6. 2 Energy Study Guide

Vocabulary:
energy- the ability to do work
kinetic energy- the energy associated with motion
potential energy- stored energy
gravitational potential energy- potential energy that depends on height
nonrenewable energy- energy that cannot be replaced in our lifetime
renewable energy- energy that can be replaced
solar- energy from the sun
biomass- renewable energy from plants and animals (garbage, trees, crops)
radiation- heat waves from the sun

EXAMPLES OF KINETIC ENERGY

bouncing ball

flying Frisbee

diver entering water

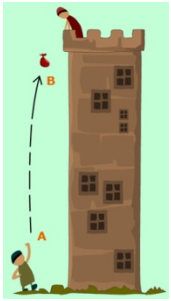
EXAMPLES OF POTENTIAL ENERGY

car battery

box of golf balls

ball in hand

GRAVITATIONAL POTENTIAL ENERGY:



On the way up:

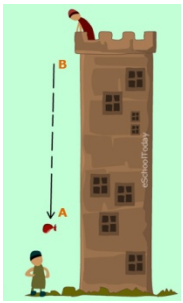
At point A, the bag has the least amount of kinetic energy.

At point B, the bag has the most amount of potential energy.

On the way down:

At point A, the bag has the least amount of gravitational potential energy.

At point B, the bag has the most amount of gravitational potential energy.



Nonrenewable Energy

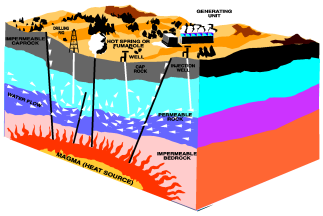
Renewable Energy

coal, oil, natural gas

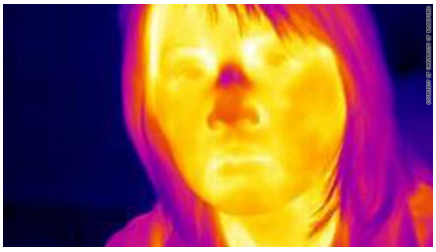
wood, wind, water, sun (solar)

Types of Energy

geothermal- comes from inside the Earth

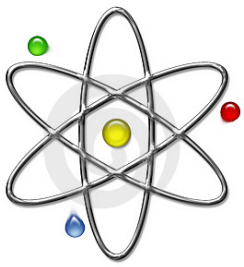


thermal- from heat



sound- from sound waves

nuclear- stored in the nucleus of atoms

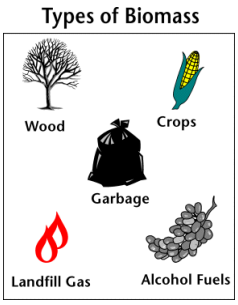


radiant - from light

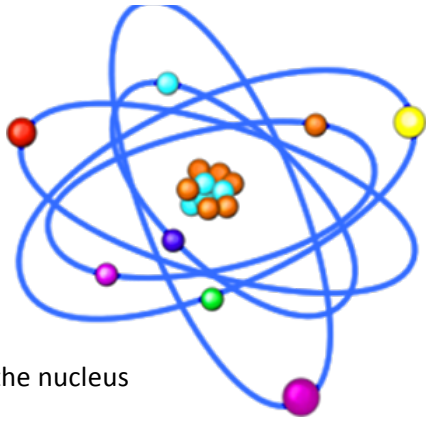
electrical- from electricity

mechanical- from a machine

Biomass- from plants, animals, or garbage



6.4 Matter Study Guide



Vocabulary:

atom- the basic building block of all matter
matter- anything that has mass and takes up space
period- the horizontal rows on the periodic table
group- the vertical rows on the periodic table
protons- positively charged particles inside the nucleus
electrons- particle is the most energetic and moves rapidly around the outside of the nucleus
nucleus- center of an atom; contains protons and neutrons
atomic number- how many protons are in an atom
molecule- atoms that are formed by two nonmetals
element- a substance cannot be broken down chemically into other substances
compound- consists of two or more substances that are all chemically combined
mixture- a substance made of two or more materials that can be separated back into its original materials
solution- a mixture that forms when one substance dissolves another
chemical bond- the force that holds atoms together
chemical change- a change in matter that produces a new substance
physical change- breaking or mixing substances
chemical equation- a shorter, easier way to show chemical reactions, using symbols instead of words

Group

Period

Periodic Table of the Elements

hydrogen 1 H 1.0079																	helium 2 He 4.0026
lithium 3 Li 6.941	beryllium 4 Be 9.0122											boron 5 B 10.811	carbon 6 C 12.011	nitrogen 7 N 14.007	oxygen 8 O 15.999	fluorine 9 F 18.998	neon 10 Ne 20.180
sodium 11 Na 22.990	magnesium 12 Mg 24.305											aluminium 13 Al 26.982	silicon 14 Si 28.086	phosphorus 15 P 30.974	sulfur 16 S 32.065	chlorine 17 Cl 35.453	argon 18 Ar 39.948
potassium 19 K 39.098	calcium 20 Ca 40.078	scandium 21 Sc 44.956	titanium 22 Ti 47.867	vanadium 23 V 50.942	chromium 24 Cr 51.996	manganese 25 Mn 54.938	iron 26 Fe 55.845	cobalt 27 Co 58.933	nickel 28 Ni 58.693	copper 29 Cu 63.546	zinc 30 Zn 65.39	gallium 31 Ga 69.723	germanium 32 Ge 72.61	arsenic 33 As 74.922	selenium 34 Se 78.96	bromine 35 Br 79.904	krypton 36 Kr 83.80
rubidium 37 Rb 85.468	strontium 38 Sr 87.62	yttrium 39 Y 88.906	zirconium 40 Zr 91.224	niobium 41 Nb 92.906	molybdenum 42 Mo 95.94	technetium 43 Tc [98]	ruthenium 44 Ru 101.07	rhodium 45 Rh 102.91	palladium 46 Pd 106.42	silver 47 Ag 107.87	cadmium 48 Cd 112.41	indium 49 In 114.82	tin 50 Sn 118.71	antimony 51 Sb 121.76	tellurium 52 Te 127.60	iodine 53 I 126.90	xenon 54 Xe 131.29
caesium 55 Cs 132.91	barium 56 Ba 137.33	57-70 ✶ lutetium 71 Lu 174.97	hafnium 72 Hf 178.49	tantalum 73 Ta 180.95	tungsten 74 W 183.84	rhenium 75 Re 186.21	osmium 76 Os 190.23	iridium 77 Ir 192.22	platinum 78 Pt 196.08	gold 79 Au 196.97	mercury 80 Hg 200.59	thallium 81 Tl 204.38	lead 82 Pb 207.2	bismuth 83 Bi 208.98	polonium 84 Po [209]	astatine 85 At [210]	radon 86 Rn [222]
francium 87 Fr [223]	radium 88 Ra [226]	89-102 ✶ ✶ lawrencium 103 Lr [262]	rutherfordium 104 Rf [261]	dubnium 105 Db [262]	seaborgium 106 Sg [266]	bohrium 107 Bh [264]	hassium 108 Hs [269]	meitnerium 109 Mt [268]	ununnilium 110 Uun [271]	unununium 111 Uuu [272]	ununbium 112 Uub [277]		ununquadium 114 Uuq [289]				

*Lanthanide series	lanthanum 57 La 138.91	cerium 58 Ce 140.12	praseodymium 59 Pr 140.91	neodymium 60 Nd 144.24	promethium 61 Pm [145]	samarium 62 Sm 150.36	europium 63 Eu 151.96	gadolinium 64 Gd 157.25	terbium 65 Tb 158.93	dysprosium 66 Dy 162.50	holmium 67 Ho 164.93	erbium 68 Er 167.26	thulium 69 Tm 168.93	ytterbium 70 Yb 173.04
**Actinide series	actinium 89 Ac [227]	thorium 90 Th 232.04	protactinium 91 Pa 231.04	uranium 92 U 238.03	neptunium 93 Np [237]	plutonium 94 Pu [244]	americium 95 Am [243]	curium 96 Cm [247]	berkelium 97 Bk [247]	californium 98 Cf [251]	einsteinium 99 Es [252]	fermium 100 Fm [257]	mendelevium 101 Md [258]	nobelium 102 No [259]

Chemical Changes | **Physical Changes**

burning 

rusting 

cooking  

film processing 

broken/cut  

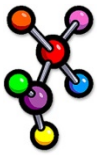
painted or colored 

folded 

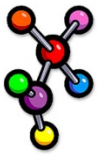
mixture 

change of state (solid, liquid, gas)   

Composition of Ocean Water (Mostly)	
Element	Percent of Ocean Water
Oxygen	85.7000
Hydrogen	10.8000
Chlorine	1.9000
Sodium	1.0500



MOLECULES AND COMPOUNDS



O_2= Two elements of Oxygen
H_2O= Two elements of Hydrogen, One Oxygen
CO_2= One element of Carbon, Two Oxygen
Fe_2O_3 (rust)= Two Iron, Three Oxygen

Element	Symbol	Atomic Number	Atomic Mass	Protons	Neutrons	Electrons
Neon	Ne	10			10	10
Sulfur	S		32	16		
Iodine	I	53			74	
Nickel	Ni		59	28		

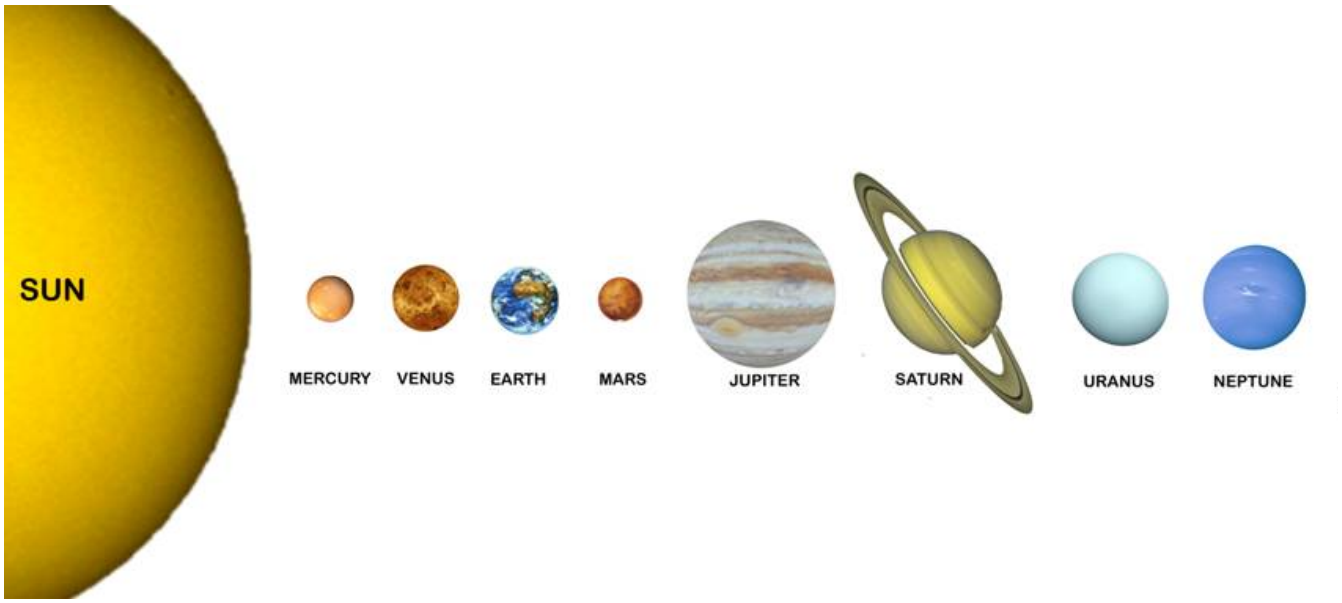
# of Protons = # of Electrons Atomic Mass = Protons + Neutrons

Atomic Number = # of Protons

a. What is the atomic number of S? _____
b. How many protons are in Ne? _____
c. How many electrons are in I? _____
d. What is the Atomic Number of Ni? _____
e. What is the Atomic Mass of I? _____
f. What is the Atomic Mass of Ne? _____
g. How many neutrons are in S? _____

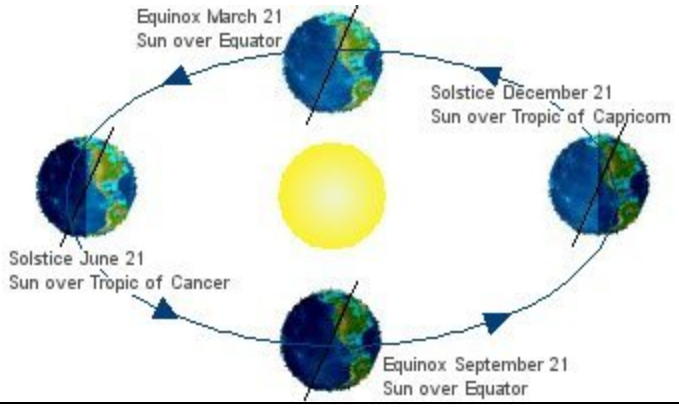
Answer Key: a. 16, b. 10, c. 53, d. 28, e. 127, f. 20, g. 16

6.8 Solar System Study Guide



- Inner or Terrestrial (made of land) Planets: Mercury, Venus, Earth, Mars
- Outer or Gas Giant Planets: Jupiter, Saturn, Uranus, Neptune
- The Asteroid Belt is between Mars and Jupiter.
- Mercury and Venus have no moons.
- A **comet** is a celestial body made up of ice and gas. It is also called a "dirty snowball".
- A **meteorite** is a small ball of rock or dust in space. When the meteorite enters the Earth's atmosphere, it becomes a **meteor**. When it hits the ground, then it is called a **meteoroid**.
- **Solar eclipses** happen when the moon passes directly between the Earth and Sun.
- **Lunar eclipses** happen when the Earth is directly between the moon and the Sun.

The seasons are caused by the **revolution** of the Earth around the sun (365 days).



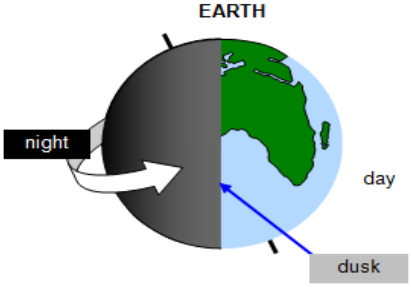
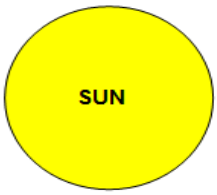
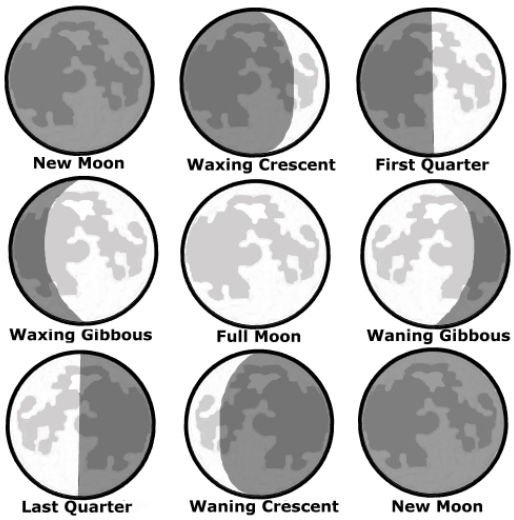


Figure 1

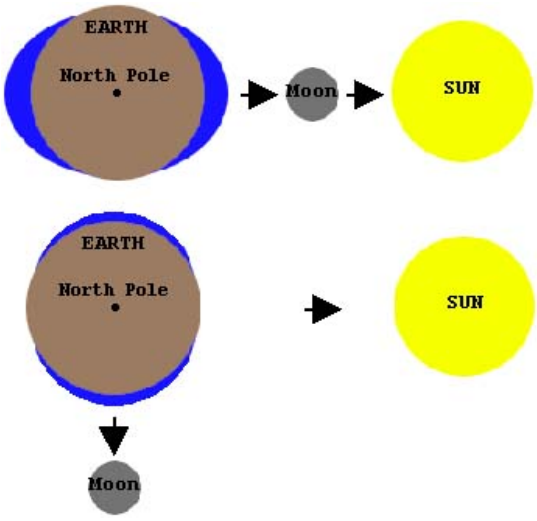


Day and night are caused by the **rotation** of the Earth on its axis (24 hours).

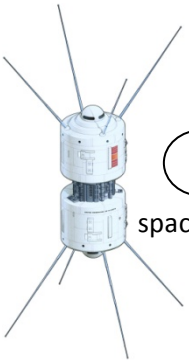


Phases of the moon are caused by the light reflecting off of the sun.

When the moon appears to be getting larger, it is **waxing**. When the moon appears to be getting smaller, it is **waning**.



Tides are caused by the gravitational pull of the moon.

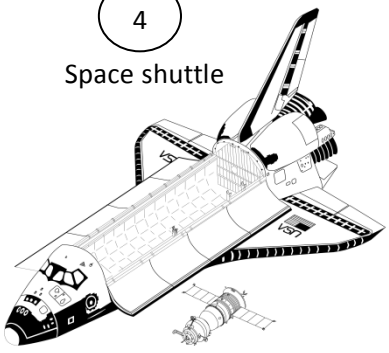


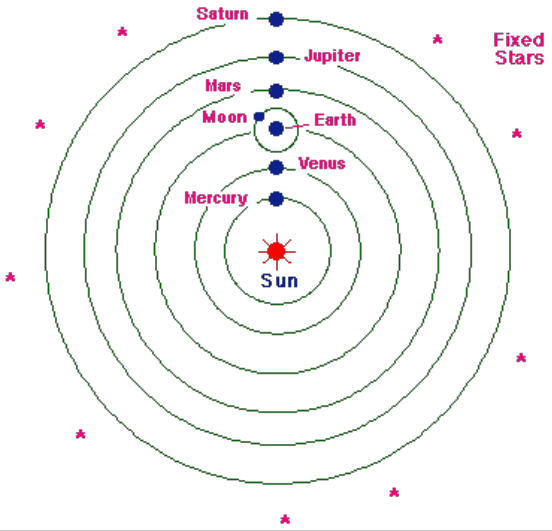
3 space probe

1 telescope

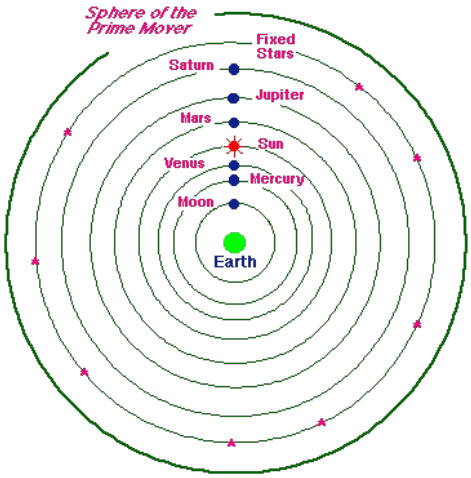
2 satellite

4 Space shuttle





Copernicus proposed a sun centered solar system called **heliocentric**.



Ptolemy and Aristotle theorized that the Earth was the center of the solar system. This was called the **geocentric** model.

6.5 Earth's Water Study Guide

DID YOU KNOW?

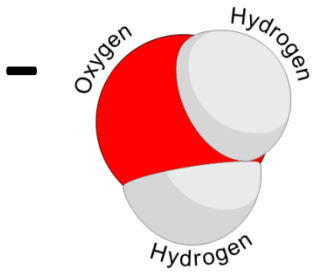
Water is the only substance on Earth that commonly exists in all 3 states of matter!

Water molecules stick together because one side has a positive charge and the other side has a negative charge.

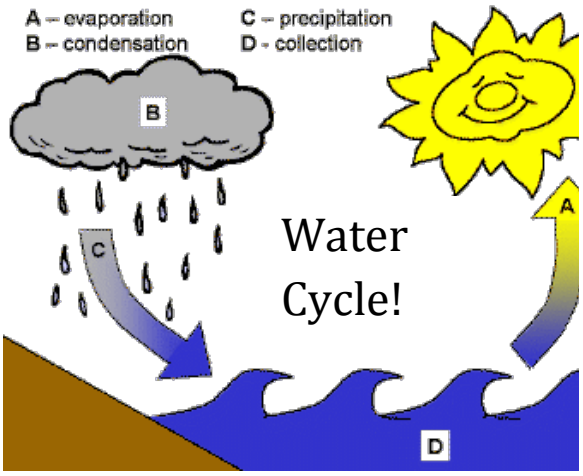
Opposites attract!

DID YOU KNOW?

Water is called the "universal solvent" because it dissolves so many



A water molecule is made up of 2 hydrogen atoms bonded to 1 oxygen atom.



Vocabulary

condensation- when gas changes into a liquid

transpiration- when plants release water into the air

precipitation- water falls to Earth as rain, sleet, hail or snow

evaporation- the process by which molecules at the surface of a liquid absorb enough energy to change into a gas

water cycle- the movement of water through its liquid, gas, and solid states throughout the world

chemical weathering- kind of weathering causes the mineral composition of rocks to change

abrasion- a form of mechanical weathering when rocks grind against each other

physical weathering- rocks are broken down into smaller pieces

hydroelectricity- using water to create power (energy) in power plants

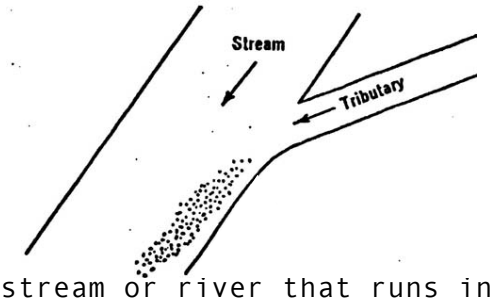
turbidity- cloudiness of water

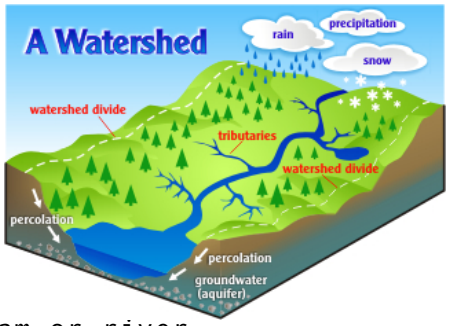
ecosystems- made up of living and nonliving things in an area

point source- specific sources of pollution that can be identified

Did you know?

The amount of fresh water on Earth is only 3% and the amount





A stream or river that runs into another stream or river land from which water drains into a river system

(Virginia's largest is Chesapeake Watershed)

areas where fresh and salt water are mixed by the tides Most of Earth's fresh water is found in huge masses of ice called glaciers. (estuaries help prevent the land from flooding after storms)

Biotic
living

wat

out o the water

Abiotic
nonliving

sunlight, water, rocks

<u>wetlands</u> play an important role in:

a) controlling flood

b) filtering pollutants

c) provide habitats and food for animals

Pollution

Testing the <u>water quality</u> is the most helpful way to determine the health of an ecosystem.
Harmful to our water: pet and human waste, industrial waste, agricultural chemicals

6.7 Watershed Unit Study Guide

vocabulary:

biotic- living factors in an environment

abiotic- nonliving factors in an environment

marsh- an example of a wetland

ecological- interaction of animals and their surroundings

estuary- where the river meets the ocean

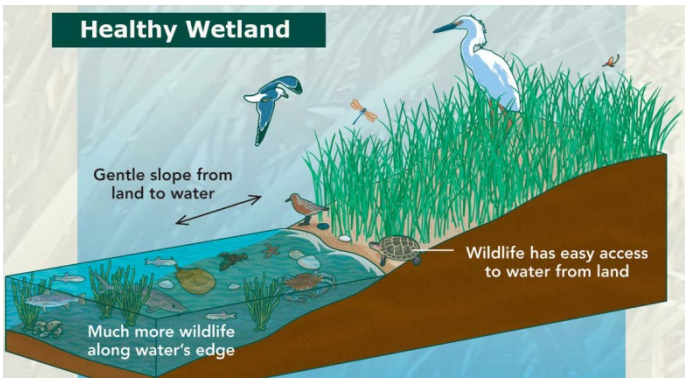
turbidity- cloudiness of water

nutrients- food for animals and plants

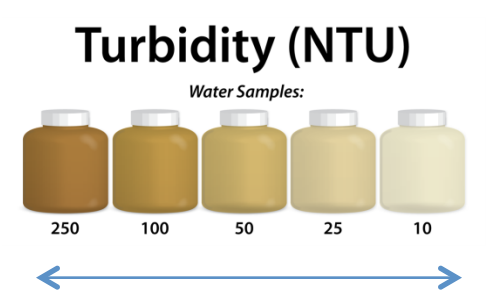
Secchi disk- tool used to measure turbidity of water

watershed- area of land drained by a river system

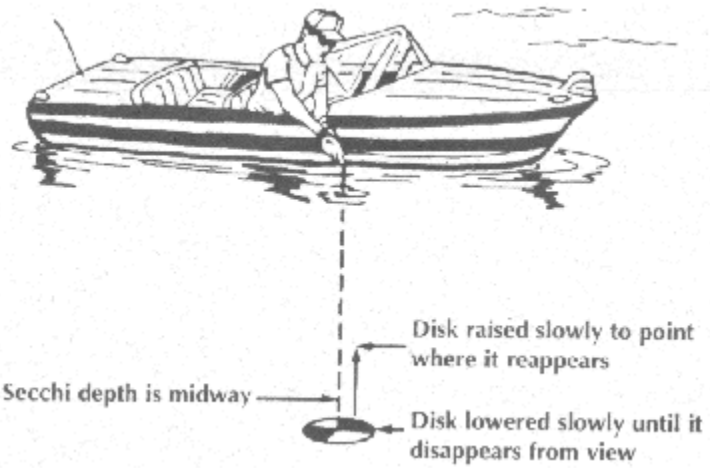
salinity- the amount of salt in the water



The soil and sediment in wetlands help to keep the waters clean by filtering out pollutants.



Wetlands can absorb a lot of water from floods and tidal action, and protect the surrounding land.

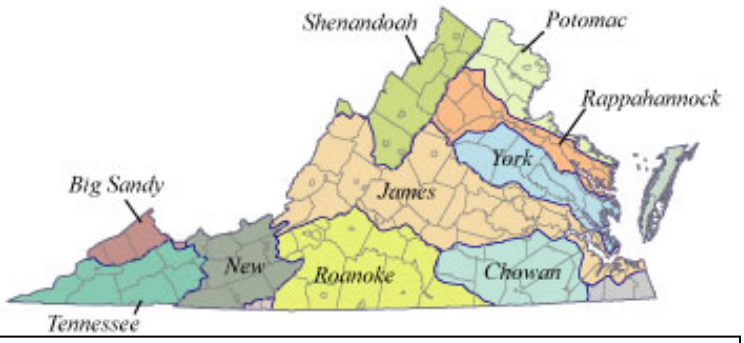


A Secchi disk is used to measure turbidity.

tributaries- small rivers and streams that lead to larger rivers

reservoirs- natural or man-made lakes used to store water

watershed- an area of land where all the water drains to the same place



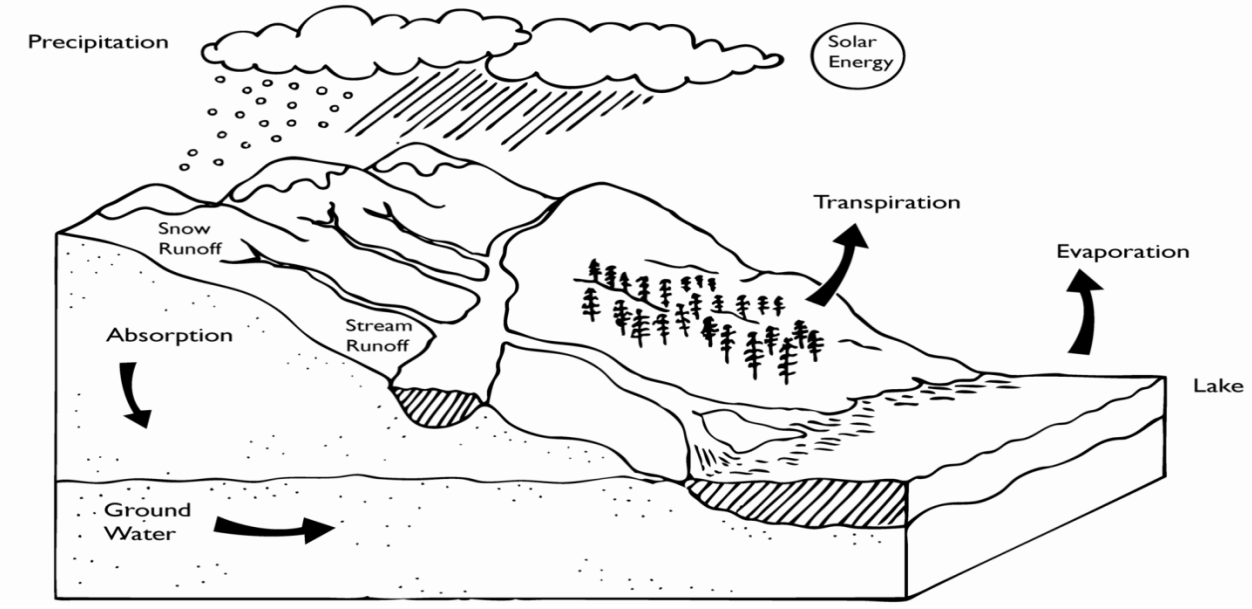
Virginia's Watersheds (the largest is the James Watershed).

Fun Fact!

The Chesapeake Bay is an estuary where fresh and salt water meet and are mixed by the tides. It is the largest estuary in the United States.

Chesapeake Bay Watershed covers 6 states including Virginia!

WATERSHED DIAGRAM



Watersheds provide homes for a wide diversity of plants and animals.

What can you do?

Make sure your actions don't pollute or harm the environment. Don't litter!

Pick up after your pets!

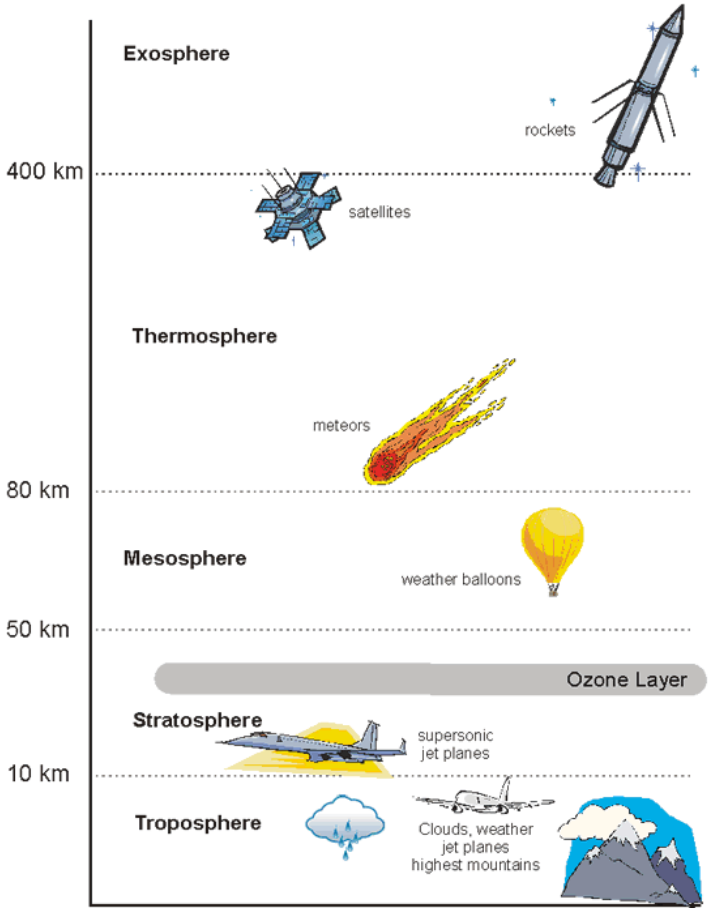
Reduce the use of hazardous products in your home and garden.

Take paints, oils, batteries and other hazardous materials to the nearest recycling or collection facility.

Do not pour anything but water into storm sewer grates – these sewers flow directly into waterways.

If you have livestock, build fences to keep the animals out of rivers streams, lakes, and wetlands

6.3, 6.6 Science Weather Study Guide



Vocabulary:

air pressure- the force caused by the weight of air

humidity- the amount of water vapor in the air

atmosphere- the layer of gases that surrounds Earth

tornado- a funnel shaped cloud that reaches down from a storm cloud to touch Earth's surface

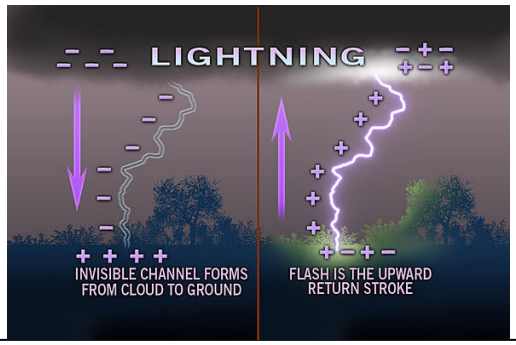
precipitation- an form of water that falls from the sky

stationary front-the result when a warm air mass and a cold air mass meet and no movement occurs

occluded front- the result when a rapidly moving cold air mass runs into a slowly moving warm air mass

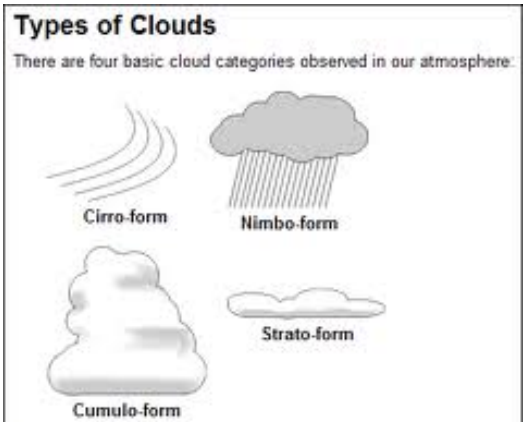
warm front- brings warm and humid weather to the area

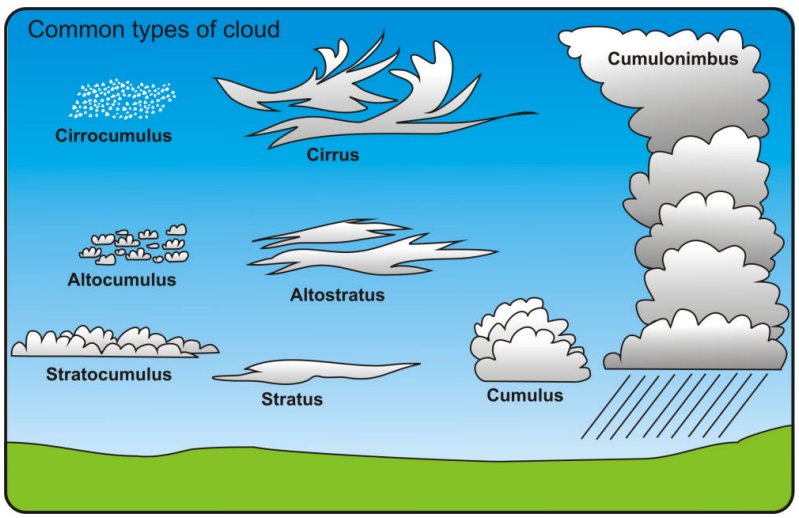
cold front- likely to bring thunderstorms



Lightning- caused by electric charges in a cloud. The charges can jump from one cloud to another or from the cloud to the ground.

The two most abundant gases in the atmosphere are **nitrogen and oxygen.**



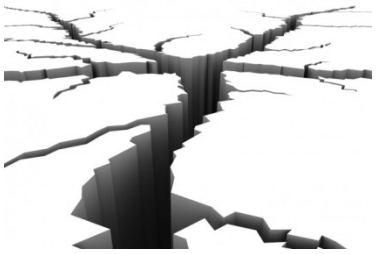


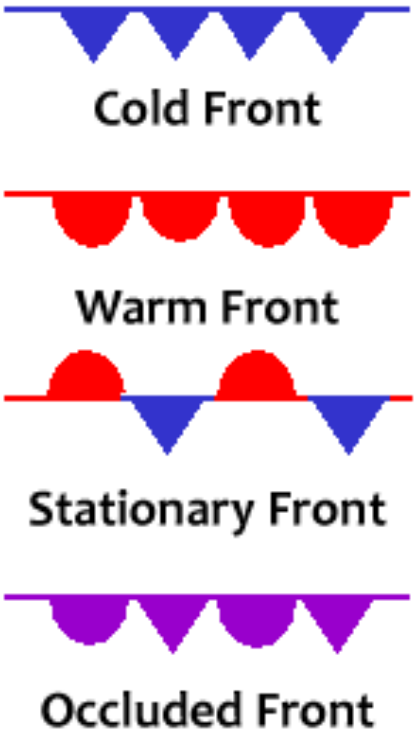
Natural Disasters:

Tornado- a funnel shaped cloud that reaches down to touch Earth's surface

Hurricane- a tornado that starts over the water and sometimes comes over land

Earthquake- shaking of Earth's surface



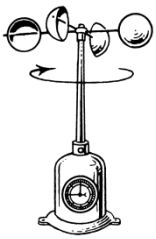


1. What type of weather front is moving into San Francisco?
2. Which city has the lowest temperature?
3. What type of weather front just passed Seattle?
4. What type of weather front is heading towards Atlanta?
5. What city has the highest temperature?

Weather Tools

barometer- used to measure air pressure

hygrometer- used to measure humidity



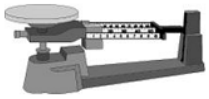
anemometer- used to measure wind speed

thermometer- used to measure temperature

rain gauge- used to measure rain fall

6.1 Scientific Method Study Guide

Measurement Tools:



triple balance scale
(measure mass)

scale
(measure weight)

ruler/meter
(measure length)

graduated cylinder
(measure volume)

Vocabulary:

Experiment- steps to test a hypothesis

Hypothesis- a question that can be tested in an experiment

Constant- the factor that stays the same in an experiment

Variable- the factor that changes in an experiment

Scientific Method- a process that leads to stating a conclusion; the steps you take in an experiment

Dependent Variable- this IS changed by the experiment, it depends on what happens

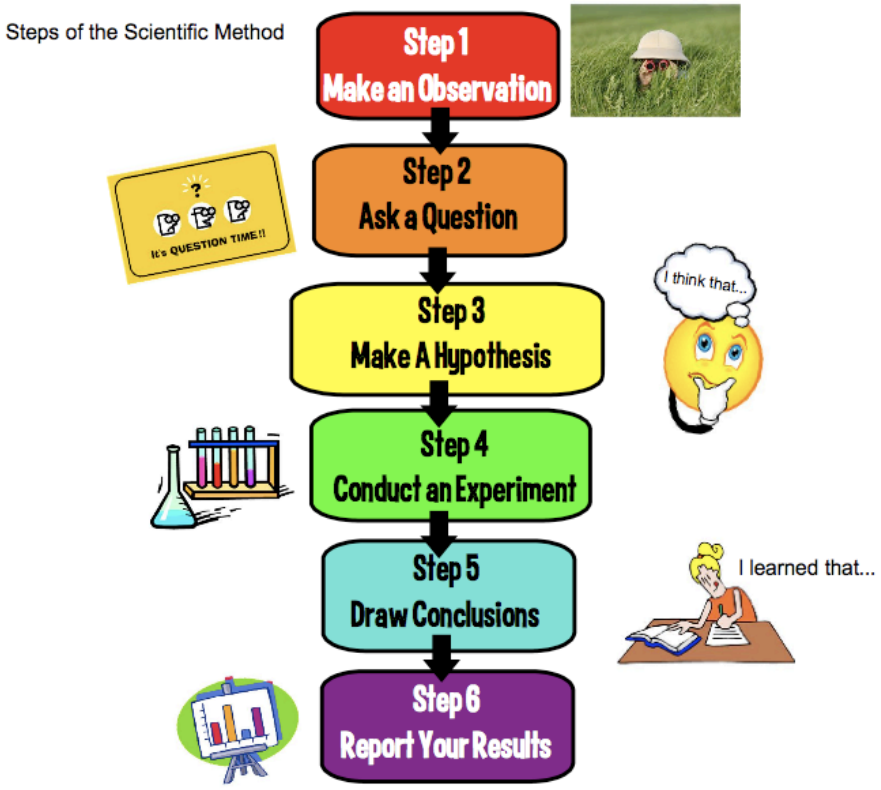
Independent Variable- the variable that isn't changed by the experiment, it stays the same

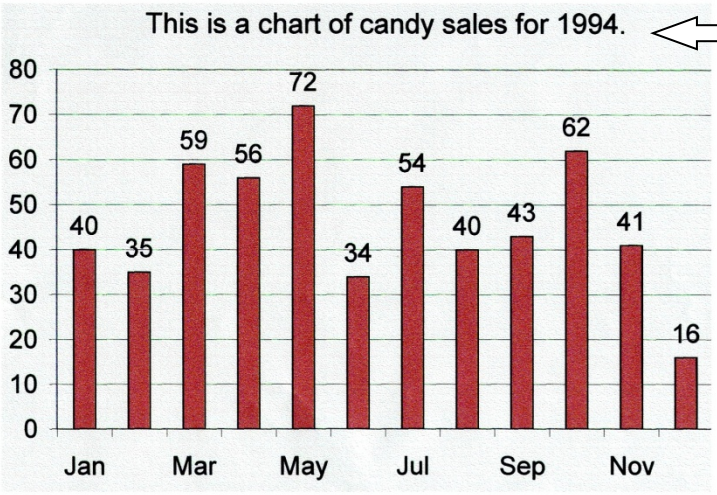
Scientist- a person who studies science and performs experiments

Mass- the amount of space an object takes up; the amount of matter an object contains

Units of Measurement:

Metric length		
10 millimeters	=	1 centimeter
10 centimeters	=	1 decimeter
10 decimeters	=	1 meter
10 meters	=	1 decameter
10 decameters	=	1 hectometer
10 hectometers	=	1 kilometer (1000 meters)





Based on the graph, what month had the most sales?

What month had the least sales?

How much was sold in October?

How many pieces of candy were sold in 1994?

According to the graph, how many dolphins were seen in 1997?

What year were the most dolphins sighted?

How many dolphins were seen in 2000 and 2001?

About how many dolphins were seen in