Physical State or Phase	one of the properties of matter; the phases are solid, liquid, gas, plasma
Physical Weathering	the process of breaking down rock through environmental events such as grinding or ice formation (Lesson #31)
Plasma	a state of matter rarely found on Earth; plasma is a mixture of gases and charged particles (Lesson #67)
Plate Tectonics	the movement of the Earth's plates and the changes this movement creates in the Earth's surface (Lesson #25)
Plate	also called a tectonic plate; these large sections of Earth's lithosphere are separate from each other and are able to move (Lesson #25)
Population	a group of the same kind of organism living in an ecosystem
Potential Energy	energy of position; stored energy (Lesson #102)
Precipitation	rain, snow, sleet, or hail; water in any form that falls to Earth's surface
Primary Consumer	herbivores; animals that eat only plants
Producer	an organism that produces its own food (Lesson #5)
Product	any new substance formed during a chemical reaction (Lesson #66)
Prokaryote	a unicellular organism with no nucleus (Lesson #50)
Properties	characteristics; anything that describes a thing
Protist	an organism in the Linnaean System that is more complex than bacteria; may be unicellular or multi-cellular
Proton	one type of subatomic particle; a positively charged particle found in the nucleus of an atom (Lesson #77)

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Quarter Moon	the phase of the lunar cycle in which one half of the moon's visible surface is illuminated (Lesson #12)
Radiant Energy	energy that moves through waves
Radiation	movement of heat energy through waves
Rarefaction	the portion of a longitudinal wave that is spread out (Lesson #107)
Reactant	the "beginning" substances in a chemical reaction, as in the ingredients in a recipe (Lesson #66)
Re-Crystallization	a process in which the minerals within a rock change shape or size (Lesson #43)
Red Giant	the stage, late in a star's life cycle, when the outer layers of the star expand and cool (Lesson #23)
Reference Point	a point used for reference (or comparison) when measuring motion (Lesson #90)
Regional Metamorphism	changes in rocks that occur from pressure created by a large landform, such as a mountain, pressing down on the underlying rock and flattening it (Lesson #43)
Replicate	to reproduce or repeat an experiment (Lesson #4)
Reproduction	the process by which organisms are created; may be sexual or asexual
Responding Variable	see Dependent Variable (Lesson #2)
Revolution	the circular orbit of an object around another object; Earth revolves around the sun; the time it takes for one revolution is called a year (Lesson #10)
Rift	the opening formed at a divergent boundary; volcanoes can form at rifts (Lesson #29)
River	flowing water carried downstream by the force of gravity (Lesson #34)
Road Cut	a place where a portion of the Earth's surface is cut away to clear space for a road; road cuts expose the layers of Earth's surface (stratification) (Lesson #42)
Rock Cycle	the process in which rocks change from one type to another; example: metamorphic to sedimentary (Lesson #41)
Rotation	the motion of a planet as it spins on its imaginary axis; the time it takes to complete one rotation is called a day (Lesson #8)
Runoff	melting ice or snow; precipitation that drains off the land and soaks into the ground or flows to a body of water
Satellite	an object that orbits another object; satellites can be human-made or natural (Lesson #6)
Scientific Method	a procedure that scientists follow when they want to answer questions or solve problems
Sea Floor Spreading	a divergent boundary found on the ocean floor (Lesson #26)
Second	the metric base unit for time (Lesson #56)

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Secondary Consumer	a carnivore; an animal that gets energy by consuming other animals
Sediment	tiny pieces of rock and sand (Lesson #42)
Sedimentary Rock	rock formed from tiny bits of weathered rock and sand which are then compacted and cemented together (Lesson #42)
Seismic Wave	energy that travels through the Earth following an earthquake (Lesson #30)
Semiconductor	material that allows electricity to move through it but not as easily as electricity moves through a conductor; some metalloids are semiconductors (Lesson #85)
Sex Cell	a special cell required for sexual reproduction; sex cells contain half the number of chromosomes found in other cells (Lesson #47)
Sexual Reproduction	process by which new organisms are made, requiring two separate parent organisms; results in offspring which are genetically related but not identical to the parents (Lesson #47)
Solar Eclipse	an event that occurs when the moon moves between the Earth and sun, blocking the sun's light from reaching Earth (Lesson #16)
Solar System	a collection of bodies in space which orbit a central star (Lesson #6)
Solid	the state of matter in which a substance has a definite shape and a definite volume (Lesson #67)
Solution	a mixture in which the various parts are so evenly mixed they cannot be individually distinguished; a homogeneous mixture (Lesson #74)
Sound Energy	energy carried by vibrating particles (Lesson #104)
Speed	change in distance over time; a measure of how fast an object is moving (Lesson #90)
Sperm	sex cells that come from the father
Spiral Galaxy	a galaxy with a central bulge of bright light surrounded by a swirling disk of dust and gases (Lesson #19)
Star	a ball of gas, specifically hydrogen and helium (Lesson #22)
Static Electricity	a type of potential energy that builds up on an object as the result of freed electrons
Stationary Front	two air masses that meet where neither air mass is strong enough to push the other aside
Stellar Evolution	the life process of a star; the process describing how a star ages (Lesson #22)
Stratification	layers of rock created by changing conditions that occurred during the formation of the layers (Lesson #42)
Stress	in geology, the tension or force felt by Earth's surface that leads to deformation (Lesson #28)

Help Pages

Glossary

Subatomic Particles	the small particles that make up the atom; examples are protons, neutrons, and electrons (Lesson #77)
Subduction	occurs when one of Earth's plates is forced down into the Earth's mantle during convergence (plates colliding head-on) (Lesson #27)
Sublimation	a change from the solid state directly to the gas state (Lesson #68)
Supernova	the end of a larger star's life cycle; occurs when a star collapses and explodes (Lesson #23)
Surface Water	water that is in above ground reservoirs, such as lakes, rivers, and oceans
Suspension	also known as a heterogeneous mixture; the individual substances can be seen or distinguished from one another (Lesson #74)
Swamp	a wetland biome which consists predominantly of trees
Symbiosis	a relationship between two organisms in which one organism is helped while the other organism may be helped, harmed, or unaffected
T Tauri star	the beginning of star formation; formed when the gases from explosions in outer space begin to collapse and contract (Lesson #22)
Temperate	moderate in temperature; describes areas that are warm in summer and cold in winter
Temperature	a measure of average kinetic energy
Tertiary Consumer	third level consumer; an animal that eats animals that eat other animals
Theory	a conceptual model; an attempt to explain the reason that something occurs (Lesson #4)
Thermal Energy	heat energy (Lesson #103)
Till	the debris left behind by a glacier as it moves (Lesson #35)
Trait	a characteristic that is inherited or passed from parent to child; examples: hair color, height, eye color
Transform Boundary	a collision between two of Earth's plates in which the plates slide past each other in opposite directions (Lesson #27)
Transition Metals	Groups 3 through 12 on the periodic table; elements that are harder and more dense than the metals in Groups 1 and 2; good conductors of electricity (Lesson #83)
Transmutation	the act of changing one element to another by changing the nucleus (Lesson #89)
Transpiration	the process by which plants take in water through their roots, then release it into the surrounding air through their leaves
Transverse wave	a wave in which the disturbance is at right angles to the movement of the wave (Lesson #107)

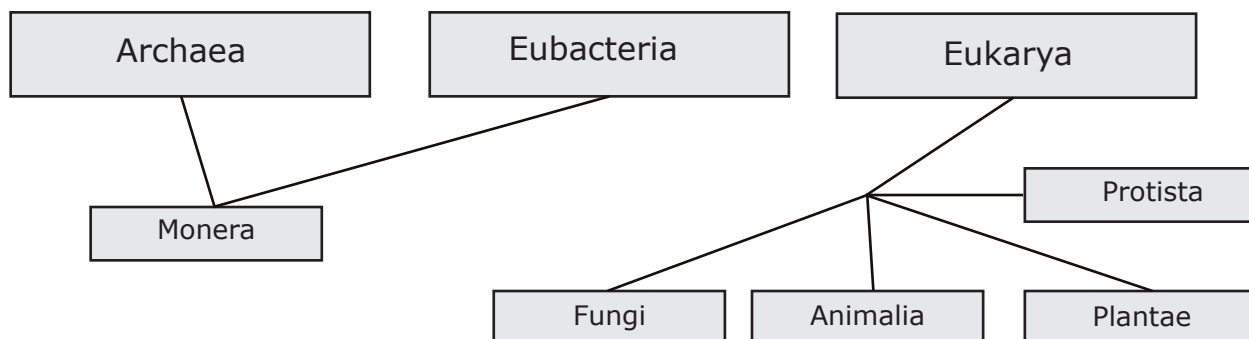
Help Pages

Glossary

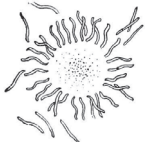



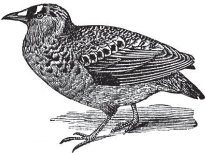
Troposphere	the layer of atmosphere covering Earth's entire surface and containing 90% of all the gases in the atmosphere; the troposphere is where weather occurs
Trough	the low point of a transverse wave (Lesson #107)
Unbalanced Forces	unequal forces acting on the same object; when forces are unbalanced, a change in motion occurs (Lesson #99)
Unicellular	describes an organism made up of only one cell
Variable	something that is changed during an experiment (Lesson #2)
Variation	differences in and among offspring which are caused by the random mixing that occurs during meiosis (Lesson #47)
Velocity	similar to speed; a measure of how fast an object is moving as well as its direction (Lesson #91)
Volcano	an opening or crack in the Earth's crust where magma and gas can come out (Lesson #29)
Volume (Matter)	the amount of space that matter occupies
Volume (Sound)	the loudness of a sound; corresponds to the amplitude of a sound wave
Waning	decreasing; as the surface of the moon gradually becomes less illuminated, we say that the moon is waning (Lesson #14)
Warm Front	weather condition that occurs when a new air mass moving in is warmer and less dense than the previous air mass; causes gentle changes in weather
Water Cycle	the process by which liquid water continually recycles itself by evaporating, condensing, and falling to Earth as precipitation
Waterfall	formed when running water drops over a cliff (Lesson #34)
Wavelength	the measure of a portion of a wave from one crest (or compression) to the next crest (or compression) (Lesson #108)
Wave	a disturbance that carries energy through space and matter; energy is transferred through waves (Lesson #106)
Waxing	increasing; as the surface of the moon gradually becomes more illuminated, we say that the moon is waxing (Lesson #14)
Weathering	the process that breaks big rocks into little ones; weathering can be physical, chemical, or biological (Lesson #31)
Weight	a property of matter created by an object's mass and the gravity it experiences; an object's weight will change if the gravity it experiences changes (Lesson #101)
White Dwarf	a type of star that forms from a Red Giant, when the outer layers are swept away by solar winds (Lesson #23)
Work	effort or activity; the result of force applied over distance

Help Pages

Linnaean Classification: Domains and Kingdoms



Kingdoms

Kingdom	Illustration	Description	Examples
Monera (Bacteria)		one-celled; no nucleus; may absorb or make own food	green sulfur bacteria, purple bacteria, acidophilus
Protista (Protists)		one-celled with nucleus; absorb or make own food; some protists are multicellular	amoeba, diatom, euglena, algae, paramecium, protozoa
Fungi		many-celled; absorb food from their environment; some are unicellular	mushrooms, puffballs, mold, yeast, mildew, toadstools
Plantae		many-celled; cells contain chloroplasts and can make food	trees, flowers, shrubs, grasses, cacti, seaweed, ferns, moss
Animalia		able to move; many-celled; feed on plants and animals	monkeys, birds, fish, octopus, elephants, cats, spiders, humans

Help Pages

Terrestrial Biomes

Biome	Description	Location	Plant Life	Animal Life
Coniferous Forest (Taiga or Boreal Forest)	short, warm, and rainy summers; extremely cold and snowy winters; fewer species than deciduous forests or rainforests; many animals hibernate during winter	Northern Europe, North America, Asia, mountain ranges such as the Rocky Mountains and the Alps	large coniferous trees, such as fir, spruce, and pine; hardy deciduous trees, mosses, lichens, ferns; wildflowers	moose, elk, deer, bear, mountain lions, lynx, wolves, birds, small mammals, and a few reptiles; migrating birds
Deciduous Forest (Temperate Forest)	four distinct seasons; short, mild winters; trees lose their leaves in fall; rich soil with lots of forest floor plant life	Eastern U.S., New Zealand, Europe, China, Japan	tall trees: cedar, elm, oak, maple, linden, hickory, beech; wildflowers and green plants	deer, black bear, wolves, birds, reptiles, amphibians, rodents, and other small mammals
Tropical Rainforest	warm, moist, and humid with high precipitation; many hours of daylight; very rich in plant & animal life; holds the greatest diversity of life	located on or near the equator in Africa, Asia, Australia, Central & South America	lush, green trees and other plants that grow in layers: emergent, canopy, understory, and forest floor	a vast variety of insects, birds, bats, monkeys, snakes, frogs, and lizards

Biome	Average Annual Rainfall (estimates)
Coniferous Forest	40 – 100 cm (400 – 1,000 mm)
Deciduous Forest	75 – 150 cm (750 – 1,500 mm)
Tropical Rainforest	more than 200 cm (2,000 mm+)
Desert	less than 50 cm (<500 mm)
Grasslands	50 – 120 cm (500 – 1,200 mm)
Tundra	15 – 25 cm (150 – 250 mm)

Help Pages

Terrestrial Biomes

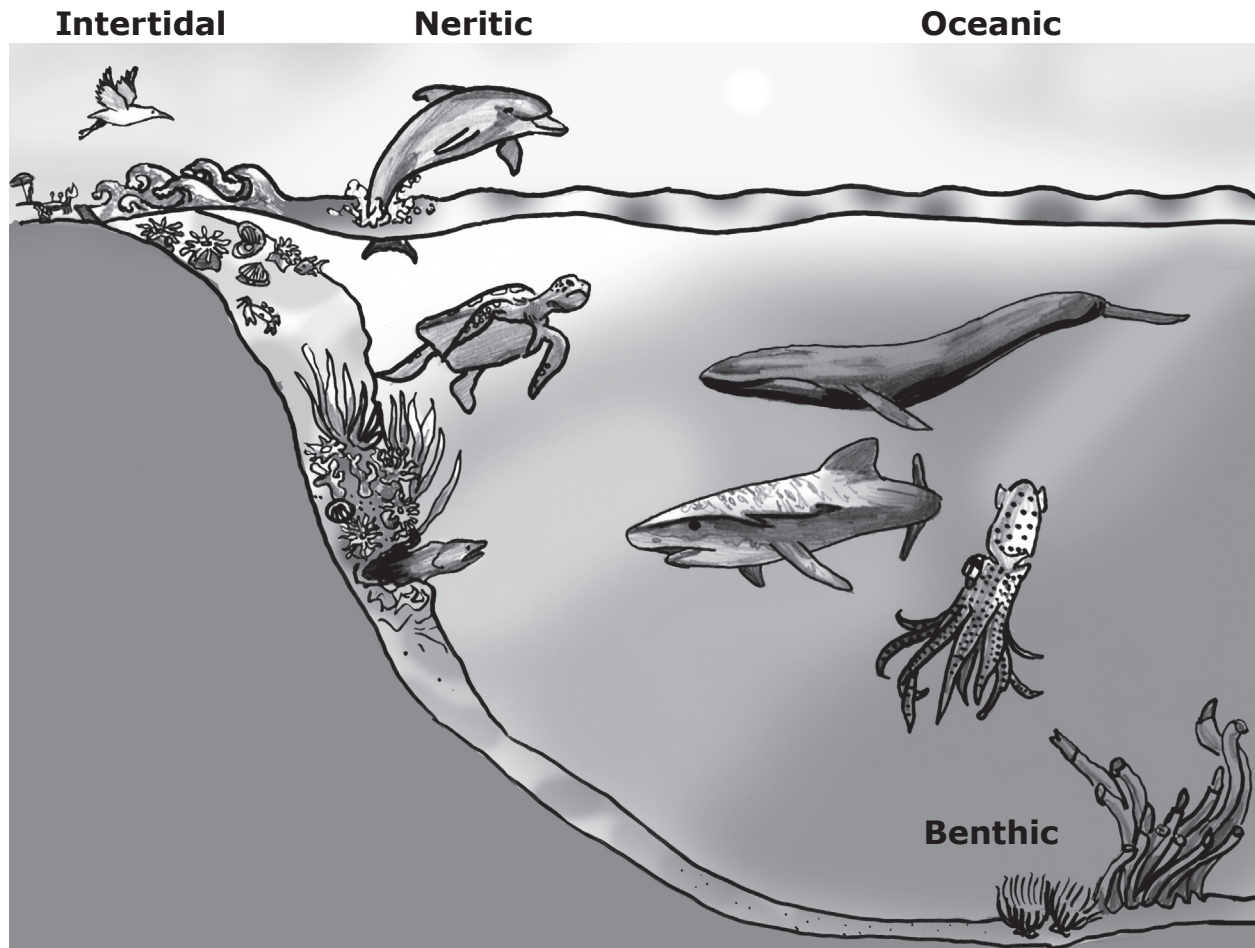
Biome	Description	Location	Plant Life	Animal Life
Desert	hot and dry with extremely low precipitation; sometimes very cold at night; cloudless skies; sandy, coarse, and rocky soil	Africa, Australia, Southern Asia, North America, South America	shrubs, small trees; cacti with very deep root systems, thick skins, and prickly needles	nocturnal animals such as jack rabbits and kit foxes; camels, ants, & other insects; tortoises, owls, lizards, toads
Grasslands (Prairie, Steppe, Pampas, Savanna)	some are temperate; others have hot summers, cold winters; low or inconsistent rainfall; soil quality varies; wildfires are frequent	Asia, Africa, Australia, Europe, North America, South America	thousands of different species of flowering grasses with deep root systems; some short trees and shrubs	pollen-eating insects, humming birds, coyotes, rabbits, turkeys, prairie dogs, buffalo, zebras, lions, eagles, kangaroos
Tundra (Arctic Biome)	coldest and harshest of all land biomes; very little precipitation; constant under-layer of permafrost; nicknamed the "frozen prairie" or "ice desert"	North Pole, Antarctica, Iceland, Siberia, Alaska, Canada, Norway, Sweden, and Finland	mosses, lichens, wildflowers, grasses, shrubs; only short plants that have roots close to the surface are able to survive	large numbers and varieties of insects, migrant birds, small mammals, sheep, oxen, wolves, foxes, caribou, polar bears, mountain goats

Help Pages

Ocean Zones

Mnemonic Device: **I**guanas **N**ever **O**ffer **B**ribes

Zone	Description/Location	Animal Life
Intertidal	where the land and ocean meet; very shallow and warm	crabs, clams, sea anemones
Neritic	extends from the edge of the land to the edge of the continental shelf; stable water; sunlight	dolphins, sea turtles, fish, eels, phytoplankton
Oceanic	includes all open ocean areas away from shore	whales, sharks, squid
Benthic	the ocean floor; very dark	bacteria, worms, sea urchins




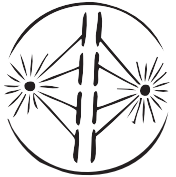
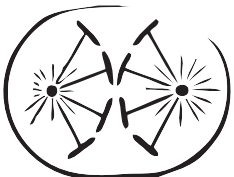

Help Pages

Symbiosis

Symbiosis is a relationship between two organisms living in association with each another. Depending upon the partner and the type of partnership, symbiosis can be beneficial, harmful, or neither. The first partner *initiates the relationship* and *will always benefit* from it. The other partner – called the **host** – is the one who may benefit, be harmed, or be unaffected. When both partners benefit, the type of symbiosis is **mutualism**. When the first partner benefits, but the host is unaffected, the type of symbiosis is **commensalism**. When the first partner benefits, but the host is harmed, the type of symbiosis is **parasitism**.

Cell Cycle

Mnemonic Device: **P**erfect **M**eatballs **A**re **T**asty!

Interphase		before mitosis; the time during which the cell is growing and preparing for division; chromosomes and organelles are copied	
	Prophase	DNA molecule is unwound; chromosomes coil up to separate neatly and to prevent the fragile DNA from being broken	
	Metaphase	chromosomes line up in the center of the cell	
	Anaphase	matching copies of chromosomes are pulled apart to opposite side of the cell	
	Telophase	a membrane forms down the middle of the cell, dividing it in two	

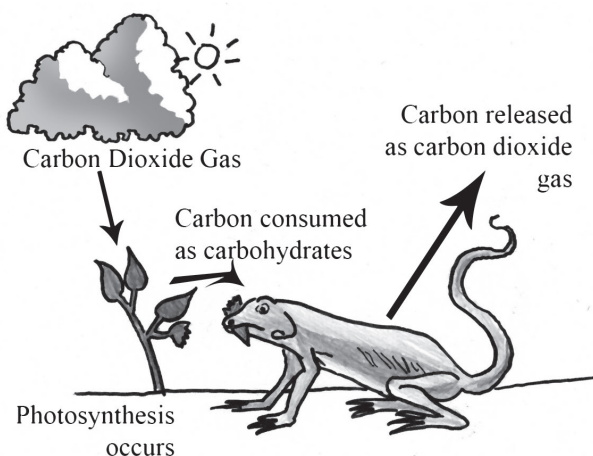
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Nutrient Cycles

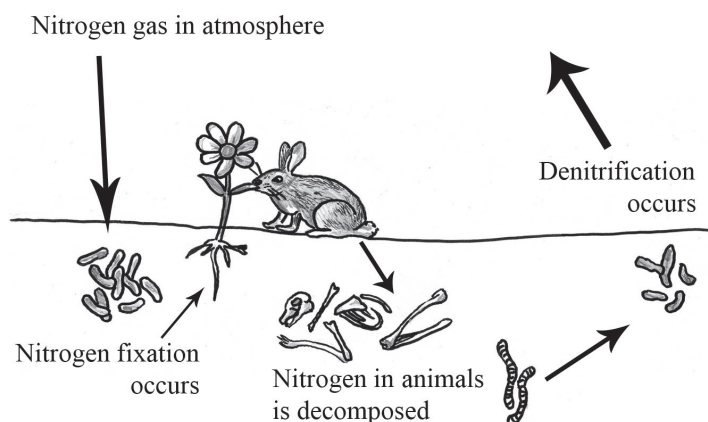
All living things require **nutrients** to stay alive and to grow. These nutrients are all around us in the food we eat, the air we breathe, and the ground that we walk on. The nutrients we depend on do not stay in one place. As organisms interact with their surroundings, and as our environment changes, nutrients move from one location to the next. For example, a water molecule may start out in the ocean, but through the process of evaporation, that same water molecule becomes part of the clouds in the atmosphere. A **nutrient cycle** consists of two parts: the **processes** that move the nutrient from one area to the next and the **reservoirs** (storage areas) where the nutrient will spend some time. In the example of the water molecule, *evaporation* is a *process* while *the ocean* and *the clouds* are *reservoirs*. Some reservoirs, like the ocean, can store water for very long periods of time while others, like rain clouds, hold water for only a few days.

Cycle	Process	Reservoir
Water	evaporation, condensation, precipitation	atmosphere, oceans, rivers, lakes, streams, groundwater, snowcaps, glaciers, bodies of plants and animals
Nitrogen	nitrogen fixation, decomposition, denitrification	atmosphere, soil, bodies of plants and animals
Carbon	photosynthesis, respiration	atmosphere, rocks and minerals, bodies of plants and animals

Carbon Cycle

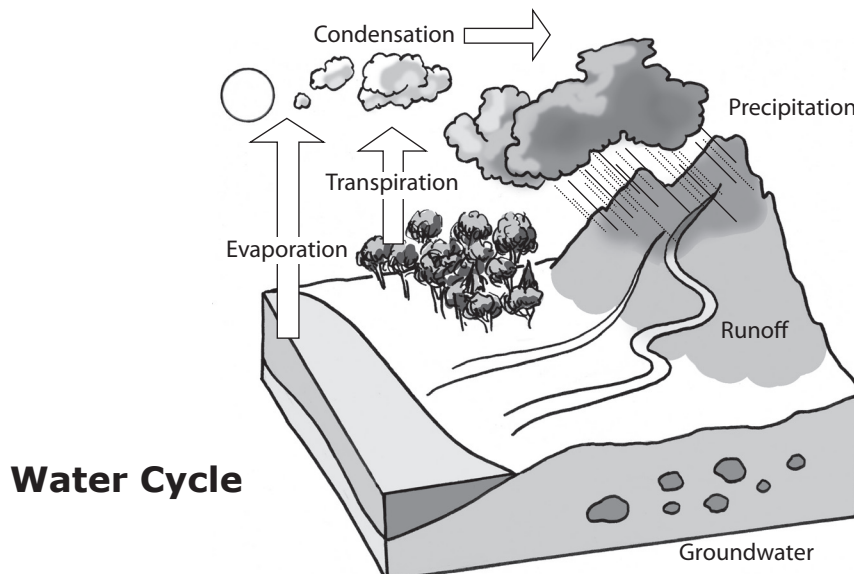


Nitrogen Cycle



Help Pages

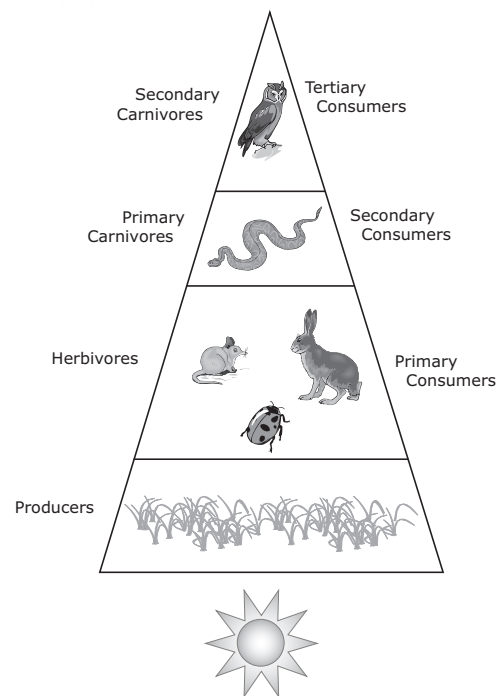
Nutrient Cycles (continued)



Water Cycle

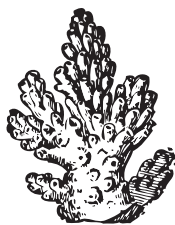
Energy Pyramids / Trophic Levels

To the right is an energy pyramid showing the different trophic levels, and the types of organisms that inhabit each level.

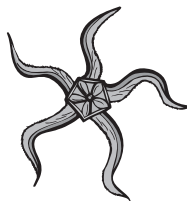


Animal Symmetry

What type of body plan does an animal or organism have? Many animals exhibit what is called *symmetry*. This refers to the level of organization the body has. Some organisms are **asymmetrical**, which means they have no particular organization, while others have **radial symmetry**, meaning they are organized around a central point. The most advanced animals tend to have **bilateral symmetry**, in which the animal's two sides look like mirror images of each other.



Asymmetry




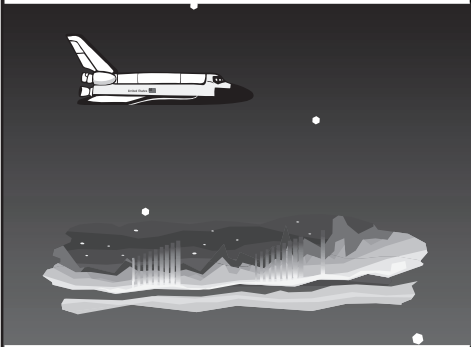

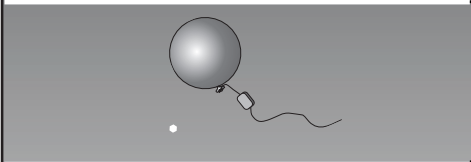

Radial Symmetry



Bilateral Symmetry

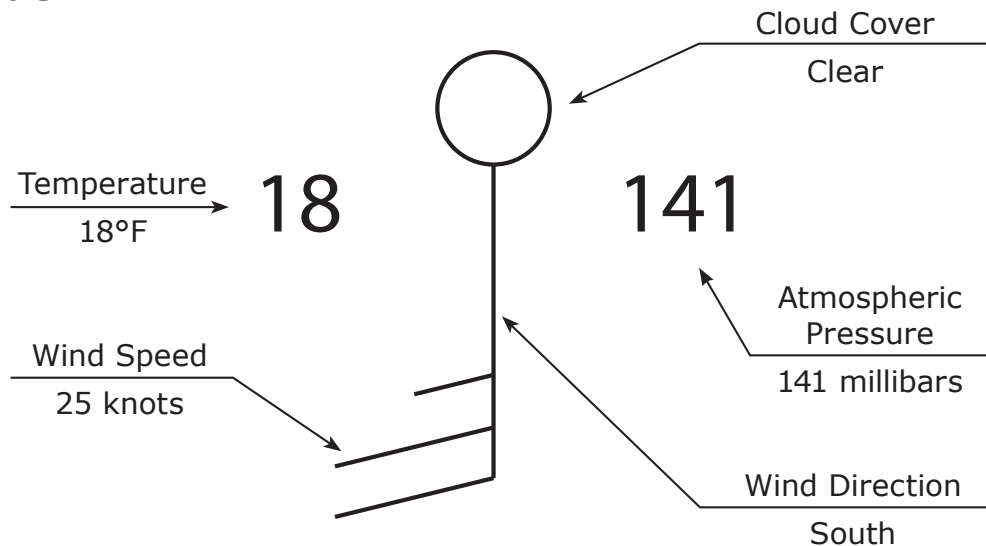
Help Pages

Layers of the Atmosphere

	<p>Exosphere This is where the atmosphere meets outer space.</p>
	<p>Thermosphere The space shuttle flies in this layer. This is where auroras occur.</p>
	<p>Mesosphere Meteors burn up in this layer.</p>
	<p>Stratosphere Weather balloons fly in this layer.</p>
 <p>Mt. Everest</p>	<p>Troposphere Airplanes fly in this layer. This is where weather occurs.</p>

Mnemonic device: **T**remendous **S**ounds **M**ake **T**hings **E**xciting!

Station Model



Help Pages

Electromagnetic Spectrum

All of the different types of light waves make up the electromagnetic spectrum.

Gamma rays have the most energy of all the waves in the electromagnetic spectrum. They have very short wavelengths and very high frequencies. The distance of one gamma wavelength is shorter than one billionth of a meter (0.000000001 m). Gamma rays can be very harmful because they can kill human cells. That is why gamma rays are sometimes used to kill cancer cells. Gamma rays are most typically associated with radioactive elements and nuclear reactions.

X-rays have less energy than gamma rays but can still be very harmful. The wavelength of an x-ray is slightly longer than a gamma ray, but x-rays are also very short and have very high frequencies. X-rays are powerful enough to move through clothing and skin. Because of this power, doctors use x-rays to look for dental cavities and broken bones.

Ultraviolet rays are longer than x-rays and have less energy. However, ultraviolet waves still have a great deal of energy. Most ultraviolet rays come from the sun. These UV waves are responsible for sunburn. However, humans need some ultraviolet radiation to help make vitamin D which builds healthy bones and a healthy nervous system.

Visible light waves include the energy waves that can be seen with the human eye. The light in the visible range can be divided into a spectrum of seven different colors: red, orange, yellow, green, blue, indigo, and violet. These are the colors of the rainbow. The different colors that we see are due to visible waves with different amounts of energy. The highest energy of visible light is violet light while the lowest energy light is red. When all of the colors of the rainbow are mixed together, the light we see is white. White light can be separated into the seven colors with the help of a prism.

Infrared waves have less energy than visible light waves and a longer wavelength. Infrared radiation can not be seen, but it can be felt. Many forms of infrared radiation give off heat. In restaurants, heat lamps use infrared radiation to keep food warm. The remote control for a television set also uses infrared radiation. Waves travel from the remote control to the television to change a channel or turn the TV on or off.

Microwaves are near the end of the electromagnetic spectrum, and these wavelengths are much longer than those of infrared waves; they vary from several centimeters to almost one foot in length. Microwaves are low energy waves and can be a very helpful form of radiation. They are used to cook food in microwave ovens. Wireless computers and radar detectors use microwave technology.

Radio waves are the longest wavelengths; they can be longer than a football field! Radio waves have the lowest energy of all the waves in the electromagnetic spectrum. Radios, televisions, and cellular phones all use radio waves for communication. Radio waves can even carry information from outer space.

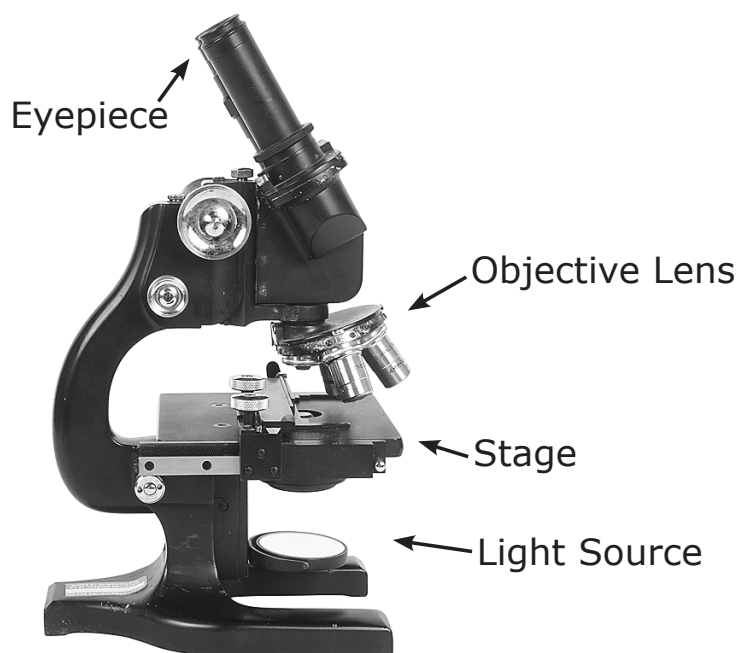
Help Pages

Temperature

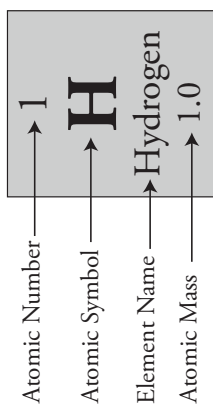
The **Kelvin** scale is a temperature scale that is based on absolute zero. **Absolute zero** is the coldest that an object can get. If an object were to cool down to absolute zero, all of the particle motion in the object would stop. Nothing in our everyday life comes anywhere close to absolute zero; however scientists experimenting in laboratories have gotten pretty close. A Kelvin unit is the same size as a Celsius unit, but Kelvin starts at a different place. On the Kelvin scale, water melts (or freezes) at a temperature of 273 K and boils at a temperature of 373 K.

Temperature	Fahrenheit	Celsius	Kelvin
Water Boils	212°F	100°C	373 K
Water Freezes	32°F	0°C	273 K
Normal Human Body Temperature	98.6°F	37°C	310 K
Room Temperature	68°F	20°C	293 K
Absolute Zero	-459.69°F	-273.16°C	0 K

Parts of a Compound Light Microscope



Periodic Table of the Elements



1 H Hydrogen 1.0	2 He Helium 4.0
3 Li Lithium 6.9	4 Be Beryllium 9.0
11 Na Sodium 23.0	12 Mg Magnesium 23.0
19 K Potassium 39.1	20 Ca Calcium 40.1
37 Rb Rubidium 85.5	38 Sr Strontium 87.6
55 Cs Cesium 132.9	56 Ba Barium 137.3
87 Fr Francium (223)	88 Ra Radium (226)
9 F Fluorine 19.0	10 Ne Neon 20.2
17 Cl Chlorine 35.5	18 Ar Argon 40.0
35 Br Bromine 79.9	36 Kr Krypton 83.8
53 I Iodine 126.9	54 Xe Xenon 131.3
85 At Astatine (210)	86 Rn Radon (222)
13 Al Aluminum 27.0	14 Si Silicon 28.1
31 Ga Gallium 69.7	32 Ge Germanium 72.6
49 In Indium 114.8	50 Sn Tin 118.7
81 Tl Thallium 204.4	82 Pb Lead 207.2
113 Ni Nihonium (284)	114 Fl Flerovium (289)
115 Mc Moscovium (289)	116 Lv Livermorium (293)
117 Ts Tennessine (294)	118 Og Oganesson (294)
5 B Boron 10.8	6 C Carbon 12.0
7 N Nitrogen 14.0	8 O Oxygen 16.0
15 P Phosphorus 31.0	16 S Sulfur 32.1
33 As Arsenic 74.9	34 Se Selenium 79.0
51 Sb Antimony 121.8	52 Te Tellurium 127.6
83 Bi Bismuth 209.0	84 Po Polonium (209)
115 Uup Ununpentium (289)	116 Uuh Ununhexium (293)
117 Uus Ununseptium (unknown)	118 Uuo Ununoctium (294)
29 Cu Copper 63.6	30 Zn Zinc 65.4
47 Ag Silver 107.9	48 Cd Cadmium 112.4
79 Au Gold 197.0	80 Hg Mercury 200.6
111 Rg Roentgenium (268)	112 Cn Copernicium (285)
28 Ni Nickel 58.7	29 Cu Copper 63.6
46 Pd Palladium 106.4	47 Ag Silver 107.9
78 Pt Platinum 195.1	79 Au Gold 197.0
110 Ds Darmstadtium (277)	111 Rg Roentgenium (268)
27 Co Cobalt 58.9	28 Ni Nickel 58.7
45 Rh Rhodium 102.9	46 Pd Palladium 106.4
77 Ir Iridium 192.22	78 Pt Platinum 195.1
109 Mt Meitnerium (266)	110 Ds Darmstadtium (277)
26 Fe Iron 55.9	27 Co Cobalt 58.9
44 Ru Ruthenium 101.1	45 Rh Rhodium 102.9
76 Os Osmium 190.23	77 Ir Iridium 192.22
108 Hs Hassium (266)	109 Mt Meitnerium (266)
25 Mn Manganese 54.9	26 Fe Iron 55.9
43 Tc Technetium 98.0	44 Ru Ruthenium 101.1
75 Re Rhenium 186.21	76 Os Osmium 190.23
107 Bh Bohrium (264)	108 Hs Hassium (266)
24 Cr Chromium 52.0	25 Mn Manganese 54.9
42 Mo Molybdenum 95.9	43 Tc Technetium 98.0
74 W Tungsten 183.84	75 Re Rhenium 186.21
106 Sg Seaborgium (266)	107 Bh Bohrium (264)
23 V Vanadium 50.9	24 Cr Chromium 52.0
41 Nb Niobium 92.9	42 Mo Molybdenum 95.9
73 Ta Tantalum 180.95	74 W Tungsten 183.84
105 Db Dubnium (262)	106 Sg Seaborgium (266)
22 Ti Titanium 47.9	23 V Vanadium 50.9
40 Zr Zirconium 91.2	41 Nb Niobium 92.9
72 Hf Hafnium 178.49	73 Ta Tantalum 180.95
104 Rf Rutherfordium (261)	105 Db Dubnium (262)
21 Sc Scandium 44.9	22 Ti Titanium 47.9
39 Y Yttrium 88.9	40 Zr Zirconium 91.2
57-71 *	72 Hf Hafnium 178.49
89-103 **	104 Rf Rutherfordium (261)
57 La Lanthanum 138.9	58 Ce Cerium 140.1
89 Ac Actinium (227)	90 Th Thorium 232.0
61 Pm Promethium (145)	62 Sm Samarium 150.4
93 Np Neptunium (237)	94 Pu Plutonium (244)
60 Nd Neodymium 144.2	61 Pm Promethium (145)
92 U Uranium 238.0	93 Np Neptunium (237)
59 Pr Praseodymium 140.9	60 Nd Neodymium 144.2
91 Pa Protactinium (231)	92 U Uranium 238.0
63 Eu Europium 152.0	64 Gd Gadolinium 157.3
95 Am Americium (260)	96 Cm Curium (243)
65 Tb Terbium 158.9	66 Dy Dysprosium 162.5
97 Bk Berkelium (247)	98 Cf Californium (251)
67 Ho Holmium 164.9	68 Er Erbium 167.3
101 Md Mendelevium (258)	102 No Nobelium (259)
69 Tm Thulium 168.9	70 Yb Ytterbium 173.0
103 Lr Lawrencium (260)	104 Rf Rutherfordium (261)
71 Lu Lutetium 175.0	72 Hf Hafnium 178.49

() Refers to the atomic mass of the most stable isotope.

Uut Elements in gray have temporary names and not all of their properties are known.

State of Phase at Room Temperature
 solid gas liquid

Elements to the left of the “step” are metals, and those to the right are nonmetals.

* 57 La Lanthanum 138.9	* 58 Ce Cerium 140.1	* 59 Pr Praseodymium 140.9	* 60 Nd Neodymium 144.2	* 61 Pm Promethium (145)	* 62 Sm Samarium 150.4	* 63 Eu Europium 152.0	* 64 Gd Gadolinium 157.3	* 65 Tb Terbium 158.9	* 66 Dy Dysprosium 162.5	* 67 Ho Holmium 164.9	* 68 Er Erbium 167.3	* 69 Tm Thulium 168.9	* 70 Yb Ytterbium 173.0	* 71 Lu Lutetium 175.0
** 89 Ac Actinium (227)	** 90 Th Thorium 232.0	** 91 Pa Protactinium (231)	** 92 U Uranium 238.0	** 93 Np Neptunium (237)	** 94 Pu Plutonium (244)	** 95 Am Americium (260)	** 96 Cm Curium (243)	** 97 Bk Berkelium (247)	** 98 Cf Californium (251)	** 99 Es Einsteinium (252)	** 100 Fm Fermium (257)	** 101 Md Mendelevium (258)	** 102 No Nobelium (259)	** 103 Lr Lawrencium (260)