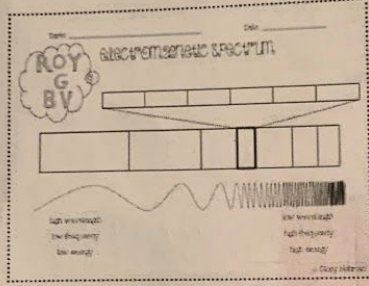


6.P.1 Understand the properties of waves and the wavelike property of energy in earthquakes, light and sound.

6.P.1.1 Compare the properties of waves to the wavelike property of energy in earthquakes, light and sound.
 6.P.1.2 Explain the relationship among visible light, the electromagnetic spectrum, and sight.
 6.P.1.3 Explain the relationship among the rate of vibration, the medium through which vibrations travel, sound and hearing.

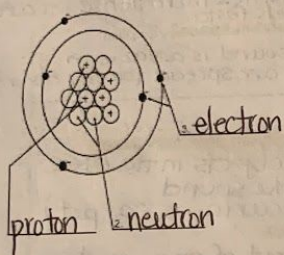
<p>Electromagnetic Spectrum: Label and color the EM Spectrum.</p> 	<p>Visible Light:</p> <p>What colors are included in visible light (use the acronym to help)?</p> <p>R-O-Y-G-B-I-V</p> <p>Draw a diagram to show what colors have the largest and smallest wavelength.</p>
<p>Absorption: What is absorption? Matter can capture electromagnetic radiation and convert the energy of a photon to internal energy.</p>	<p>Scattering: What is scattering? When a beam of light is redirected in many different directions when it interacts with a particle of matter.</p>
<p>What medium does light travel through fastest?</p> <p>Light travels the fastest in a <u>Vacuum</u>. Light travels slower in <u>Solids, liquids, gases</u>. Light travels <u>faster</u> than sound.</p>	<p>Refraction: What is light refraction? When light moves from one substance to another it changes speed & direction. What happens when white light is refracted? You can see the light spectrum (rainbow) bc each color travels @ different speeds.</p>
<p>Transparent, Translucent and Opaque:</p> <p>What is transparent? Allow light to pass through easily. What is translucent? Allows light to pass through, but you can't see the objects behind it clearly. What is opaque? Allows no light to pass through it.</p>	<p>Why does an object appear black, white, or green?</p> <p>Black: All colors from light are absorbed and No light is reflected. White: All colors from light are reflected. Green: All colors from light are absorbed but only green is reflected back to your eyes.</p>

6.P.2 Understand the structure, classifications and physical properties of matter.

6.P.2.1 Recognize that all matter is made up of atoms and atoms of the same element are all alike, but are different from the atoms of other elements.

6.P.2.2 Explain the effect of heat on the motion of atoms through a description of what happens to particles during a change in phase.

6.P.2.3 Compare the physical properties of pure substances that are independent of the amount of matter present including density, boiling point, melting point and solubility to properties that are dependent on the amount of matter present to include volume, mass and weight.



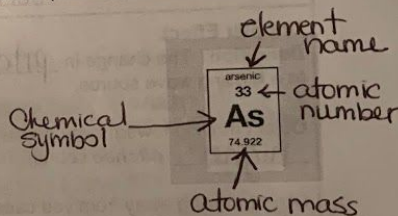
Label the diagram: electron, neutron, proton

The nucleus is the center of the atom. protons and neutrons are both found in the nucleus of an atom and electrons are found orbiting the nucleus.

The atomic number tells us how many protons (and electrons) an element has. You can subtract the atomic number from the atomic mass (rounded) to find the

number of neutrons.

Subatomic Particle	Charge
Neutrons	0
Protons	+
Electrons	-



Element / Atom / Molecule / Compound

Basic substance made of a single type of atom?
element

Two or more atoms chemically joined together?
~~compound~~ molecule

A molecule that contains more than one element?
compound

Smallest amount of an element?
atom

Key Terms

- Atom = smallest unique particle of matter
- Element = all the atoms of an element are the same
- Molecule = two or more atoms chemically joined (can be the same type or different)
- Compound = two or more atoms of *different elements* chemically joined
- Mixture = two or more elements or compounds not chemically joined

Periodic Table

An organizational system for elements. Elements are arranged in ROWS going from right to left called periods and COLUMNS going up and down called groups.

1 H 1.00794																	2 He 4.002602	
3 Li 6.941	4 Be 9.012182																	10 Ne 20.1797
11 Na 22.989770	12 Mg 24.3050																	18 Ar 39.948
19 K 39.0983	20 Ca 40.078	21 Sc 44.955910	22 Ti 47.867	23 V 50.9415	24 Cr 51.9961	25 Mn 54.938048	26 Fe 55.845	27 Co 58.933200	28 Ni 58.6934	29 Cu 63.546	30 Zn 65.39	31 Ga 69.723	32 Ge 72.61	33 As 74.92160	34 Se 78.96	35 Br 79.504	36 Kr 83.80	
37 Rb 85.4678	38 Sr 87.62	39 Y 88.90585	40 Zr 91.224	41 Nb 92.90638	42 Mo 95.94	43 Tc (98)	44 Ru 101.07	45 Rh 102.90550	46 Pd 106.42	47 Ag 107.8682	48 Cd 112.411	49 In 114.818	50 Sn 118.710	51 Sb 121.760	52 Te 127.60	53 I 126.90447	54 Xe 131.29	
55 Cs 132.90545	56 Ba 137.327	57 La 138.9055	58 Ce 140.12	59 Pr 140.90765	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.964	64 Gd 157.25	65 Tb 158.92534	66 Dy 162.50	67 Ho 164.93032	68 Er 167.26	69 Tm 168.93421	70 Yb 173.04	71 Lu 174.967		
87 Fr (223)	88 Ra (226)	89 Ac (227)	104 Rf (261)	105 Db (262)	106 Sg (263)	107 Bh (262)	108 Hs (265)	109 Mt (266)	110 Ds (269)	111 Rg (272)	112 Cn (277)	114 Fl (289)	116 Lv (289)	118 Og (294)				

58 Ce 140.116	59 Pr 140.90765	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.964	64 Gd 157.25	65 Tb 158.92534	66 Dy 162.50	67 Ho 164.93032	68 Er 167.26	69 Tm 168.93421	70 Yb 173.04	71 Lu 174.967
90 Th 232.0381	91 Pa 231.03628	92 U 238.02891	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)

Atomic masses generally increase as you move from left to right, top to bottom.

The atomic number determines the number of protons and electrons in the atom.

The atomic mass minus the atomic number determines the number of neutrons in the atom.

The smallest particle of an element is called an atom.

An element is a pure substance.

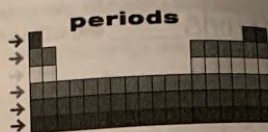
Regardless of the amount of a certain element, it will still have identical PROPERTIES (ex. Melting point, Boiling point, Freezing point, Density...)

11 Na Sodium 22.99	12 Mg Magnesium 24.31
19 K Potassium 39.10	20 Ca Calcium 40.08

Elements are considered the building blocks to everything because they can be combined to make different substances.

Periods (Rows)
Elements in the same PERIOD have the same number of energy levels.

The period number is the same as the number of energy levels.



Groups (columns)
Elements in the same GROUP have similar properties because they have a similar electron arrangement.

Metals are on the left hand side of the table.

Non-metals are on the right hand side of the table.

Metalloids are between the metals and non-metals.

Groups/Valence Electrons

Group I or Alkali metals - Elements whose atoms have 1 outer-shell electron; they are very reactive.

Group II or Alkaline Earth Earth metals - Elements whose atoms have 2 outer-shell electrons

Group III or _____ - Elements whose atoms have 3 outer-shell electrons

Group IV or _____ - Elements whose atoms have 4 outer-shell electrons

Group V or _____ - Elements whose atoms have 5 outer-shell electrons

Group VI or _____ - Elements whose atoms have 6 outer-shell electrons

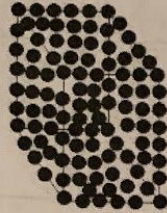
Group VII or Halogens - Elements whose atoms have 7 outer-shell electrons

Group VIII or Noble gases - Elements whose atoms have full outer shells so they are very unreactive.

Phase Changes

Phases of Matter: Define and label the picture that matches the phases of matter.

Solid



liquid



gas

Phase Change Descriptions

Boiling

Condensation

Deposition

Evaporation

Melting

Freezing

Sublimation

Vaporization

The change from liquid to gas

Vaporization

The change from liquid to solid

Freezing

Vaporization from the surface of a liquid

Evaporation

The change from gas to liquid

Condensation

The change from gas to solid

Deposition

The change from solid to liquid

Melting

The change from solid to gas

Sublimation

Vaporization from within as well as from the surface of a liquid

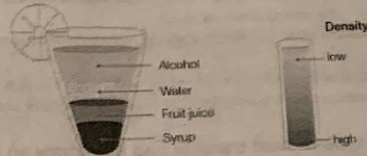
Boiling

Make flashcards for the following vocabulary terms:

Heterogenous mixture, homogeneous mixture, solution, solute, solvent, universal solvent, solubility, soluble, insoluble, dilute solution, concentrated solution, saturated solution, supersaturated solution, unsaturated solution

Density

What is density? a measure of mass per unit of volume



$\text{Density} = \frac{\text{mass}}{\text{volume}}$ $\text{Mass} = \text{density} \times \text{volume}$ $\text{Volume} = \frac{\text{mass}}{\text{density}}$

1. Mass = 40g
Volume = 20ml
What is the density?
2. Mass = 16g
Volume = 8ml
What is the density?

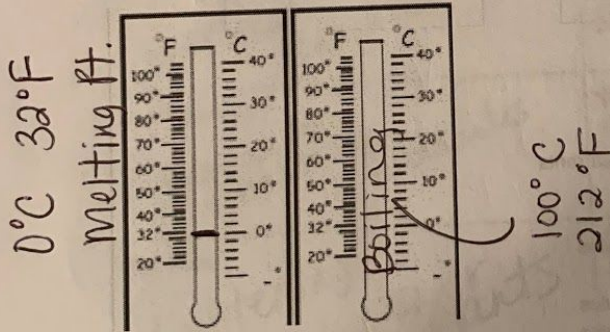
$$D = \frac{40g}{20ml}$$

$$2g/ml$$

$$D = \frac{16g}{8ml}$$

$$2g/ml$$

Melting Point, Freezing Point and Boiling Point of Water



6.P.3 Understand characteristics of energy transfer and interactions of matter and energy.

6.P.3.1 Illustrate the transfer of heat energy from warmer objects to cooler ones using examples of conduction, radiation and convection and the effects that may result.

6.P.3.2 Explain the effects of electromagnetic waves on various materials to include absorption, scattering, and change in temperature.

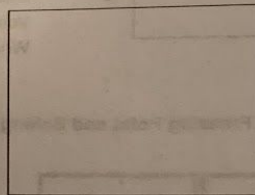
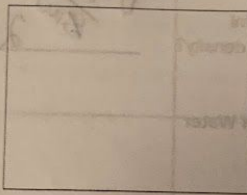
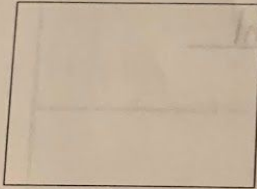
6.P.3.3 Explain the suitability of materials for use in technological design based on a response to heat (to include conduction, expansion, and contraction) and electrical energy (conductors and insulators).

Name the type of heat transfer and then draw an illustration showing the type of heat transfer.

Conduction - heat moving between 2 objects where molecules are touching.

Radiation - heat energy that travels in waves through the air.



Convection - method of moving heat where warm things rise and cool things sink.



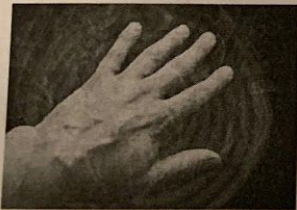
Answer with (T) rue or (F)alse

- plate tectonics can be explained by convection currents
- ocean currents are caused by conduction
- cool air rises
- higher temperature means faster moving molecules
- warm air sinks
- lower temperature means slower moving molecules
- when air cools down, the air molecules move faster
- when air warms up, the air molecules move slower
- heat equilibrium is when a colder object gains heat as a warm object transfer its heat to the colder object. The two objects will meet at a temperature somewhere in between the two temperatures.

Explain the different types of energy. Draw an illustration to help you remember each.

<p>Mechanical</p> <p>Machine</p>	<p>the energy a substance or system has related to its because temp. of its motion.</p>
<p>Radiant (light)</p> 	<p>only form of energy we can actually see. Formed through Chemical, radiation: Mechanical means.</p>
<p>Sound</p> 	<p>form of energy that is associated with vibrations of matter. (mechanical)</p>
<p>Chemical</p> <p>wood/coal burning</p>	<p>energy stored in the bonds of Chemical compounds. Released in chemical rxn.</p>
<p>Heat (thermal)</p> <p>moving or vibrating molecules</p>	<p>the energy a substance or system has related to its temp.</p>
<p>Electrical</p> <p>lightening power plants</p>	<p>energy carried by moving electrons in an electric conductor.</p>
<p>Nuclear</p> <p>Uranium</p>	<p>energy that is trapped inside each atom.</p>

Decide if the following heat transfers are: conduction (Co), convection (Cv) or radiation (R).



Co



Cv



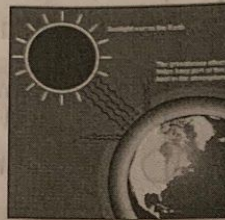
R



Co
Spoon in hot pot



Cv



R



Co
Grabbing a cold can of
soda

6.E.1 Understand the earth/moon/sun system, and the properties, structures, and predictable motions of celestial bodies in the Universe.

6.E.1.1 Explain how the relative motion and relative position of the sun, Earth and moon affect the seasons, tides, phases of the moon, and eclipses.

6.E.1.2 Explain why Earth sustains life while other planets do not based on their properties (including types of surface, atmosphere and gravitational force) and location to the Sun.

6.E.1.3 Summarize space exploration and the understandings gained from them.

Define the following vocabulary terms:

Rotation: The spinning of Earth on its axis

Revolution: The Earth's yearly orbit around the sun

Axis: The imaginary line around which a planet such as Earth spins

What causes the phases of the Moon? The moon's revolution around the Earth in relation to the Earth.

What is the difference between a Solar Eclipse and a Lunar Eclipse?

Draw and label both a Solar Eclipse and a Lunar Eclipse.

Which phase of the Moon occurs at the same time a Solar Eclipse occurs? New Moon

Which phase of the Moon occurs at the same time a Lunar Eclipse occurs? Full Moon

Explain why we only see one side of the Moon? The moon's rotation & revolution take the same amount of time

Explain what causes day and night.
The Earth rotating on its axis.

Why does the Earth have seasons?
Tilt of the Earth as it orbits the Sun:

Describe the difference between a Spring Tide and a Neap Tide. Draw an illustration of each.

6.E.2 Understand the structure of the earth and how interactions of constructive and destructive forces have resulted in changes in the surface of the Earth over time and the effects of the lithosphere on humans.

6.E.2.1 Summarize the structure of the earth, including the layers, the mantle and core based on the relative position, composition and density.

6.E.2.2 Explain how crustal plates and ocean basins are formed, move and interact using earthquakes, heat flow and volcanoes to reflect forces within the earth.

6.E.2.3 Explain how the formation of soil is related to the parent rock type and the environment in which it develops.

6.E.2.4 Conclude that the good health of humans requires: monitoring the lithosphere, maintaining soil quality and stewardship

Name the 4 main Earth's Layers

Crust
Mantle
Outer Core
Inner Core

For each the 4 main Earth's Layers, write information (facts) on each.

Name of Earth Layer	Information (facts)
Crust	<ul style="list-style-type: none"> • Thin-layer - surface of Earth • Continental Crust / Oceanic • broken into plates "float" • Continental sit on top of denser oceanic
Mantle	<ul style="list-style-type: none"> • Located below crust • thickest layer • lithosphere - crust; uppermost layer of mantle • Convection currents • Upper Mantle <ul style="list-style-type: none"> - directly below crust - upper-lithosphere • Lower Mantle <ul style="list-style-type: none"> - semi-rigid
Outer Core	<ul style="list-style-type: none"> • liquid nickel and iron • 4000 °F - 9000 °F
Inner Core	<ul style="list-style-type: none"> • solid nickel and iron • may reach 9000 °F • acts like a solid b/c of extreme pressures

Although igneous rock is the basic component of the crust, the composition and texture of soil and its properties and resistance to erosion are greatly influenced by plant roots and debris, fungi, insects, rodents, and other organisms. The upper-most layer of the crust is covered by soil. The ingredients in soils can vary from place to place and around the Earth. Soils have many properties such as particle size, fertility and ability to hold moisture. Depending upon the combination of properties, soils have great variability in their ability to support structures and plant growth. Forces deep inside Earth and at the surface produce a slow cycle that builds, destroys, and changes the rocks in the crust. Plate movements start the rock cycle by helping to form igneous rocks. Plate movements also cause faulting, folding and other motions of the crust that help to form metamorphic and sedimentary rock. Igneous rocks form as hot magma cools inside the crust, or as lava hardens on the surface. When these liquids cool to a solid state, they form crystals. When elements and compounds that are dissolved in water leave a residue, crystallization of minerals occurs. Soil is a mixture of: rock particles, minerals, decayed organic matter, water and air. Soil forms as rock is broken down by weathering and mixes with other materials on the surface.

Weathering/ Erosion/ Deposition

Weathering breaks down rock. Erosion moves rock that has been broken down. Deposition is the resting place for rock that has been weathered and moved.

Erosion is the process where wind and rain wash topsoil away, making it difficult for plants to grow and survive.

Erosion is the movement of weathered rock and soil. Moving water is the cause of most weathering.

Chemical or **Mechanical** - weathering of rock caused by freezing and thawing, animal actions, growth of plant roots and erosion.

Chemical or Mechanical - weathering caused by water, oxygen (oxidation), carbon dioxide (carbonic acid), living organisms (make weak acids) and acid rain.

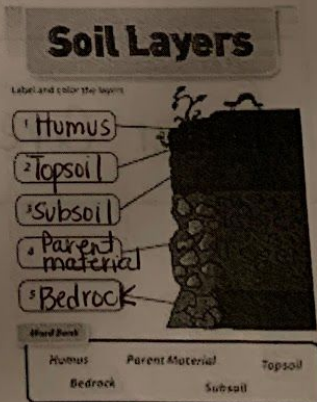
Soil Horizons = Soil Layers = Soil Profile

Soil is the loose material in which plants can grow in the crust of the Earth. Soil is a mixture of four different materials: tiny pieces of rock, humus, air, and water.

Soil is considered a(n) non-renewable resource and very important to humans because it takes close to 500-1,000 years to make 1 inch of soil.

(diagram from education.com)

Humus is the part of soil made up of decayed living things. Plants absorb minerals from the soil. We the eat the plants, which gives us the minerals that are found in soil.



Water is an important part of soil. The plants take it in through the soil.

Rocks and Minerals

Sedimentary rocks - formed when sand, dirt, and other materials are squeezed together until they harden. Fossils are sometimes present.

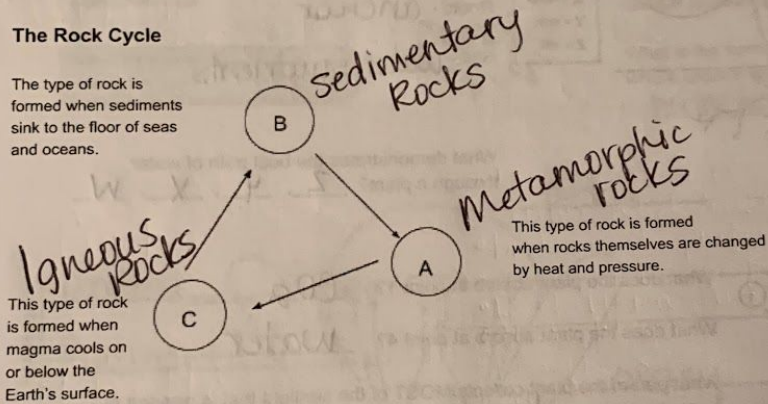
Igneous rocks - were once melted and then cooled. They are formed from magma (lava).

Metamorphic rocks - formed by heat and pressure.

The Rock Cycle

The type of rock is formed when sediments sink to the floor of seas and oceans.

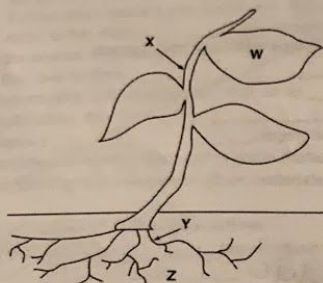
This type of rock is formed when magma cools on or below the Earth's surface.



Rocks and minerals can be classified using physical attributes such as color, shape, texture, and hardness. Minerals are non-living solid, non-living objects formed in nature. Rocks are naturally formed solid made of one or more minerals.

6.L.1 Understand the structures, processes and behaviors of plants that enable them to survive and reproduce.

- 6.L.1.1 Summarize the basic structures and functions of flowering plants required for survival, reproduction and defense.
- 6.L.1.2 Explain the significance of the processes of photosynthesis, respiration and transpiration to the survival of green plants and other organisms



Key
W = leaves
X = stems
Y = roots
Z = soil

What are the functions of each of the parts of the flower?

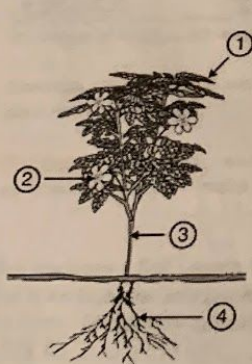
Leaves - collect sunlight for photosynthesis

Stems -

Roots - anchor

Soil - water & nutrients

What demonstrates the best path of water through a plant? Z, Y, X, W



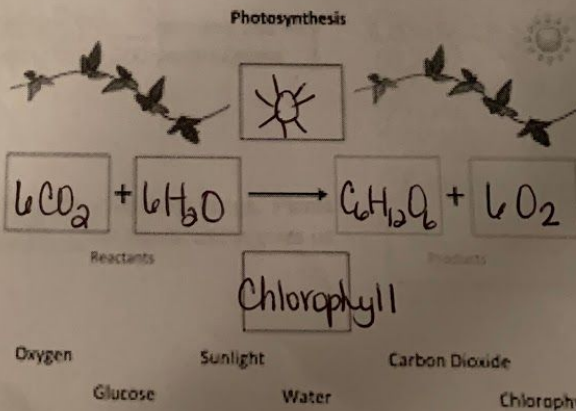
What does the plant absorb at point 1? CO₂

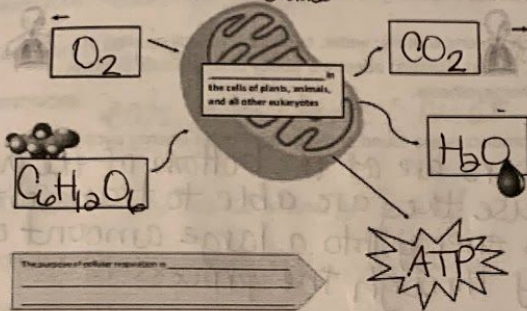
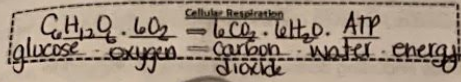
What does the plant absorb at point 4? Water

What part of the plant collects MOST of the sunlight that is needed to make food? leaves

What organelle is in the leaves that collects/absorbs the sunlight? Chloroplasts

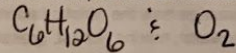
Fill in the boxes for photosynthesis using the chemical formulas.



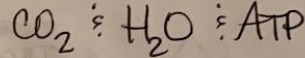


Fill in the boxes for Cellular Respiration using the chemical formulas.

Which compounds are reactants?



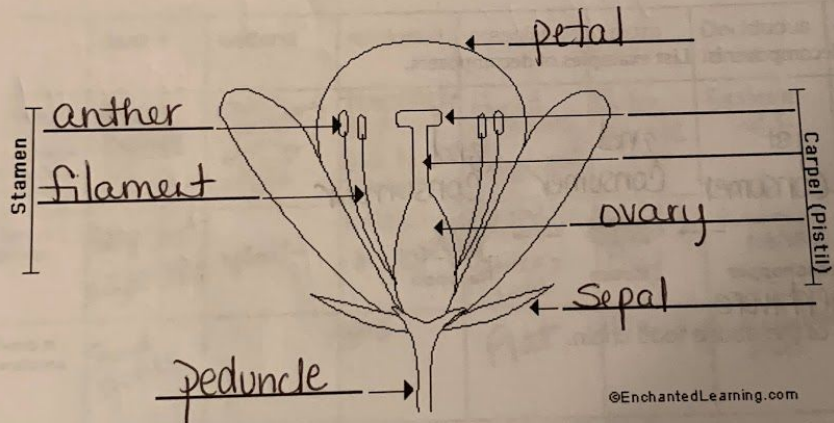
Which compounds are products?



ALL living things perform cellular respiration.

What is the name of the organelle where cellular respiration occurs?

mitochondria



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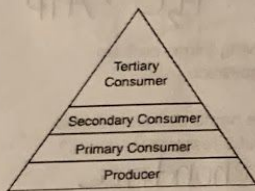
Label the parts of the flowering plants reproduction parts.

6.L.2 Understand the flow of energy through ecosystems and the responses of populations to the biotic and abiotic factors in their environment.

6.L.2.1 Summarize how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within a food chain or food web (terrestrial and aquatic) from producers to consumers to decomposers.

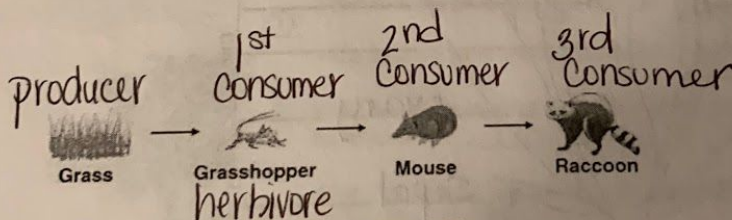
6.L.2.2 Explain how plants respond to external stimuli (including dormancy and forms of tropism) to enhance survival in an environment.

6.L.2.3 Summarize how the abiotic factors (such as temperature, water, sunlight, and soil quality) of biomes (freshwater, marine, forest, grasslands, desert, Tundra) affect the ability of organisms to grow, survive and/or create their own food through photosynthesis.



Explain why producers are found at the bottom of an energy pyramid.
Producers are at the bottom of the pyramid because they are able to transform the sun's energy into a large amount of plant energy through the process of photosynthesis.

Define what a decomposer is. List examples of decomposers.



Label each level of the above food chain.

What does abiotic mean? List some abiotic factors found in the environment.

Abiotic = without life

- rain
- sun
- rocks

the following:

producer: uses sunlight to make food (plants)

Herbivore: eats plants

Carnivore: eats meat

Omnivore: eats both plants & meat

What is the original source of energy? SUN

Explain dormancy. inactive state

ECOSYSTEMS

	desert	wetland	rainforest	grassland	tundra	Deciduous forest	ocean
Where is this ecosystem found? label the map	North America Africa	where standing water covers the soil	temperate tropical Chile, N. Zealand S. America	Great Plains Midwest	Arctic circle	Eastern U.S.	70% of Earth Pacific, Atlantic Indian Arctic Southern
Type of climate	Day-hot Night-cold	varies	Warm Wet	Summer hot winter cold	Cold & dry	4 changing seasons	Warm or cold depending on location
Types of landforms	Sand dunes		trees	Flat	Permafrost	Mountains Flat	underwater mountain ranges
Kinds of plants	Cacti	duckweed Cattails	Epiphytes orchids	wild oats foxtail	lichens mosses	Deciduous trees	Kelp phytoplankton
Kinds of animals	Snakes lizards	amphibians Insects leeches	Birds monkeys	Ungulates horses deer prairie dogs	lemmings Caribou	black bear	fish whales mollusks

Sound: Basics

What is sound? Compressional wave that travels through a series of compressions & rarefactions.

What is the speed of sound?

About 770 mph

Sound waves are longitudinal waves.

Which is faster (sound / light)?

Sound and States of Matter:

Does sound travel faster through a solid, liquid or a gas? Solid - liquid - gas

Why is there a difference in speed through different mediums? Because they have different densities. More dense means sound travels faster.

Can you hear sound in space? Explain.

No because sound is a vacuum and particles are spread too far apart

Relationships with Sound:

How is frequency and pitch related?

High frequency = high pitch
Low frequency - low pitch

How is loudness and amplitude related?

Increase in amplitude = loud

Decrease in amplitude = soft

Acoustics:

How can you modify an area to reduce echoes? Place objects in the area to absorb the sound (furniture, curtains, carpet)

Increase loudness?

Take items out of room or place hard materials to increase echoes and reverberations.

Doppler Effect:

Definition: The change in pitch due to a moving wave source.

Object moving towards you cause higher pitched sound.

Object moving away from you cause lower pitched sound.

Echolocation and Sonic Boom:

What is echolocation? The use of ultra-sonic sound waves to find prey.

What is sonar? A system that uses the reflection of underwater sound waves to detect objects.

What is a sonic boom? The sound made when something breaks the sound barrier.

Comparisons:

How are sound, light and earthquake waves alike?

They all transfer energy.

Resonance:

What is resonance?

The ability of an object to vibrate by absorbing energy at its natural frequency.