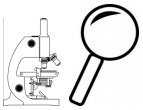
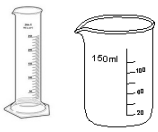
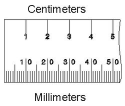
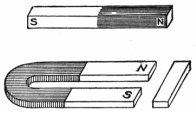
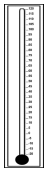
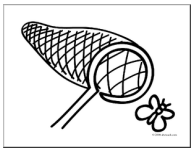
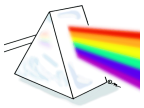
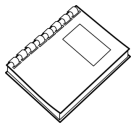
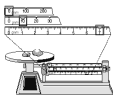
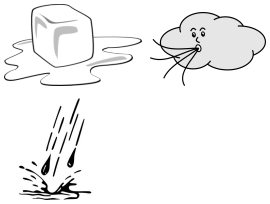
Safety
hazard- a possible source of danger
precaution- an action taken before to guard against possible danger
safety equipment- materials such as goggles, gloves, or protective clothing to keep us safe

Scientific Instruments (Tools)			
calculators and computers-organize data		spring scale- measures weight or force in grams or newtons	
microscopes and hand lenses- magnify small objects		graduated cylinders and beakers- used to measure volume in milliliters or liters	
camera- record observations using images or video		hot plate- used to heat substances	
metric rulers and meter sticks- measures length or distance in meters or centimeters		magnets- piece of iron that exhibits magnetic properties	
Celcius thermometer- measures temperature in degrees Celcius		collecting net- used to collect living things like insects	
prism- a transparent geometric object that refracts light and separates it into the spectrum of colors		notebook- used to record data and observations	
mirror- a shiny surface that reflects light		timing devices (clocks and stopwatches)- used to record time	
pan balance and triple beam balance- measure mass in grams		terrariums and aquariums- habitats for living things	

Earth Changes		
Agents of Change		Type of Landforms
weathering- the breaking down of rock into sediment	weathering-break it, break it 	delta- a fan shaped deposit of sediment at the mouth of a river 
erosion- the movement of sediment from one place to another	erosion- move it, move it 	canyon- a v-shaped valley eroded by a river 
deposition- the laying down of sediment	deposition- drop it, drop it 	sand dune- a mound or hill of wind blown sand 
wind, water, and ice are agents of weathering, erosion, and deposition		u-shaped valley- valley created by movement of a glacier 

Slow vs. Rapid Changes to Earth's Surface
Slow Changes- weathering, erosion, deposition; creation of canyons, valleys, deltas, mountain formation
Rapid (fast) Changes- volcanic eruptions, earthquakes, tsunamis, landslides, floods

Constructive vs. Destructive Forces	
Constructive Forces- forces that build up the land; examples include deposition, delta formation, sand dune formation, mountain formation, volcano formation	Destructive Forces- forces that tear down the land; examples include weathering, erosion, formation of canyons and valleys, earthquakes, landslides, volcanic eruptions

Soil

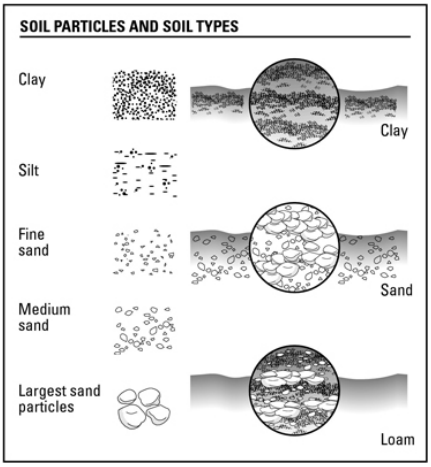
Types of Soil Particles

clay- tiny particles, hold lots of water, smooth and sticky

silt- small particles, holds water pretty well, smooth

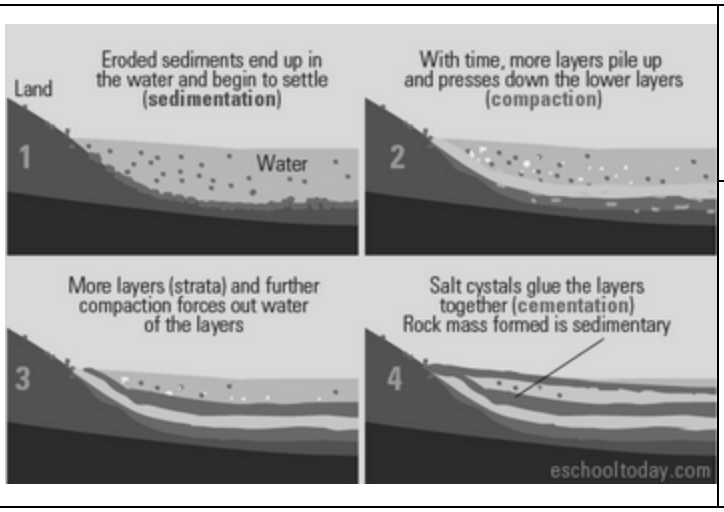
sand- larger particles, does not hold water well, gritty

humus- rich dark organic nutrient rich soil that supports plant life

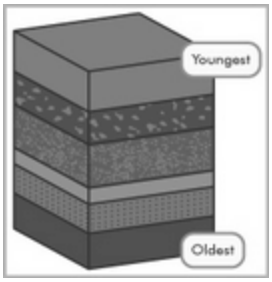


Sedimentary Rocks

sedimentary rocks- formed when layers of sediment are pressed together and harden over time examples- limestone, coal, shale, sandstone

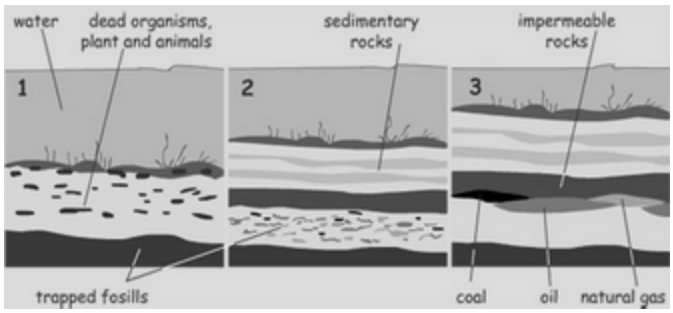


Layers of Sediment + Pressure + Millions of Years = Sedimentary Rock



Fossil Fuels

fossil fuel- non-renewable resource formed from remains of dead organisms



examples are coal, petroleum (oil), and natural gas

fossil fuels take millions of years to form and form in sedimentary rock

Remains Dead Organisms + Sediment Layers + Pressure + Time = Fossil Fuel

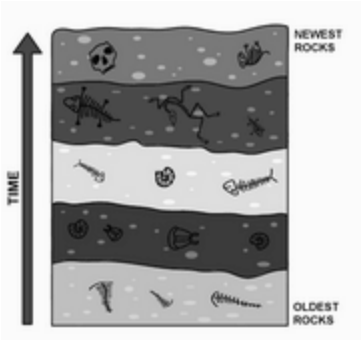
burning fossil fuels releases energy from the sun stored in the dead living things

Fossils

fossil- the preserved remains or traces of a living thing from long ago ; formed when an organism is buried in sediment and slowly hardens into rock or is trapped in tar, ice, or sap

fossils give evidence of past living organisms
- what organisms ate
- what organisms looked like
- what organisms lived
- how organisms moved
- how life on earth has changed over time

fossils give evidence of past environments
- what the climate was like in the past- warm or cool, dry or wet
- what type of environment is was in the past- forest, ocean, swamp, desert, etc.
- how the environment has changed over time



fossils are found in sedimentary rock

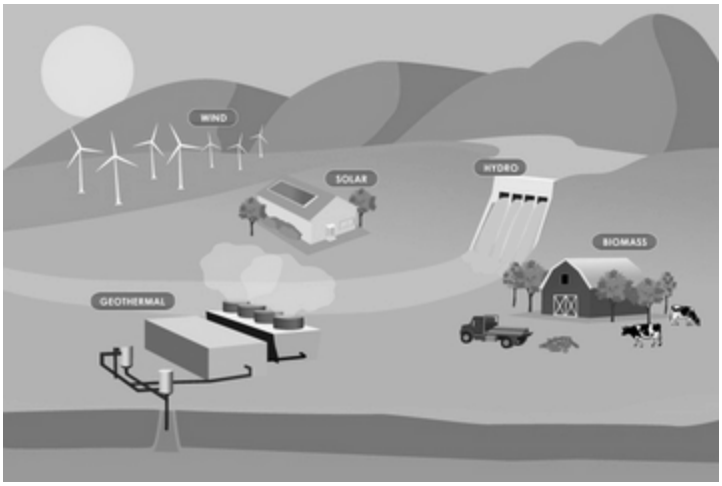
Natural Resources

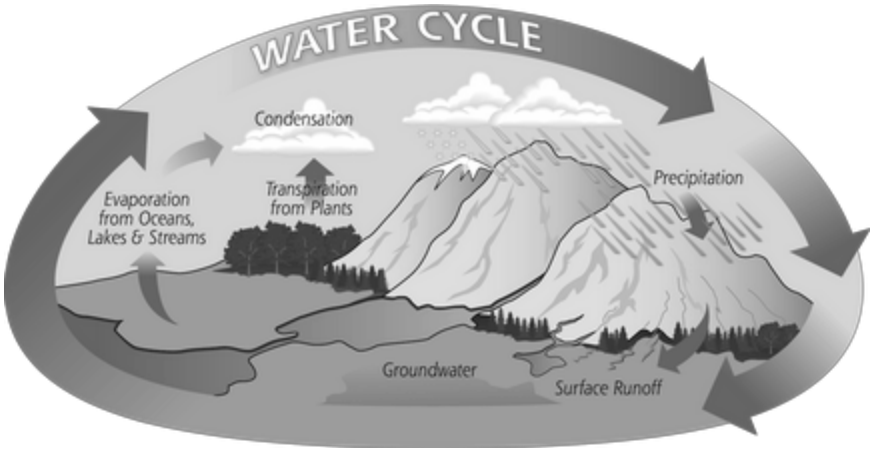
renewable resources- resources that can be replaced	non-renewable resources- resources that are being used faster than can be replaced
examples- wind, water, solar, wind, geothermal, biofuels	examples- fossil fuels (oil, coal, natural gas), minerals, soil

Alternative Energy Resources

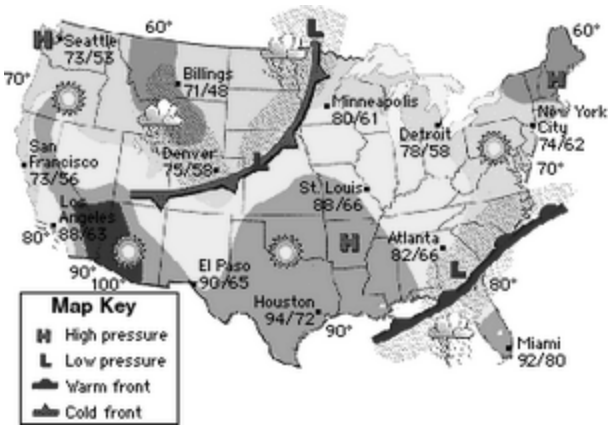
We must conserve nonrenewable energy resources such as fossil fuels, which are running out and find alternative energy resources that are renewable

solar energy- energy from the sun
wind energy- energy from moving air
hydroelectric- energy from water
geothermal- energy from heat inside earth
biomass- energy from living things



Water Cycle
water cycle- the continuous movement of water between the earth's surface and atmosphere that recycles water

The sun is the driving force of the water cycle that provides energy for evaporation to happen.

Weather vs. Climate	
weather-the condition of the atmosphere at a given time	climate- the average weather conditions over a long period of time
Examples: ● It is 72°F outside today. ● The wind is blowing southeast at 10 mph. ● It will be rainy tomorrow. ● The temperature this week will be between 50°F and 60°F	Examples: ● The average temperature in for the month of July is 90°F. ● The average yearly rainfall in our area is 25 inches. ● Texas has hot humid summers.

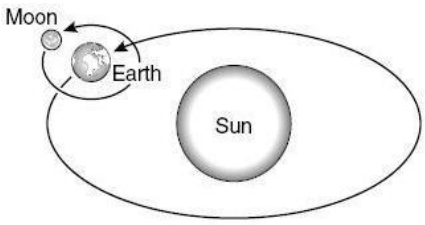
Weather Maps and Forecasting	
	A map key tells what the symbols on a weather map mean. high pressure- cool, dry air that brings fair weather with light winds low pressure- warm, moist air that bring stormy weather with high winds warm front- brings warmer air and often precipitation cold front- brings cooler air and often storms or precipitation

Movement of Earth, Sun, and Moon

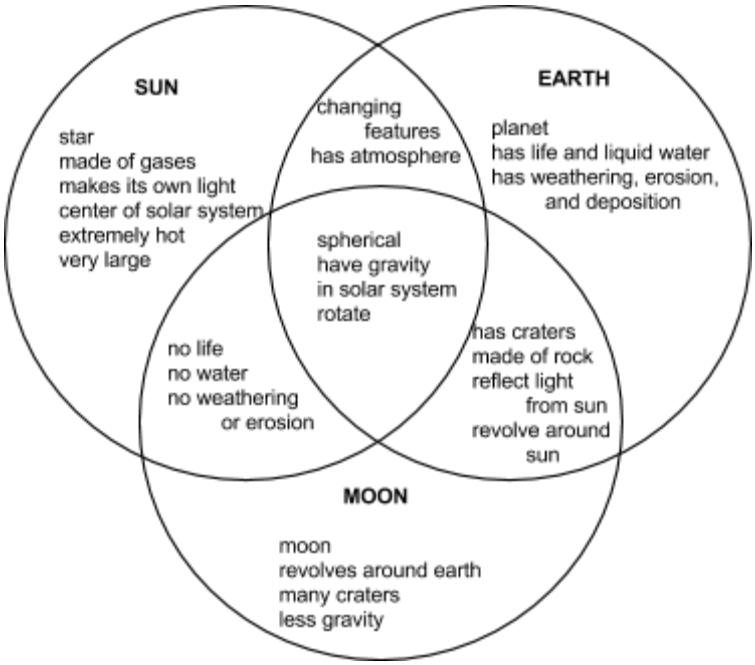
The earth rotates or spins on its axis every 24 hours causing the day and night cycle. This also causes the sun to appear to move across the sky as well as the moon and stars.

The earth revolves around the sun every 365 days or 1 year.

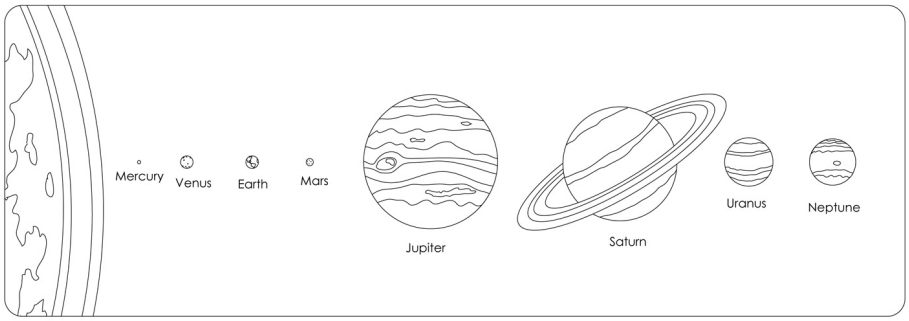
The moon rotates on its axis and revolves around the sun.



Comparing the Earth, Sun, and Moon



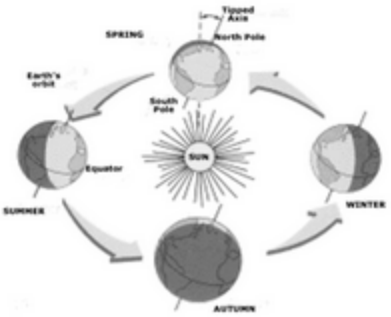
Order of the Planets from the Sun



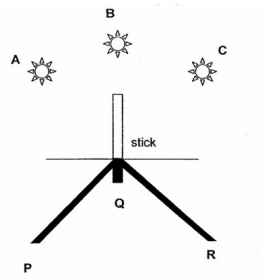
My Very Eager Mother Jupiter Served Uranus Nachos!

Patterns of Change on Earth

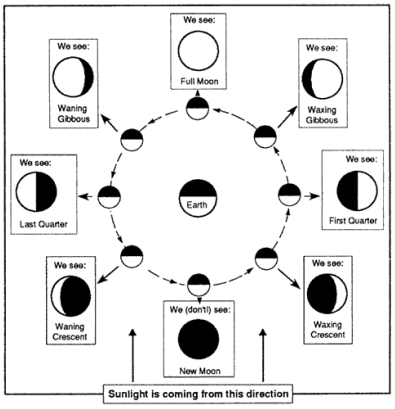
Seasons- Our earth has seasons because the earth's axis is tilted as it revolves around the sun. The number of daylight of hours, angle of sunlight received, and temperatures change with the seasons. In the summer, when the earth is tilted toward the sun the days are longer and temperatures are warmer. In the winter, when the earth is tilted away from the sun the days are shorter and temperatures are cooler.



Shadows- Due to the apparent motion of the sun across the sky, objects blocking the sun's light can create shadows. Shadows will be longest in morning and afternoon and shortest at noon. The shadow is always opposite the direction of the sun. Shadows are longer in the winter when the sun appears lower in the sky and higher in the summer when the sun appears higher in the sky.



Moon Phases- The moon appears to change shape in the sky due to the revolution of the moon around the earth. The portion of the lit part we see changes. A new moon is when we see none of the lit part and a full moon is when we see all the lit part. A quarter moon is when we see half of the lit part. A crescent moon are smaller than quarter moon and a gibbous moon is bigger than a quarter moon.
"Wax On" with your right hand- the moon is "turning on" and lit on the right.
"Wane Off" with your left hand- the moon is turning off and lit on the left.



Tides- Tides are the natural rising and falling of the ocean levels caused by the pull of gravity between the moon and earth.

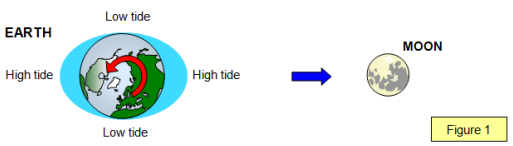
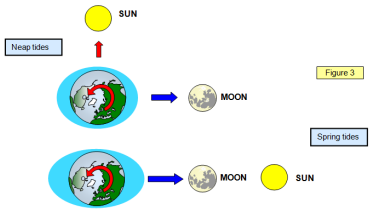


Figure 1



The tides change approximately every 6 hours due to the rotation of the earth with 2 high tides and 2 low tides each day. The tides also change monthly as the moon revolves around the earth. When the earth, sun, and moon are in line during the new moon and the full moon, the strong gravitational pull creates spring tides twice a month. When the earth, sun, and moon form an L shape during the quarter moons, weaker neap tides are formed twice a month.

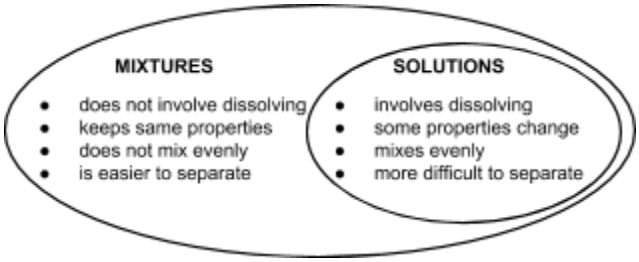
Classifying Matter by Physical Properties

mass- amount of matter in an object; measure with a triple beam balance
state of matter- matter can be a solid, liquid, or gas
magnetism- an object''s ability to be attracted to a magnet; steel, iron, cobalt, and nickel are magnetic
relative density- if an object floats or sinks in water or compared to another substance; if an object floats it is less dense and if it sinks it is more dense
solubility in water- ability of a substance to dissolve; soluble or insoluble
ability to conduct or insulate thermal or electrical energy- metals are good conductors; plastic, rubber, wood, glass, and nonmetals are good insulators

Constant Properties of Water

boiling point- 100°C, changes from a liquid to a gas melting point- 0°C, changes from a solid to a liquid freezing point- 0°C, changes from a liquid to a solid	*constant regardless of the amount of water or the current temperature

Mixtures and Solutions



*Mixtures and solutions can be separated using their different physical properties

Hand- separate objects that are easy to pick out 	Magnet- separate objects that are magnetic- steel, iron 	sieve or strainer separate objects of different sizes 	float/sink in water- separate objects of different densities 	filter- separate solid from liquid 	evaporation- use to separate solutions 

Types of Energy

mechanical energy- energy of motion 	thermal energy- heat energy; energy of movement of particles 	light energy- energy that travels as waves and can be seen 	sound energy- energy that travels as vibrations and can be heard 	electrical energy- energy of moving electrons 

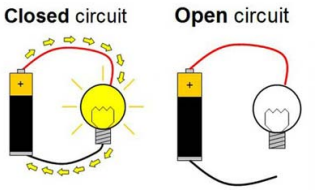
Electrical Energy

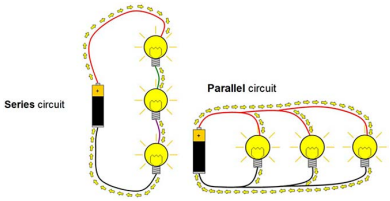
electricity requires a complete path or circuit for electrical energy to flow; the flow of electrical energy is called electric current

an electrical circuit requires:

- an energy source such as a battery
- a conducting material such as metal wire to carry the electric current
- a receiver or source such as a light bulb, motor, or buzzer

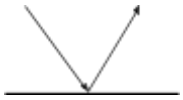
a circuit can also have a switch to turn it on and off





Light Energy

light energy travels in a straight line until it strikes an object or passes from one type of matter to another

Light can be absorbed or taken in by an object	Light can be reflected or bounce off an object	Light can be refracted or bent.	Light can be transmitted or pass straight through
			
any opaque (non see through objects)- most everyday objects absorb some light	mirrors and other shiny surfaces like metal, windows, calm water	lenses used in eyeglasses, microscopes, cameras; prisms, water	glass or other transparent (see through objects) like clear glass or plastic

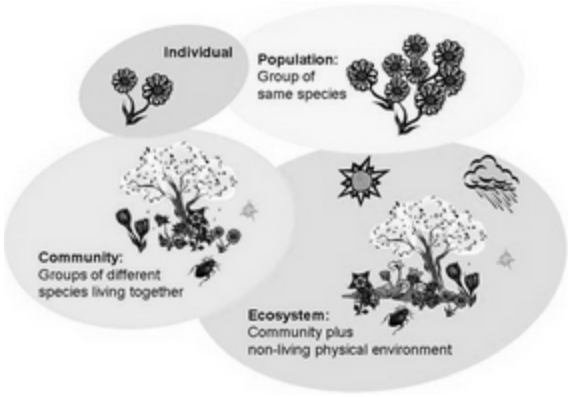
Forces and Motion

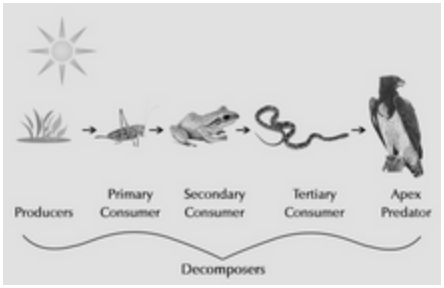
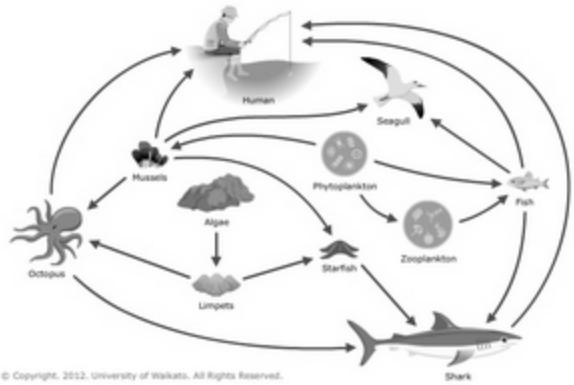
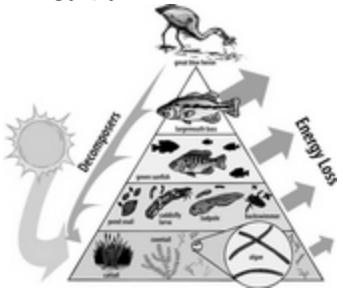
force- a push or a pull

gravity- a force that pulls objects toward one another

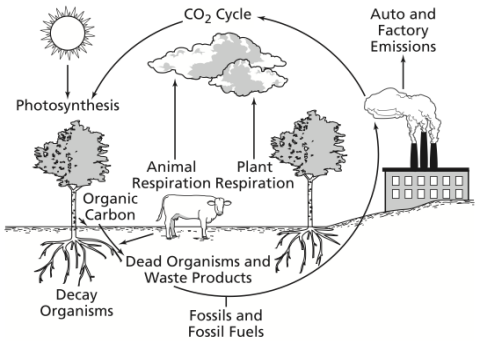
friction- a force of one object rubbing against another object causing it to slow down

magnetism- a force that creates a magnetic field and pulls iron objects toward one another

Interdependency in Ecosystems	
Organisms <u>interact</u> and <u>depend</u> on other organisms and the non-living elements in an ecosystem to survive living + non-living = ecosystem a <u>habitat</u> is the place where an organism lives in an ecosystem an organism's <u>niche</u> is its role or job in its ecosystem	

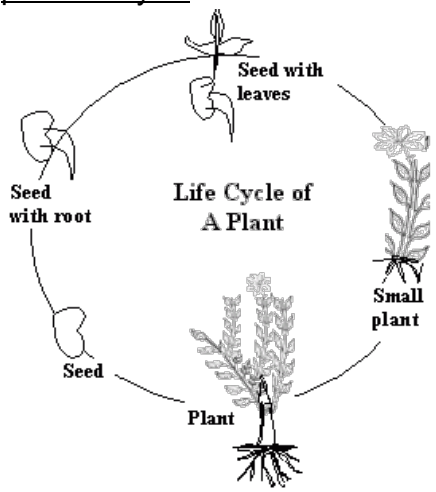
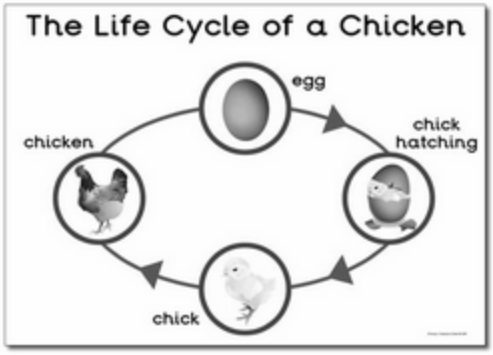
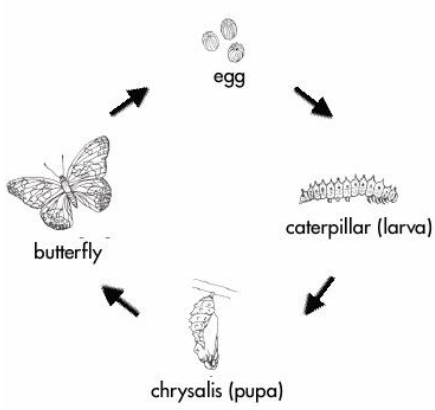
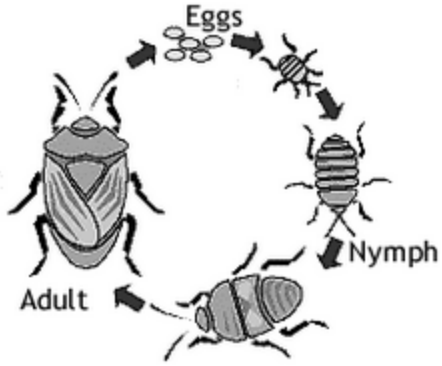
Transfer of Energy in Ecosystems		
Energy is transferred (or passed on) through an ecosystem from organism to organism	All this energy that is transferred starts from the sun.	Plants take the energy from the sun and turn it into a form that other organisms can use
<u>Producers</u> are use the sun's energy to make food through photosynthesis ● plants including grasses, trees, flowers, bushes, etc.	<u>food chain</u> 	
<u>Consumers</u> are organisms that consume (or eat) other organisms to obtain energy ● <u>herbivores</u>- consumers that eat only producers (plants) ● <u>omnivores</u>- consumers that eat only other consumers (animals) ● <u>omnivores</u>- consumers that eat both plants and animals	<u>food web</u> 	
<u>Decomposers</u> are organisms that break down dead organisms fungus, bacteria, and some insects	<u>energy pyramid</u> 	

Changes to Ecosystems		
Changes from Natural Disasters- fires, earthquakes floods, volcanoes, climate changes over time	Changes by Organisms- organisms building homes (nests, dams, etc.), overgrazing due to overpopulation	Changes by Humans- destroying habitats to build, pollution, introducing foreign species, hunting
Effects- organisms overcome and survive, move and find new habitats, slowly adapt over time, or die		

Carbon Dioxide- Oxygen Cycle	
Plants need CO_2 to make food through photosynthesis and give off O_2 Animals need O_2 for respiration (breathing) and give off CO_2	

Adaptations	
adaptation- a characteristic or behavior of an organism that helps it survive	
Purpose	Examples
Obtain food, energy or water	● beaks and talons of hawks and eagles ● long sticky tongues of frogs to eat ● shallow or deep roots of plants to get water ● large leaves of plants to get sunshine ● herbivores have large flat teeth for chewing plants ● carnivores have sharp teeth for tearing meat
Protection	● thorns on plants to keep organisms from eating ● poisonous leaves to keep predators from eating ● odor of skunks and other organisms ● camouflage or mimicry to hide from predators ● hard shell of turtle or armadillo to protect and hide
Water conservation	● scaly skin of lizard ● thick waxy leaves that prevent loss of water ● thick trunks and branches of cacti to store water
Movement	● birds have light bones to fly ● water birds have webbed feet to swim
Hearing or Seeing	● owls have sensitive ears to help find prey ● eagles and hawks have excellent eye -sight to see prey

Inherited Traits vs. Learned Behaviors	
Inherited Trait- a physical characteristic you are born with	Learned Behavior- a behavior you learn
• color of eyes • height • color of fur or skin • leaf shape • color of flower • type of seeds	• reading or writing • going to a certain location looking for food • animal doing a trick • animal learning how to hunt or how to build a nest

Life Cycles	
Life cycle- the sequence of stages or changes in the life of an organism	
plant life cycle  *adult plant produces seeds and cycle repeats	direct development- develop through slowing growing but keeping the same basic features  examples- most mammals, birds, and reptiles
complete metamorphosis- organism's appearance changes drastically at each of its 4 growth stages egg, larva, pupa, adult (ELPA)  examples- butterflies, beetles, moths	incomplete metamorphosis- organism changes appearance slightly at each of its 3 growth stages egg, nymph, adult (ENA)  examples- grasshoppers, dragonflies, cockroaches