Name:_____ **Helpfulness and Limit of Models**

Date:_____ Partners:_____

Use the following table, your knowledge of our solar system, and a ruler or calipers in order to decide how accurate this model of the solar system is. Make two lists, one of things are correctly represented by this model of the solar system, and some of things that are incorrect or misleading. Be prepared to share your lists with the class in order to compile one master list.

SOLAR SYSTEM DATA CHART

Object	*Mean Distance from the Sun (millions of km)*	*Period of Revolution*	*Equatorial Diameter (km)*
Sun	---	---	1,392,000
Earth	149.6	365.26 days	12,756
Earth's Moon	149.6 (0.386 from Earth)	27.3 days	3,476

Things that are accurate:

Things that are inaccurate:

Name:_____ **As the World Revolves**

Date:_____Partners:_____

OBJECTIVES:

- Earth's rotation on its axis causes regular changes including night and day.
- Most objects in the solar system are in regular and predictable motion. These motions explain such phenomena as the day, the year, and seasons.
- During Earth's one-year period of revolution, the tilt of its axis results in changes in the angle of incidence of the Sun's rays at a given latitude; these changes cause variation in the heating of the surface. This produces seasonal variation in weather.
- Explain variations in day length.

PROCEDURE:

Get familiar with your globe: Answer the following questions and then have your teacher check your answers before you begin working.

a. The half of Earth that is shining in the light represents _____.

b. The half of Earth that is in darkness represents _____.

c. Take your right hand and orient it so your thumb is pointing the same direction as your North Pole. The direction your fingers are curling is the direction the Earth spins. Slowly spin your globe and focus on one city. As the city moves from darkness to light, this represents _____.

d. As the city moves from light to darkness, this represents _____.

e. For your city in question the sun rises in the _____ and sets in the _____.

f. There are _____ lines of longitude and _____ lines of latitude on the globe.

g. The lines of longitude are evenly space apart at _____degrees of longitude each, therefore every line of longitude represents a time of _____hour(s).

h. The line 23.5 °S of the equator is called the _____ and this line is important because _____

_____

_____

i. At 66.5°N of the equator is the _____ and 66.5 °S of the equator is _____. These lines are important because _____

_____

_____

DIRECTIONS:

1. Plug the model into an outlet and make the model Earth revolve around the sun until the black arm is extended over the December 21st. (Move Earth to where the North Pole is pointed as far away as possible from the Sun.)
2. Move the moon to the opposite side of Earth (where night is).
3. Mark the following cities with an erasable marker, a small piece of sticky tack or a small piece of tape. Something that will be easy to remove and easy to see.

   Singapore, Indonesia; Canberra, Australia; Havana, Cuba; Rio de Janerio, Brazil; Cairo, Egypt; Victoria Island, Canada; The South Pole; Antarctica (where the post is holding Earth up).
4. Also find your position on the map and then mark it as well.
5. Determine approximately what day your globe is representing and write that on the line below_____
6. Fill out the graph below by counting the number of meridians that are exposed to the sunlight and darkness.

	Hours of Daylight	***Hours of Darkness***
Singapore, Indonesia (equator)		
Cairo, Egypt (North of the Equator)		
Canberra, Australia (South of the Equator)		
Havana, Cuba (Tropic of Cancer)		
Rio de Janerio, Brazil (Tropic of Capricorn)		
Victoria Island, Canada (North of Arctic Circle)		
The South Pole		

7. Now make the model Earth revolve around the sun until the black arm is extended over June 21st solstice. You can find this position by moving Earth to where the North Pole is pointed as close as possible to the Sun.

8. Determine approximately what day your globe is representing and write that on the line below

_____

9. Fill out the graph below by counting the number of meridians that are exposed to the sunlight and darkness.

	Hours of Daylight	***Hours of Darkness***
Singapore, Indonesia (equator)		
Cairo, Egypt (North of the Equator)		
Canberra, Australia (South of the Equator)		
Havana, Cuba (Tropic of Cancer)		
Rio de Janerio, Brazil (Tropic of Capricorn)		
Victoria Island, Canada (North of Arctic Circle)		
The South Pole		

10. Now make the model Earth revolve around the Sun until the black arm is exactly half way between the summer and winter solstice.

11. Determine approximately what day your globe is representing and write that on the line below

_____

12. Fill out the graph below by counting the number of meridians that are exposed to the sunlight and darkness.

	Hours of Daylight	***Hours of Darkness***
Singapore, Indonesia (equator)		
Cairo, Egypt (North of the Equator)		
Canberra, Australia (South of the Equator)		
Havana, Cuba (Tropic of Cancer)		
Rio de Janerio, Brazil (Tropic of Capricorn)		
Victoria Island, Canada (North of Arctic Circle)		
The South Pole		

QUESTIONS:

1. How does the duration of insolation change as the season change from December 21st to March 21st to June 21st to September 21st in the Northern Hemisphere?

2. How does the duration of insolation change as the seasons change from December 21st to March 21st to June 21st to September 21st in the Southern Hemisphere?

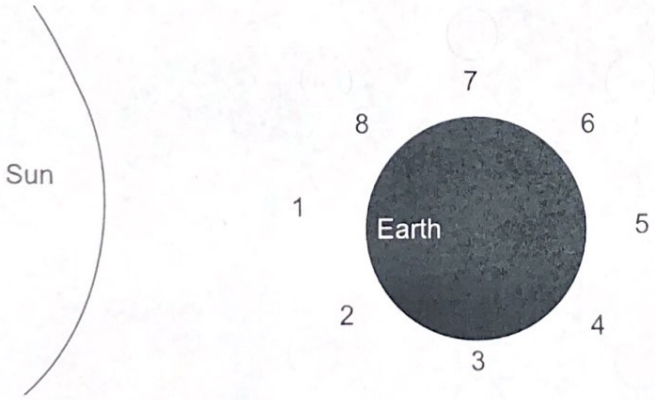
Name:_____ **Phases of the Moon**

Date:_____

DIRECTIONS:

Turn off all the lights in the classroom and plug in your model. Place the moon directly between the sun and earth. This is position 1. Pretend that the moon's orbit around earth is a big pie and cut that pie into eight slices.

1. In the space provided below for each 1/8th of an orbit around the earth, draw a top down view of which half of the sun and moon are light and which are dark.



2. Now pretend you are a nighttime observer from earth. Align your head so that you are always viewing the moon with earth directly between your head and the moon. You will only be able to see half of the moon. Draw a diagram for each position 1-8 and shade in the shadow side of the moon. Under each diagram state the phase of the moon it represents.

1 2 3 4 5 6 7 8

Name:_____ Date:_____

ECLIPSES AND TIDES EXPLAINED USING THIS MODEL:

A solar eclipse occurs when the moon comes between the Earth and the Sun. In the space below sketch the position of the Earth, Moon, and Sun during a solar eclipse:

A lunar eclipse occurs when the Earth comes between the Moon and the Sun. In the space below sketch the position of the Earth, Moon, and Sun during a lunar eclipse:

On your model of the Earth, Moon, and Sun system notice that the shadow of the Moon or Earth is dark towards the center of the shadow. This dark part is called the umbra. The lighter part around the edges is called the penumbra. Label this portion of your diagram.

Tides occur because of the rotation of the Earth and the gravitational pull on Earth by the Sun and moon. High tide is when the moon is directly overhead. As earth rotates the moon is also revolving around earth. It takes about 24 hours and 50 minutes for the moon to be directly overhead again. High tide occurs again when the moon is on the exact opposite side of earth. Therefore the time between high tide until high tide is _____

Neap Tide: When the sun and moon are at right angles to one another the change in water levels from high tide to low tide are the most modest. This is because the gravitational pull from the moon is pulling at a right angle to the gravitational pull of the sun.

The neap tide occurs during which two phases of the moon?

_____.

Spring Tide: When the sun and moon are in line with earth, the highest high tide and the lowest low tide occur.

The spring tide occurs during which two phases of the moon?

_____.