

Lesson 1

Night Sky contains:

- Moon: satellite of body that orbits a planet
- Meteors: streak of light produced when a small objects burns up entering Earth's atmosphere
- Comet: cold mixture of dust and ice---give a long trail of light
- Planets: object that orbits the sun
- Stars: giant ball of hot gas; mainly composed of hydrogen and helium

Constellations

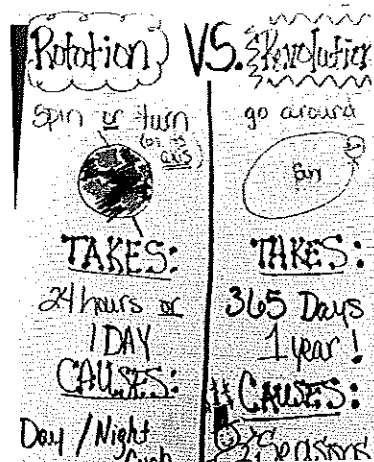
- Pattern or group of stars that people imagined to represent a figure, animal or object
- In Western culture there are 88 known constellation
- Star Chart can help find constellations

Stars Motion

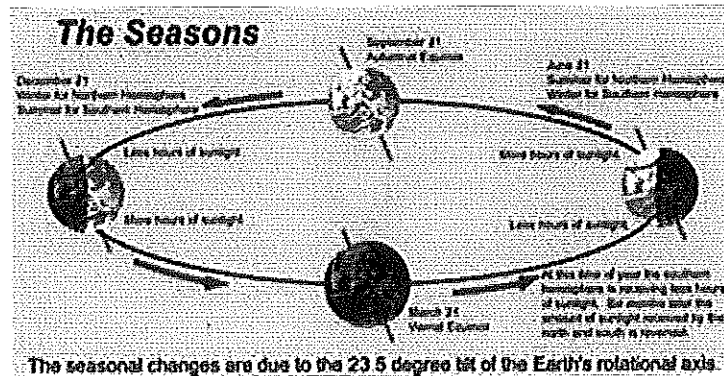
- earth's motion causing the apparent movement of stars and the sun
- Season changes are caused by Earth's orbit around the sun

Lesson 2

Rotation versus Revolution



Seasons



-Earth has seasons because its axis is tilted as it revolves around the sun

-Tilted at a 23.5° angle

-Solstice is when sun appears farthest north of the equator once each year and farthest south--- Summer Solstice is the longest day and shortest night (for the Northern Hemisphere that is June 21st) and the Winter Solstice is the longest night and shortest day (for the Northern Hemisphere that is December 21st)

-Halfway between a solstice neither hemisphere is tilted towards the sun, which is called an Equinox---Equal day and Night and that occurs on March 21 (Vernal-Spring Equinox) and September 22 Autumnal-Fall Equinox)

Lesson 3

Gravity

-Newton Universal Law of Gravity---strength of force of gravity between two objects depends on two factors: the mass of an object and the distance between them

-Mass: amount of matter in an object

-Weight: measure of force of gravity

-Mass never changes, but objects weight does depending on location (one Moon you will weight 1/6 as much as Earth, because pull on Moon's gravity Is less than Earth because the moon has less mass)

-Gravity also decreases as distance increases

- Inertia is the tendency of an object to resist a change in motion
- Newton's Second Law of Motion: an object at rest stays at rest unless acted upon by a force, an object in motion will stay in motion with a constant speed unless acted upon by a force

Gravity and Inertia

- Newton concluded that inertia and gravity combine to keep Earth in orbit around the sun and the moon in orbit around the Earth

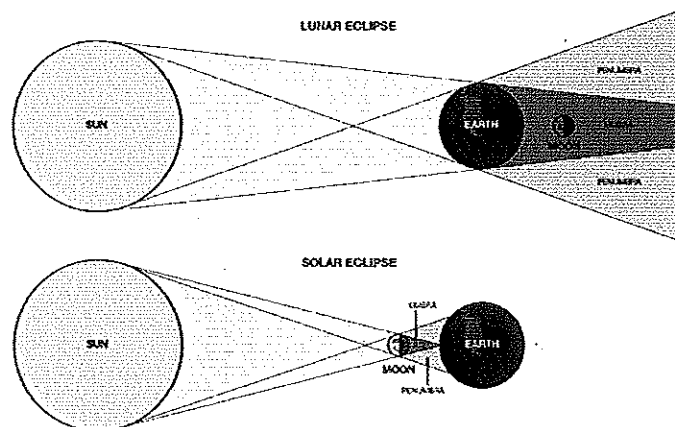
Lesson 4

Phases of the Moon: look at handout

Eclipses

- Moon travels above and below Earth's orbit
- Rare occasion the Earth, the moon, and the sun line up

- When an object in space comes between the sun and a third object it casts a shadow on that object causing an eclipse



- Umbra: very darkest part of the moon's shadow
- Penumbra: largest part of the shadow, moon casts another part of its shadow that is light than the umbra

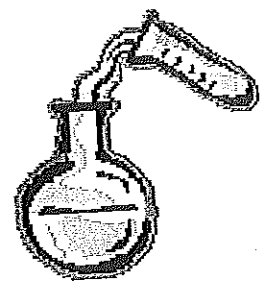
Lesson 5

Tide

- caused by ocean, the rise and fall of ocean water
- caused by the difference in how much gravity from the moon and the sun pulls on different parts of the Earth
- Spring Tides (high tides) occur during new moon also full moon (sun, Earth and moon line up)
- Neap Tides (low tides) occur during first quarter and third (last) quarter

CH 1: Chemistry - Study of matter and how things change

Physical and Chemical Properties



PHYSICAL PROPERTY



CHEMICAL PROPERTY

Characteristic of a substance that is observed without changing it to another substance
Ex: ~~color~~ state of matter, color, texture, size, temp...

Characteristic of a substance that describes its ability to change into another substance
Ex: ~~color~~ rusting, tarnishing, flammability

MIXTURES

Heterogeneous
can easily see the different parts and can be easily separated
ex: bowl of cereal

Homogeneous
evenly mixed that you can't see the different parts
ex: honey



Measuring Matter

Weight
measure of the force of gravity on an object

amount of matter in an object
Mass

Volume
amount of space matter occupies

measure of mass of material in a given volume
 $D = \frac{m}{V}$
Density

1. What is Matter?

Look around the classroom. **Everything**, from the clothes you are wearing to the air you breath is matter. Matter is very important. Matter makes up everything including living things like plants and people. It also makes non-living things such as tables and chairs. Things as big as an elephant or as tiny as a grain of sand on a beach are matter.

Everything is matter and matter comes in three different states: solid, liquid and gas. That means that everything is either a solid, a liquid, or a gas. Each state has properties.

2. What does property mean?

Each state has properties, but what does that mean? A property describes how an object looks, feels, or acts. So that means that liquids look, act, or feel differently than solids or gases.

One property of all matter, whether it's a solid, liquid, or gas, is that it takes up space and has mass.

To help you decide if something is a solid, a liquid or a gas, you need to know the properties, (*how it looks, acts or feels*) of these three states.

3. What are the properties of a solid?

1. Solids don't change shape easily.

Think of a piece of paper, you can change its shape by crumpling it, but it doesn't change its shape by itself. You have to use your energy to make the shape change. If you put a solid in a container it won't change its shape... No matter how much you move or slide it around. Think of an ice cube inside a cup. The cube is solid and it stays the same shape.

2. Solid particles don't move around.

3. Solid particles are in an aligned array. Look at the pictures. Notice the circles (particles) are lined up in tight rows. They are so tight they can't move, they just wiggle.

4. What are the properties of liquids?

1. Liquids take the shape of their container.

If you pour milk into a glass it will take the shape of the glass. If you pour the milk into a bowl, it takes the shape of the bowl.

2. Liquids have surface tension. The particles hold on to each other, like holding hands with a friend. The skin or surface of a glass filled with water holds together because the particles hold one to each other. That is called surface tension.

3. Liquids move around. The particles in liquids are farther apart than those of solids, so they can move around more. That's why liquids take the shape of their container.

5. What are the properties of gas?

1. Gas is invisible. That means you can't see it. The particles are so far apart they are invisible, but they are still there! Think about oxygen. You can't see it, but you know it's there because you breathe it.

2. Gas particles move around freely. They are spread out move fast, like when you are running on the playground at recess.

6. Can Matter Change?

Matter can change in different ways. There are physical changes and chemical changes.

Some matter can change states. That means some matter can change from a solid to a liquid, or from a liquid to a gas.

7. What is a Physical Change?

If you change something physically, it may look, act, or feel different, but it is still the same thing. The molecules haven't changed. For example, if you tear a piece of paper it looks different, but it is still a piece of paper. That is a physical change.

An ice cube, a solid, becomes a liquid when it melts. You can take the liquid and turn it back into a solid by freezing it. The change is reversible. It is a different state, but it is still water. This is called a **PHYSICAL CHANGE**. The state has changed, but it is still the same thing - water.

8. What is a Chemical Change?

Matter can also change and become something completely different, that is called a **CHEMICAL CHANGE**. A chemical change is irreversible; that means it cannot change back.

Think about baking a cake. The batter is a liquid mixture of flour, sugar, water and other ingredients. When you heat it in the oven, the batter turns into a yummy solid. You cannot change it back into flour, sugar, water and the other ingredients. The batter has made a chemical change that is irreversible and it has become something new.

Seasons, Moon Phases and Tides

- Know your vocabulary!

- **Day & Night / Seasons**

- Revolution / Rotation
- Cause
- Why is the axis important
- How day & night and seasons change

- Similarities and differences at various points on Earth
- Solstices and Equinoxes- when and where they occur

1. The study of the moon, stars, and other objects in space is called astronomy

2. B Axis

3. D Rotation

4. A Revolution

5. C Orbit

a. The movement of one object around another object

b. The imaginary line that passes through Earth's center and the North and South poles

c. The path of an object as it revolves around another object in space

d. The spinning motion of a planet around its axis

6. Each 24-hour cycle of day and night is called a(n) day (one rotation)

7. Why is an extra day added to February every four years?

Earth's orbit around the sun takes about 365 $\frac{1}{4}$ days. Four years of about 365 $\frac{1}{4}$ days each can be approximated by taking three years of 365 days and a fourth year of 366 days

8. What causes day and night? **Earth's rotation on its axis**

9. Why is it warmer near the equator than near the poles? **Because sunlight hits Earth's surface directly and is less spread out at the equator.**

10. Why does Earth have seasons? **Because its axis is tilted as it moves around the sun.**

11. Circle the letter of each sentence that is true when the Northern Hemisphere has summer.

a. The Southern Hemisphere is tilted away from the sun.

b. The Northern Hemisphere is tilted away from the sun.

c. The Southern Hemisphere is tilted toward the sun.

d. The Northern Hemisphere is tilted toward the sun.

12. What is latitude?

A measurement of distance from the equator, expressed in degrees north and south; horizontal lines

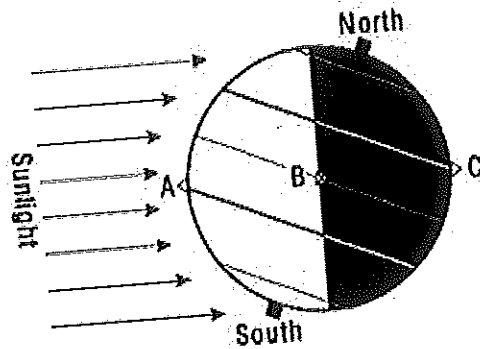
13. Circle the letter of each sentence that is true about Earth's seasons.

a. Earth is closest to the sun when it is summer in the Northern Hemisphere.

b. The hemisphere that is tilted away from the sun has more daylight than the other hemisphere.

c. When it is summer in the Northern Hemisphere it is winter in the Southern Hemisphere.

d. In December, the sun's rays in the Northern Hemisphere are indirect.



14. In the diagram above, what season is it in North America? Due to the tilt of the axis, the sun shines less directly on the surface. The sun is above the horizon for a shorter amount of time so it is winter.

15. What season is it in South Africa? Because the tilt of the axis, the sun shines more directly on the surface so it is summer.

16. Would a person at each of the points A, B, and C see the sun? If so, where would the sun be in the sky?
Point A—yes, the sun would be up in the sky
Point B—yes, the sun would be just setting
Point C—no, the sun would not be visible because it would be night. It would be rotating toward sunrise

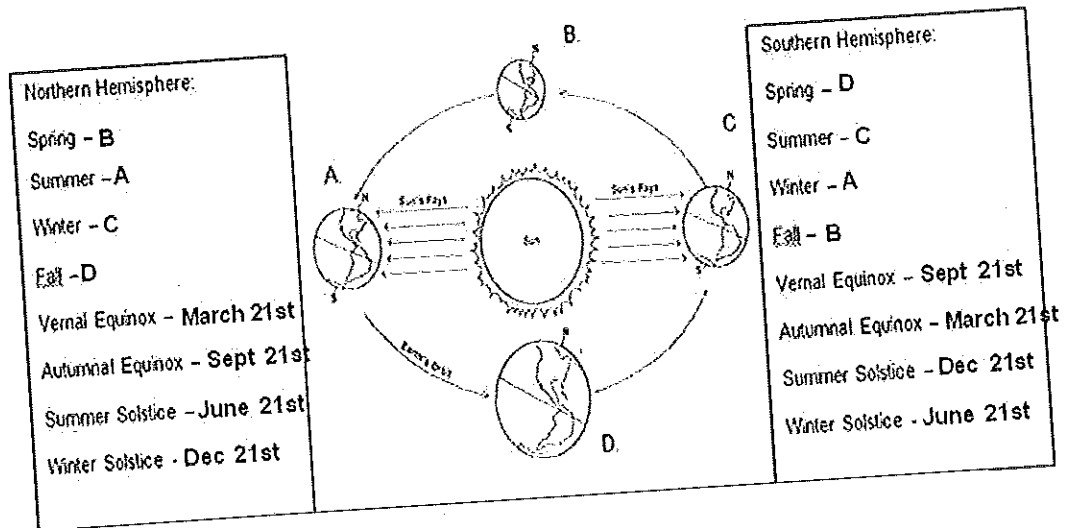
17. Which is a person standing at point B seeing, sunrise or the sunset? Explain. Sunset because the earth rotates counterclockwise (from the left to the right) so Point A would have the sun overhead and Point B is where the sun would be lowering in the sky, becoming darker.

18. Each of the two days of the year when the sun is overhead at either 23.5° south or 23.5° north is called a(n) solstice.

19. Each of the two days of the year when neither hemisphere is tilted toward or away from the sun is called a(n) equinox.

20. Complete the table.

Earth's Seasons			
Day in Northern Hemisphere	Approximate Date Each Year	Length of Daytime	Which Hemisphere Is Tilted Toward the Sun?
Summer solstice	June 21	Longest daytime	Northern Hemisphere
Autumnal equinox	September 21	Daytime equals nighttime	Neither
Winter solstice	December 21	Shortest daytime	Southern Hemisphere
Vernal equinox	March 21	Daytime equals nighttime	Neither



• Moon Phases

- Causes
- Names and which part of the moon is lit
- Where the moon is located in its revolution for each phase
- What do we see from Earth at the different phases
- Solar and Lunar Eclipses- causes and parts

21. What causes the phases of the moon, eclipses, and tides? The positions of the moon, Earth, and sun

22. Circle the letter of each sentence that is true about motions of the moon.

- a. The moon revolves around the Earth once a year.
- b. The "near side" of the moon always faces Earth.
- c. The moon rotates slowly on its axis once every 27.3 days.
- d. The moon's orbit around Earth is an oval shape.

23. The different shapes of the moon you see from Earth are called phases.

24. How often does the moon go through a whole set of phases? Each time it revolves around Earth, or about once a month (29.5 days)

25. What does the phase of the moon you see depend on? It depends on how much of the sunlit side of the moon faces Earth