

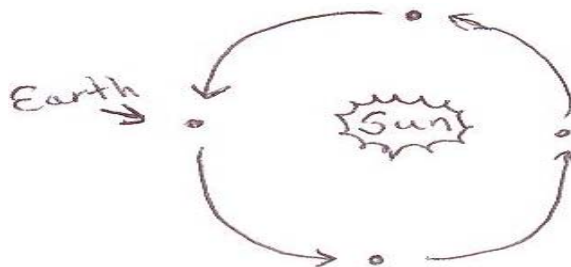
8th Grade Science Study Guide

Earth & Space Science

The Earth **rotates** on its axis. It takes 24 hours for the Earth to make one complete rotation (360 °). This makes one whole **day**.

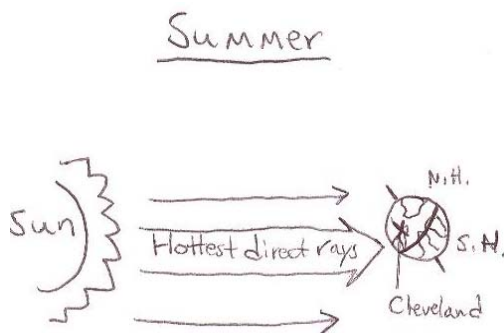


The Earth **revolves** around the sun. When the Earth makes one complete trip around the sun it has been one complete **year**.

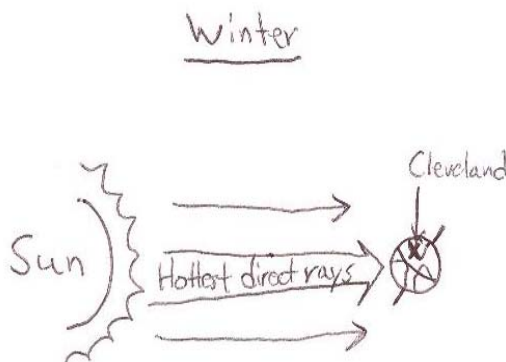


Seasons on Earth happen because the Earth tilts on its axis as it revolves around the sun. This tilt causes different parts of the Earth to be exposed to the sun's most direct rays.

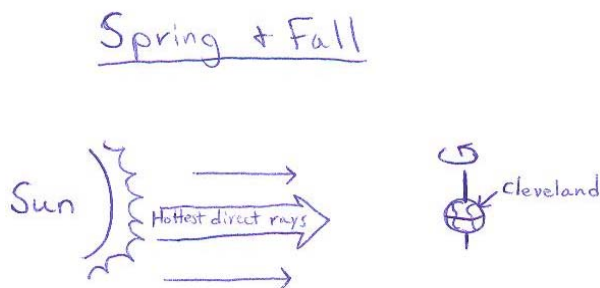
The sun's direct rays are the warmest and hit the Earth near the equator.



When the Northern Hemisphere is tilted towards the sun, it is in contact with these hotter direct rays. This is when and why we have summer in the N. Hemisphere. Since we are tilted towards the sun, most of the N. Hemisphere is in light, this means longer days & shorter nights.



The Northern Hemisphere has winter when it's tilted away from these warm direct rays. Day light hours are shorter for the N. Hemisphere because it is tilted away from the sunlight.



In Spring & Fall, the Northern & Southern Hemispheres get equal exposure to the sun. Neither the N. or S. Hemisphere is tilted closer to the sun during these 2 seasons.

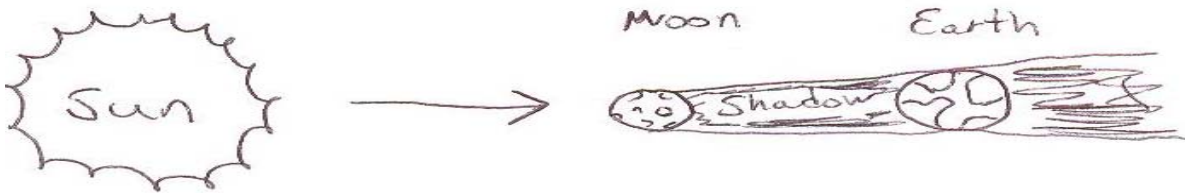


Places along the equator are warm year round because the hot direct rays never move too far away from the equator.

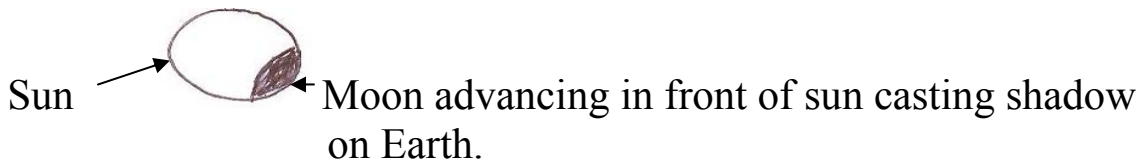


Places close to the N. Pole & S. Pole never get the sun's direct hot rays. This is why it's never warm in these areas.

Solar eclipse- occurs when the moon either partially or completely blocks the sun from the Earth's view.



From Earth, as a solar eclipse begins, it looks like the sun has a bite taken out of it.



Lunar eclipse- occurs when the Earth blocks our view of the moon. A lunar eclipse can only occur during a full moon.

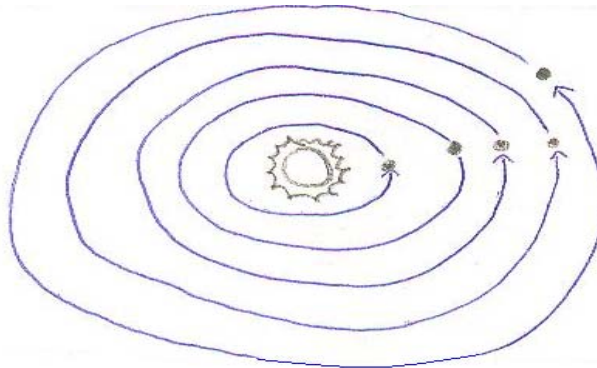


Why does the Earth and other planets in our solar system revolve around the sun? Gravitational force is the reason.

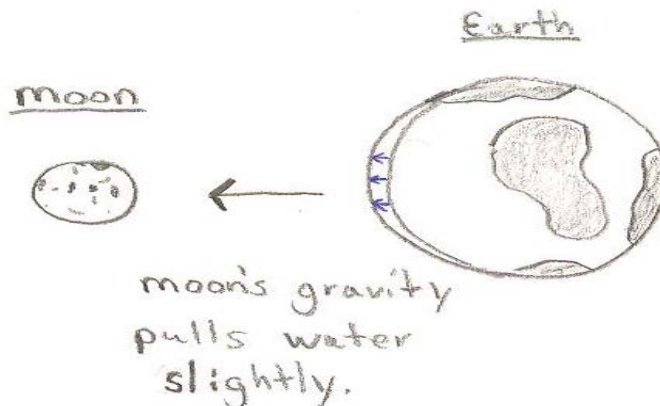


Newton proposed the ***Law of Universal Gravitation*** that says between any two objects there is attraction (gravity) that is proportional to the masses of the objects and the distances between them.

This means that the more massive an object is, it has a stronger pull of gravity on the objects that are less massive than itself. Our sun is more massive than the planets so they all revolve around the sun.



Our planet Earth is more massive than our moon so this is why the moon revolves around our Earth. Although objects that are less massive revolve around more massive objects, these less massive objects still give a pull on the more massive planet. This is why we have tidal waves. The moon has a strong enough gravity to pull water from oceans towards it, creating disturbances in the water.





Some tools to study space are:

Telescopes- with optical telescopes, astronomers see closer the objects in outer space such as moons, planets, galaxies.

Spaceship- allows astronauts to travel to close planets, our moon & into outer space to collect data, samples and experience first hand the conditions in space.

Satellites- Are used to transmit signals from outer space such as pictures, topographic maps. Just like cell phone satellites allow our signals to travel from place to place.

Probes- are sent by scientists to collect data on far away planets that humans can never get to. Probes send data back by signals & some even retrieve samples from planets.

Sample question- choose 2 tools astronomers use & list two pros & cons of each.

Telescopes

Pros: ▪ Can see closer the object you are looking at.
▪ Cheaper & safer than sending a spacecraft to outerspace.

Cons: ▪ telescopes can only help you see closer, they cannot take samples or conduct experiments.
▪ It has to be a clear night & little or no light pollution to use telescopes properly.

Spacecraft

- Pros:
- Can allow astronauts to conduct experiments in outer space and take samples of the moon.
 - Can allow humans to explore & experience being in space.

- Cons:
- It's very expensive to run a space program.
 - There are always risks when sending humans into space – it's dangerous.

Our solar system- the Sun, our Earth and the 8 others belong to the Milky Way Galaxy. Some scientists are curious to know if there are other solar systems out there which support life like ours does.



There are 3 different kinds of galaxies. Galaxies are characterized by their shape.

1). Spiral →



2). Elliptical →



3). Irregular →



Life Cycle of Stars

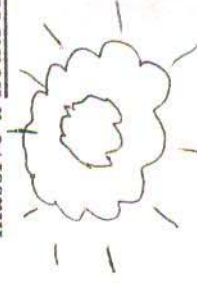
black hole



neutron star



Eventually, the super-giant's core collapses causing an explosion. If the star was very massive it will become a black hole. If not as massive-a neutron star.



A black hole forms when the core mass is more than 3 times the mass of our sun.

The neutron star forms if the star's core is 1.4-3 times the Mass of the sun.

Finally, it will burn out becoming a white dwarf. black dwarf.

Becomes a supergiant.



If the nebula is large a massive star is formed. (greater than 8 times the mass of our sun).

If gravity is strong enough- heat is generated and if hot enough will create nuclear fusion- a star is now born.

If the nebula is small a low mass star is formed. (like our sun).

nebula

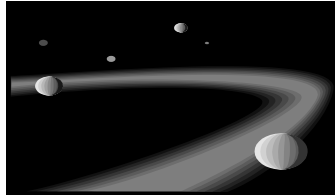
dust & gas get pulled together by gravity.



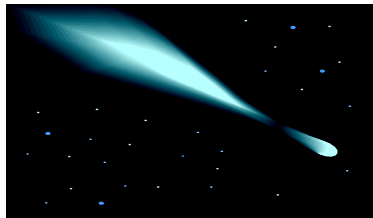
Becomes a red giant.

Asteroids, Meteors & Comets

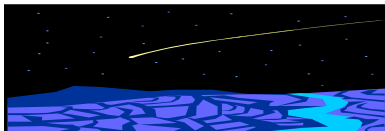
Asteroids- are very large rocky objects that revolve around the sun in a common place called the **Asteroid Belt**. The Asteroid Belt lies between the orbits of Mars and Jupiter and contains millions of asteroids. They range in size from a pebble to having a diameter of almost 600miles.



Comets- are made up of ice, dust and rocks. This is why they are called “dirty snowballs”. Most travel in elliptical orbits around the sun due to the sun’s great gravitational pull on them. Comets sometimes enter our solar system from far off in space and if they get close enough to the sun they form a tail which is vapor from the ice melting.



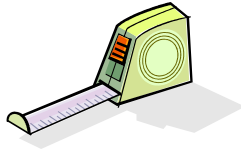
Meteoroids- are small chunks of rock that range in size from a grain of sand to a softball. They break off from comets and asteroids and can enter Earth’s atmosphere. When meteoroids enter our atmosphere they are called **meteors** or shooting stars. We see them glowing because they are traveling at great speeds and friction occurs between them and our atmosphere. This creates great heat causing them to glow. If a meteor hits the Earth’s surface it is called a **meteorite**.



When objects such as meteors, comets and asteroids come close enough to a planet, that planet’s gravity can pull that object towards it.

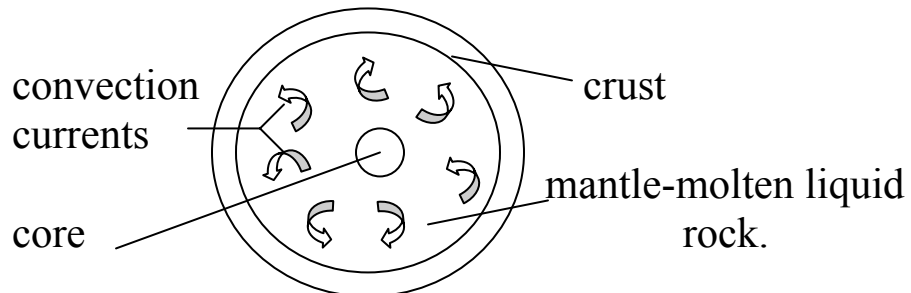
Since planets and objects in space are so far away from each other, scientists created the unit of light years which is the distance light travels in one year (9.5 trillion kilometers). Kilometers or miles are just too small.

It's like trying to measure a trip you & your family are taking out of state in inches. The units are too small.



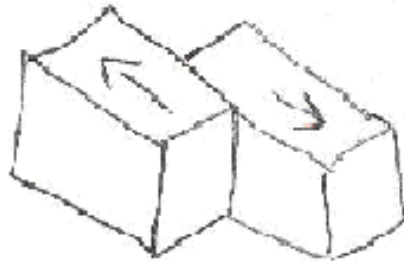
Earth Science

Cross-Section of Earth



The **crust** of the Earth, make up the plates that float on the liquid magma of the **mantle**. The heat of the Earth creates convection currents (shown w/ arrows) that slowly move magma in the mantle layer. This movement causes crustal plates to shift which is called plate tectonics.

1. When these crustal plates slide against each other. They are called transform boundaries.



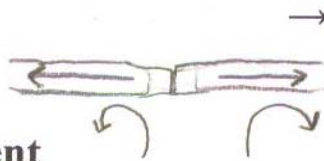
→ Earthquakes form.

2. When these plates collide & push up against each other they are called convergent boundaries.



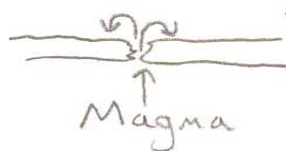
Mountain ranges form.

3. When plates → move away from each other they are called Divergent boundaries.



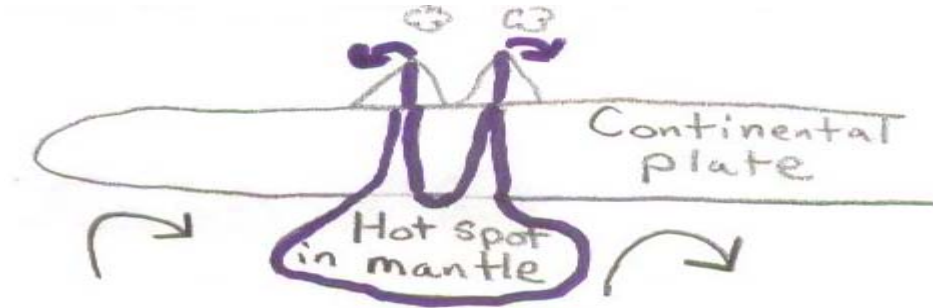
Sea-floor spreading occurs. The Mid-Atlantic Ridge is an example of this.

4. When magma from mantle layer pushes → past plates.



→ Volcanoes form.

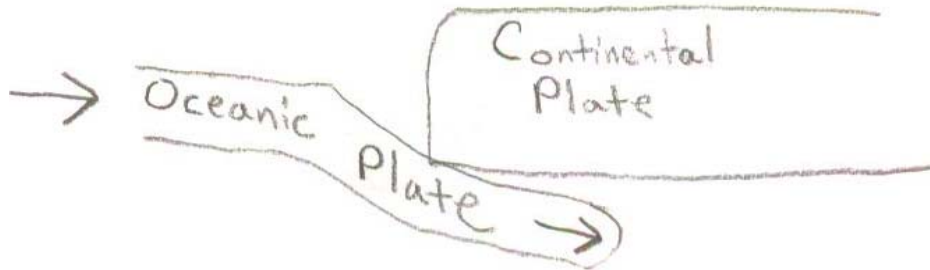
Volcanoes also occur when plates go over a hot spot in the mantle.



5. Movements of crustal plates due to the convection currents also cause



An oceanic trench occurs where a dense thin oceanic plate goes underneath a thick less dense continental plate.



The Rock Cycle

When magma leaves the mantle of the Earth, it creates igneous rocks. **Igneous rocks** are cooled lava.

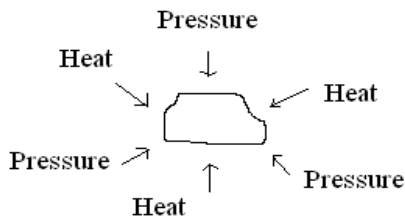


Weathering such as water, wind, rain, freezing and melting causes these rocks to breakdown or erode.

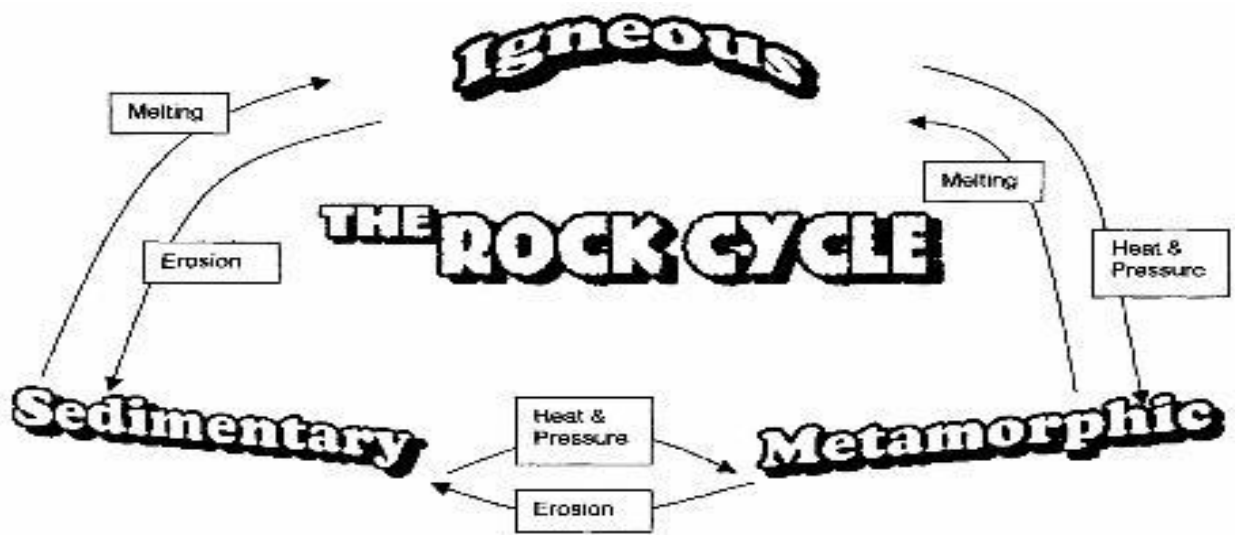
The pieces that are taken away get laid down (deposited) on the ground or on the bottom of rivers. In time, there are many layers much like the layers of a cake. This is called deposition. These particles and pieces of rock are called sediments and they can get cemented together by pressure over time to become sedimentary rocks.



Both Igneous & Sedimentary rocks can change or “morph” into a new type of rock by extreme heat & pressure when they are close to the Earth’s mantle. This new type of rock is called a Metamorphic rock.



Rocks continuously go through these different changes. This is called the Rock Cycle.

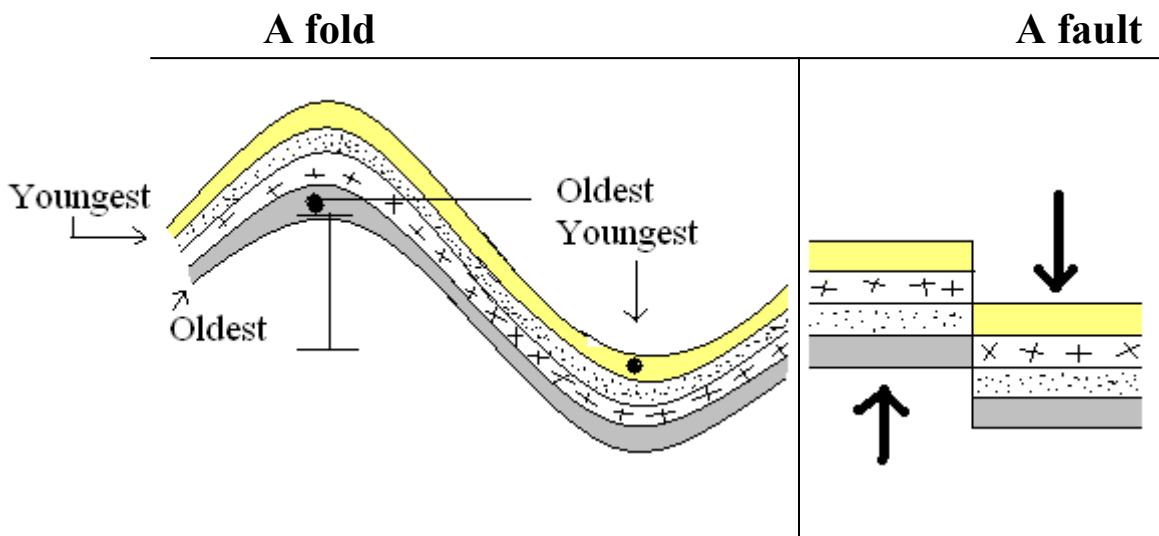


<http://www.naturescience.org/Rxcycle.htm>

When sedimentary layers are laid down, the youngest layer is always on top. These rock layers can fold & fault causing the younger layers to be put below older layers.



We can see how rock layers can fold & fault causing the younger layers to be put under older layers as shown below.



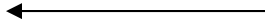
Physical Science

Reference point & motion

Object in motion



Reference point

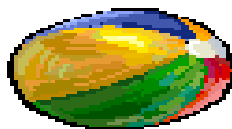


Objects are in **motion** when they change their position over time. In order to see an object in motion (moving), we must see it in relation to an object that is standing still such as this building. This object that stands still is called the **reference point**.

Balanced & Unbalanced Forces

A **balanced force** is when the forces acting on an object (opposing forces) are equal causing that object to stand still.

ex. If you hold up a ball with your hand, and the ball is standing still, the force of gravity and the weight of the ball equals the force you are applying to keep it still.



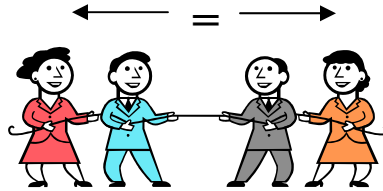
gravity



force of hand



Another example- If two sides of a tug-o-war are equal in force, the rope will not move. This is a balanced force.



Unbalanced- means that these two opposing forces are not equal.

If the force of gravity is greater than the force you apply to the ball then it will cause the ball to push your hand down.

The side of the rope that has a greater force will cause the side with the weaker force to get pulled toward them. This is an unbalanced force.



Energy can be transferred through waves. Waves are a flow of energy such as light, sound, radio and water waves.

When sound travels through the air, it is actually traveling along air molecules. These molecules bump into the next set of air molecules similar to dominoes that transfer energy to the near by domino piece.



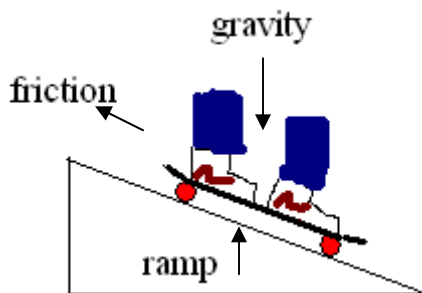
Similarly, when you drop a pebble into a pond, it causes the water molecules next to the pebble to vibrate or bump nearby water molecules. This causes a spread of ripples throughout the pond. Here, energy spreads from the original source.



Forces & Motion

A force is a push or pull on something.

If a skater goes down off a ramp, what forces are acting on the board?



Friction happens when objects rub against each other such as wheels and the ramp.

Gravity happens to any object on Earth. Gravity pushes down on a person & the board.

The ramp has a force since it is holding up the person and board.

Potential energy- Is stored energy. When the skater is at the top of the ramp, he/she has potential energy because

as soon as they reach the edge they are going down!

Kinetic Energy- Is energy in motion. The skater going down as in the picture is experiencing kinetic energy. The potential energy from being on top of the ramp got converted into this kinetic energy.



Moh's hardness scale- categorizes the hardness of minerals. Hardness is the resistance of a mineral to being scratched. These minerals are numbered 1 thru 10. 1 being the softest mineral on Earth & 10 being the hardest meaning nothing else can scratch a #10.

Moh's scale

<u>Softest</u> → Talc 1	Feldspar 6
Gypsum 2	Quartz 7
Calcite 3	Topaz 8
Fluorite 4	Corundum 9
Apatite 5	Diamond 10 ← <u>Hardest</u>

If a mineral has a higher # than another mineral, then the higher # will scratch the lower one.

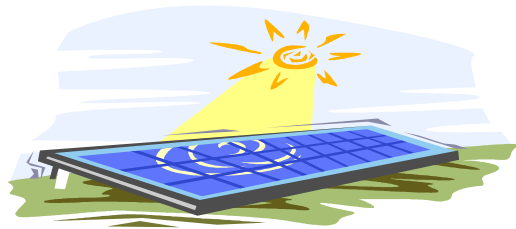
ex. Quartz will scratch Feldspar 7>6 and a diamond can scratch anything. This does not mean a diamond is the strongest substance because a hammer can smash a diamond. Being the hardest mineral on Earth means it can scratch any other material. **REMEMBER: Higher #'s scratch lower #'s.**

Environmental science issues:



Fossil layers of the Earth are our source of fossil fuels. These organisms turned into carbon which we use as fuel. They include gasoline, oil and coal. Fossil fuels are considered **nonrenewable resources** because we can never replace or renew them. They took millions of years to form!

Renewable resources however can be replaced and renewed. Sunlight, water power, wind, wood, crops are all renewable resources.



Sunlight never runs out.

Crops & wood can be constantly grown.
The downside to fossil fuels is one: They will run out one day soon.

& two: They cause GLOBAL WARMING!!!!!!



When we protect our resources (items we use from the Earth) & nature, this is called **conservation**.

How can we conserve resources?

- ◆ **recycle**
- ◆ **car pool**
- ◆ **riding a bicycle instead of driving.**
- ◆ **use public transportation.**
- ◆ **turn off water and electricity when were not using them.**



For the **OAT**, we will have to be able to trace the paths of energy through a system.

ex. What energy transformations occur for a tree getting energy from the sun?

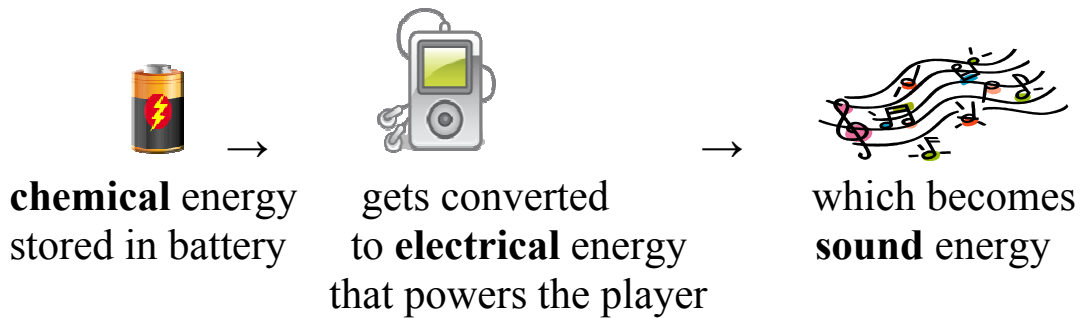


Solar energy
(or light energy)



converts to chemical energy
(during photosynthesis).

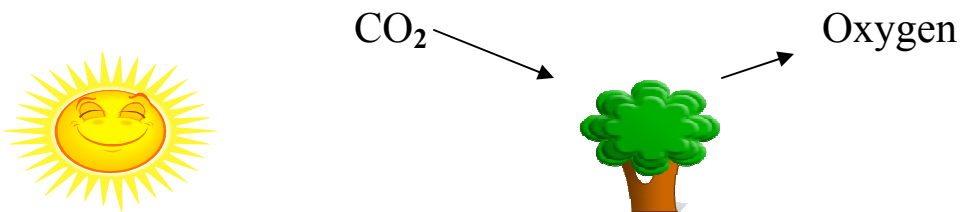
ex. What kind of energy transformations occur inside an mp3 player as someone is listening to their music?



Life Science

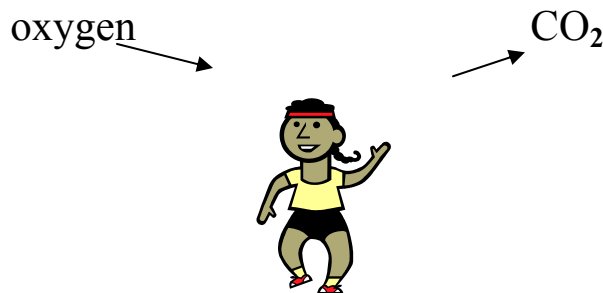
Photosynthesis & Respiration

Photosynthesis- occurs when plants convert light energy into chemical energy. This requires them to take in Carbon dioxide (CO₂) and release oxygen into the air.



Humans are opposite, we respire.

Respiration- Animals & humans take in oxygen & breath out carbon dioxide (CO₂).



Cells: The smallest structural & functional unit of an organism. They carry out life processes. New cells come from existing cells.

Inside a cell are smaller structure that carry out processes for the cell. They are called organelles.

Here is a list of organelles & their functions, found in plants & animals. Students should be familiar with these.

Organelle

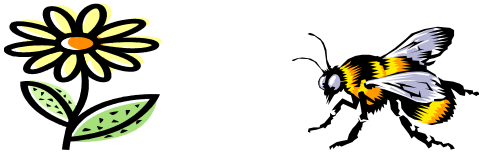
Function

Nucleus	Control center of cell & contains DNA.
Ribosome	Makes proteins.
Lysosomes	Digests food particles, wastes & foreign invaders.
Mitochondria	Produces energy. (Powerhouse).
Endoplasmic Reticulum	Transports materials throughout cell.
Golgi Complex (apparatus or body)	Processes & packages proteins for shipment out of cell.
Vacuole	Stores water, food & water.
Cytoplasm	A fluid that fills a cell & surrounds the organelles in a eukaryote.

Sometimes different organisms can interact together in a unique way where at least one organism benefits from living with the other. This is called **symbiosis**.

There are 3 types of symbiosis.

1. Mutualism- when both organisms benefit from each other.



ex. A bee & a flower. The bee pollinates the flower ensuring the flowers survival in the next generation and the flower provides the bee with nectar- the bee's food.

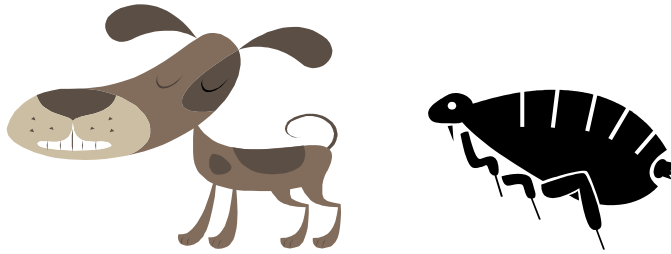
2. Commensalism- When only one organism benefits from the relationship and the other is not harmed or helped.



ex. A bird & its nest up in a tree benefits the bird giving it protection and the tree is not helped or harmed by the bird living there.

1. Parasitism- When one organism benefits and the other is harmed.
The parasite harms the host.

ex. A flea on a dog benefits because it is sucking blood which is its food. The dog (the host) is being harmed because his blood is taken away.



Reproduction

Sexual reproduction- involves producing offspring from two parents. Here, DNA from each parent combines together to create DNA of the offspring. This creates **variety**.





By chance, nature will favor certain genetic traits (characteristics) over others.

For example- Millions of years ago, some giraffes were born with short necks & others were born with longer necks. When low grass & scrubs (food for giraffes) became scarce the giraffes with the longer necks were able to reach the leaves in the higher trees to survive.

The short necks could not reach the food so they did not survive. The long necks survived so their genes for long necks were passed down to their offspring. Nature happened to favor the long neck variation, while eliminating the gene for short necks. This long neck giraffe developed gradually over many generations of giraffe families. Conditions in nature favor certain genes over others. In this example- body type.

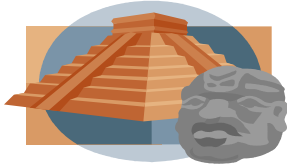
Just as this animal adapted to a change, another change could come about and not favor long necks, for example if all the tall trees were eaten or killed and the long necks couldn't bring their long necks that low to the ground. Remember that changes can occur anytime, either favoring an animals particular characteristics or causing that animal to become extinct.

Asexual reproduction- involves reproduction from only one parent. Here, the DNA of the offspring is **identical** to the parent.

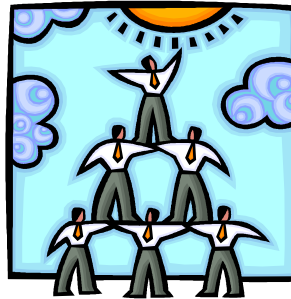


Many organisms reproduce this way including bacteria, fungi some plants & animals.

Science & Technology



What we know about science has come from people from all over the world. Scientists from the past, such as Egyptians, Chinese, & Romans made discoveries and later scientists build on this older knowledge. We can say that today's scientists are standing on the shoulders of previous people's work.



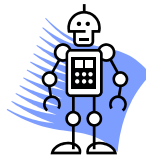
Technology are tools created by scientists that allow us to do things we couldn't do on our own. We cannot see the surface of the moon without a telescope, or see through skin and muscle to see our bones.



X-Ray



Scientists are working today on new discoveries and technologies.



In the years to come, scientists will create things we only dreamed of. Maybe you've got an idea? Study in school, keep your dreams alive and you'll have all the tools you need to be a scientist of the future!

Some places of the world have more opportunities than others to use technological advances. For example, in Cleveland, one could get the best surgery to get their heart replaced. If you lived in an undeveloped area of the world such as a rainforest, you would most likely not go to the hospital.



Politics also determines how technology gets used. We have the technology to make cars that do not create pollution that today's cars make. Unfortunately, some people care more about money than the health of the planet and its people.



If you were the president of a country, could you design a way to produce energy that does not pollute the air? What if your country did not have much money or materials? If your country's scientists came together and gave you ideas, would you be able to decide if these solutions would work or not? These are serious questions about science that affect everyone.



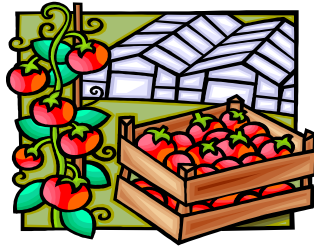
Scientific Inquiry

This area of science deals with how we ask questions or “inquire” about things.

Say you wanted to find out what kids in your school like the most: skateboarding or rollerblading? When you went to math class you asked 5 people that sat near you and 3 said they like skateboarding better.



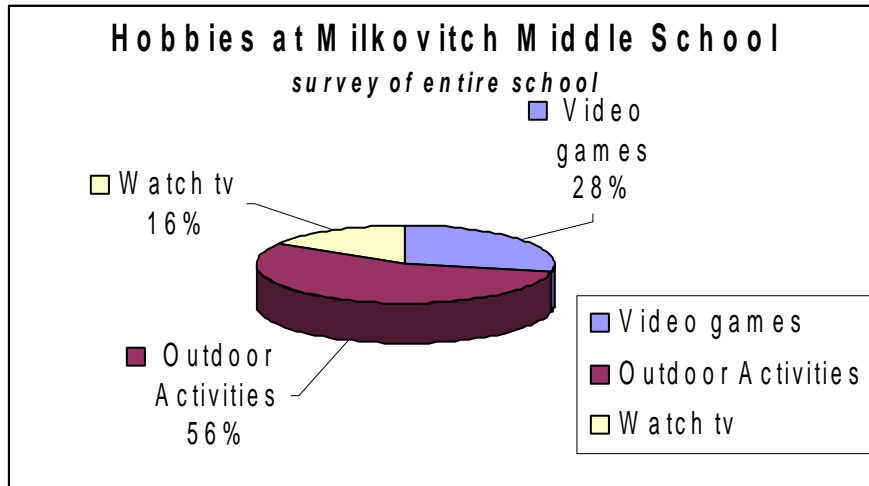
Does this give you an accurate answer of what your school likes best? No, because 5 people are not enough to give you an accurate inventory of your whole school. If you asked every student in each of your classes that would be more accurate. Scientific investigations need a large sample to be tested.



If you tested to see if fertilizer helps a tomato plant grow you would treat more than just one tomato plant with fertilizer because there could be something wrong with a plant to influence the outcome- you might think it was the fertilizer when it was something about the plant you couldn't see. Also some plants might get eaten by insects so you want enough samples.

How do we know the fertilizer works? We need to use a **control**. A control is an untreated sample that we use to compare the treated sample to. In this case a tomato plant with all the same conditions (same sunlight & water) except no fertilizers.

Be able to read and interpret graphs.



Looking at the graph above, which hobby is the favorite to most students at Milkovich?

Do we have the right tools & safety equipment for the job?

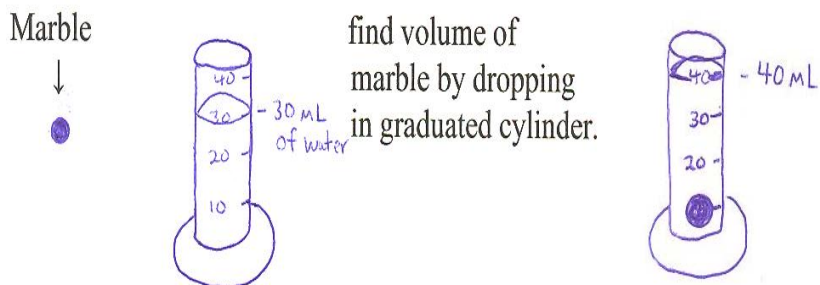


Know scientific instruments, their purposes and how to inquire about science with them.

Ex. Be able to figure out the volume of an object using a graduated cylinder.

The **volume** of an object is the amount of space it takes up. A bowling ball takes the same amount of space as a beach ball that is the same size as the bowling ball. The only difference is the bowling ball has a greater density.

Density= the amount of matter taking up that space.



The marble displaced the water from 30ml to 40ml so the marble's volume is 10ml.



Some experiments involve dangerous chemicals and hazards. If you are working on an experiment like this, your teacher will make sure you understand proper procedures in the event of an accident. What do you do if you spill an acid on your skin or in your eyes? Be sure to know how to respond in these situations.

Math skills

Show off your math skills on the science OAT.

Below are math test scores (in %) of 9 students.

75 76 79 80 87 87 87 91 98

Find mean score- or average score. To do this you add all scores together and divide by how many scores there are (9).

$$75+76+79+80+87+87+87+91+98= 760/9=\mathbf{84.4} \quad \checkmark \text{ mean}$$

Find median score- or middle score. We find median by choosing the score that is exactly in the middle of the numbers when they are in order from lowest to highest. 87 has 4 scores to the left (lower) and 4 to the right (higher).

75 76 79 80 | **87** | 87 87 91 98
If you have a list of numbers that is even such as these 6-

85 87 89 | 91 93 97

Divide the #'s evenly as shown above. The median is between 89 & 91 so you add these two middle numbers together and divide by 2 to find the # exactly between 89 & 91.

$$89+91=180 \quad 180/2=\mathbf{90} \quad \checkmark \text{ median}$$

Finding mode – This is the # that appears most frequently.

75 76 79 80 **87 87 87** 91 98

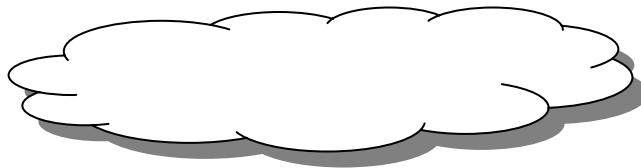
87 appears 3 times. This is the **mode**

Scientific Ways of Knowing

Inference- is an attempt to explain or speculate about your observations. This is something you think might happen, is happening given what you observe. It may or may not be true.

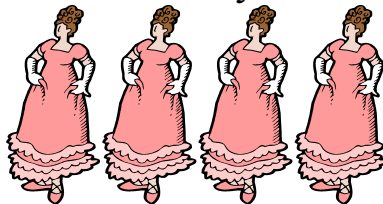
Observation- something you can detect using any of your 5 senses. This is a fact→ You saw the ghost, you heard a noise. You smelled the perfume. Facts!

We do this gathering of information every day. If you see a car going out of control, which is an observation, a fact, you can make an inference that it might hit you so you're going to run out of the way. We don't know for sure all the time if things will happen a certain way, but given the facts (what you observe) we can make intelligent inferences.

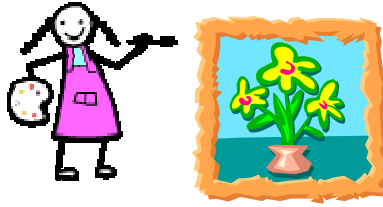


ex. You see a picture of a white puffy object in the sky. This is a fact. Your inference could be that it's a cloud because it may or may not be. It may be smoke from a fire or from a volcano.

Science follows ethical guidelines. This means scientists must do experiments that do not hurt humans or have the potential to cause more harm than good. This is why it is illegal to clone humans.



One must also be unbiased when looking at data. This means not trying to favor a particular outcome over another for personal reasons.



ex. Your friend has a picture in an art contest. You are asked to be a judge of the pictures but you don't know which one is hers. If you did know which one was hers, then you would be biased towards her art work. This means you might pick hers because she is your friend and that wouldn't be fair to the rest of the contestants.

Keep up the good work & remember to have fun!



OAT 8TH GRADE SCIENCE VOCABULARY

EARTH AND SPACE SCIENCES

SOLAR SYSTEM- The planetary system consisting of our sun and the nine planets that revolve around it.

SEASONS- Created by the tilt of the earth when the northern and southern hemispheres are either tilted away, towards or equally angled from the sun's most direct rays.

ROTATION- A planetary body such as the earth spinning on its axis like a globe as you spin it.

REVOLUTION- This is when a planet, like earth, makes one complete trip around the sun (360 degrees).

LIGHT YEAR- The distance light travels in one year. It equals 5.879×10^{12} miles or 5,879,000,000,000 miles!

TIDES- The alternate rising and falling of the surface of the ocean and water bodies (such as gulfs and bays) connected with the ocean that occurs usually twice a day, and is caused by the gravitational attraction of the sun and moon occurring unequally on different parts of the Earth.

GRAVITATION- A force manifested by acceleration toward each other of two free material particles or bodies, or of radiant-energy quanta.

ORBIT- A path described by one body in its revolution about another (as by the Earth about the sun or by an electron about an atomic nucleus).

COMET- A celestial body that consists of a fuzzy head usually surrounding a bright nucleus, that has a usually highly eccentric orbit, and that often, when in the part of its orbit near the sun, develops a long tail which points away from the sun.

ASTEROID- A small rocky body orbiting the sun.

METEOR- Any of the small particles of matter in the solar system that are directly observable only by their incandescence from frictional heating on entry into the atmosphere.

METEOROID- One of a large number of celestial bodies of various size that appear as meteors when they enter Earth's atmosphere.

GALAXY- Any of the very large groups of stars and associated matter that are found throughout the universe.

TOOLS USED TO STUDY UNIVERSE- Telescopes, probes, satellites, and spacecraft.

EARTH SYSTEMS

VOLCANO- A vent in the crust of the Earth or another planet from which usually molten rock, ash and steam are ejected.

WEATHERING- To subject to the action of the elements.

UPLIFT- To cause (a portion of Earth's surface) to rise above adjacent areas.

FAULTING- To fracture so as to produce a geologic fault.

FOLDING- Causing rock strata to undergo bending or curvature.

TRANSFORM- To change in composition or structure.

CONVERGENT- To come together or tend to come together at a point.

DIVERGENT- To separate or spread apart.

TECTONIC PLATES- The earth's top layer (crust) that shifts and moves on top of the liquid mantle.

EARTHQUAKE- A series of sudden elastic waves that are generated where tectonic plates shift past each other with great friction.

EROSION- Weathering of earth's surface by forces of nature such as wind and water. This is when soil or rock material (sediments) are taken away from an area. Can also be caused by human activity.

DEPOSITION OF SEDIMENT- The sediments that were eroded from an area are transported somewhere such as a riverbed, or shoreline.

LIFE SCIENCES

ASEXUAL REPRODUCTION- Involving or reproducing by reproductive processes(as cell division , spore formation, fission or budding) that do not involve the union of germ cells or egg and sperm.

SEXUAL REPRODUCTION- the joining of genetic material from the male and female gametes (sperm and egg) in hopes of producing an offspring.

FOSSIL- Remnant, impression or trace of an organism of past geologic ages that has been preserved in the Earth's crust.

EXTINCT- A species of organisms that no longer exists.

PHYSICAL SCIENCES

MOTION- An act, process or instance of changing position through time.

SPEED- The distance traveled divided by the time interval during which the motion occurred.

WAVE- A periodic disturbance in a solid, liquid, or gas as energy is transmitted through a medium.

SOUND WAVES- Mechanical radiant energy that is transmitted by longitudinal pressure waves in a material medium (such as air) and is the objective cause of hearing.

SCIENCE AND TECHNOLOGY

TECHNOLOGY- Human innovation in action that involves the generation of knowledge and processes to develop systems that solve problems and extend human capabilities.

RESOURCE- Industrial materials and capacities (as mineral deposits and waterpower) supplied by nature (earth science) and substances used by an organism for survival (biology).

DESIGN- To create, fashion, execute or construct according to plan.

SCIENTIFIC INQUIRY

HYPOTHESIS- A formula derived by inference from scientific data that explains a principle operating in nature.

THEORY- A supposition or system of ideas intended to explain something, especially one based on general principles independent of the thing to be explained.

MEAN- The sum of a set of numbers divided by the number of elements in the set.

MEDIAN- The middle number or item in a set of numbers or objects arranged from least to greatest, or the mean of the two middle numbers when the set has two middle numbers.

MODE-The number or object that appears most frequently in a set of numbers of objects.

SCIENTIFIC WAYS OF KNOWING

OBSERVATION-To watch carefully, especially with attention to details or behavior for the purpose of arriving at a judgment.

PREDICTION – The act of making a forecast.

INFERENCE- To use certain facts provided as input to reach a conclusion.