Benchmark One Study Guide: Science Benchmark Wed. Oct. 2nd

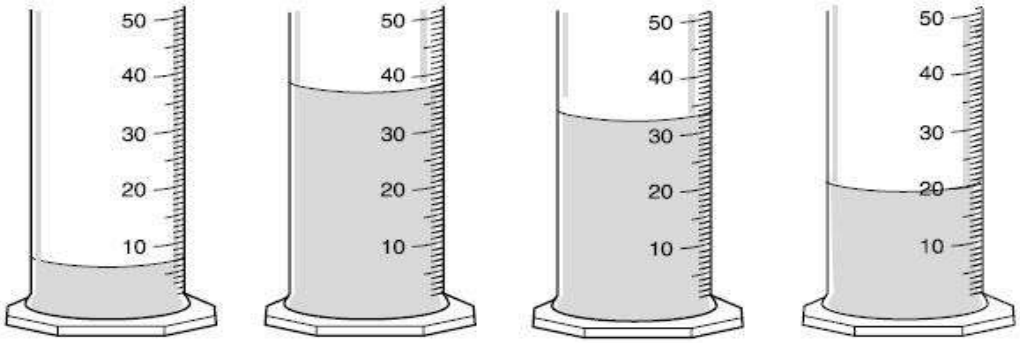
Characteristics of Science:

1. What is a graduated cylinder used to measure? Volume of a liquid (Capacity)
2. Explain how you read a graduated cylinder. Make sure the graduated cylinder is on a flat surface, get eye level, and read at the bottom of the curve, which is called the Meniscus!!

3. What science tool is used to measure the mass of an object? Triple Beam Balance

4. Explain how you read a triple-beam balance. Add the measurements on all three arms together to get the total mass of the object. The unit of measure is GRAMS!

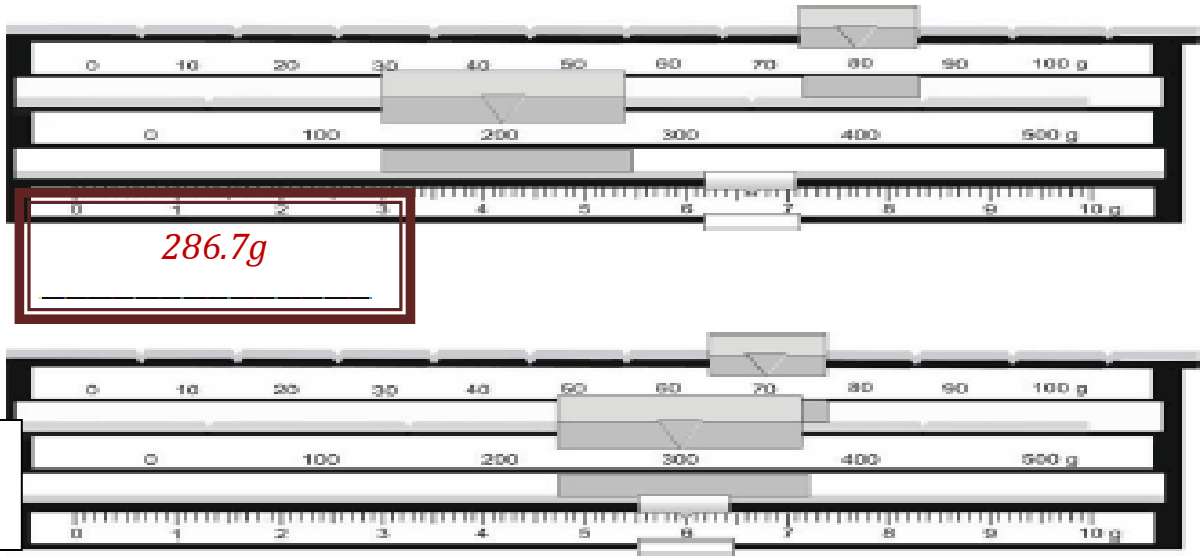
5. Read the graduated cylinders below. Be sure to put the appropriate units with your measure!



1. _____ 2. _____ 3. _____ 4. _____

7mL 38mL 33mL 20mL

6. Read the triple beam balances below. Be sure to but the appropriate units with your measure!



7. List the steps of the Scientific Method.
   1. Ask a question
   2. Form a Hypothesis
   3. Test the hypothesis
   4. Analyze Results
   5. Draw conclusions
   6. Communicate Results

8. A hypothesis should be formed after which step of the scientific method? Ask a question

9. When should safety rules and precautions be planned? Before you do the experiment.

10. Why is it important for scientists to record accurate data while experimenting? So that others can replicate the experiment and get similar results.

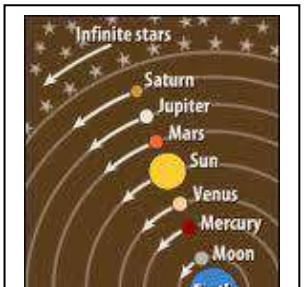
11. In what step of the scientific method should the mean or average from results be calculated and graphed?
Analyze Results

S6E1: A-Theories of the universe:

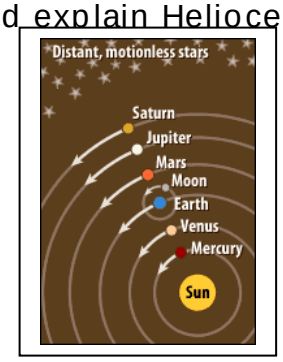
Name that Theory:

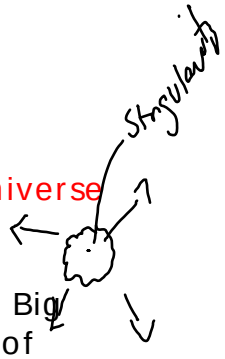
___Big Bang_____1. Expansion of the universe
__Heliocentric_____ 2. Sun Centered Solar System
_____Geocentric_____ 3. Earth Centered Solar System
___Big Bang_____ 4. Georges Llamatre and Edwin Hubble
____Geocentric__ _____5. Ancient Greeks and Aristotle
____Heliocentric_____6. Copernicus and Galileo
____Big Bang_____7. Singularity: concentrated point of matter & energy
___Heliocentric_____8. Venus' phases and Jupiter's Moons

10. Draw and explain Geocentric Theory. Earth Centered Solar System



11. Draw and explain Heliocentric Theory. Sun Centered Solar System





12. Draw and explain Big Bang Theory. Expansion of the Universe
13. What is nebula? A cloud of gas and dust that cools and condenses to form stars and planets.
14. What evidence did Edwin Hubble detect to support the Big Bang when he created the Hubble Telescope? (2 pieces of evidence) Hubble discovered that the galaxies are still expanding and moving away from one another, and he detected leftover radiation from the Big Bang explosion.

15. Rank the following objects in terms of size (1-largest to 4-smallest.)

____2____ Galaxy
____4____ Earth
____3____Sun
____1____Universe

<u>S6E1 B-Milky Way Galaxy</u>

1. What is a galaxy? A group of stars pulled together by the force of gravity.

2. What type of galaxy do we live in? (Give evidence to support how we know this information!) Our galaxy, the Milky Way, is a spiral galaxy, because it has a center bulge and five spiral arms.

3. Where is our solar system located within the Milky Way? Our solar system is located in Orion's outer arm 30,000LY from the center bulge.

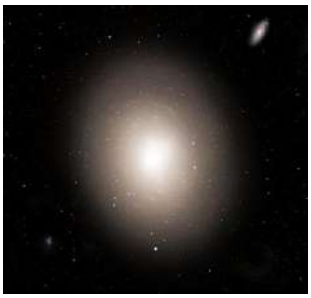
4. How far from the center bulge is our Sun? 30,000LY

5. What unit of measure do we use to measure distance within the Milky Way Galaxy? Light Years

6. Identify and describe each type of galaxy below.

_____Spiral___
Has a center bulge and arms, lots of nebula for new stars to form.
_____

_____Irregular__
Chaotic mix of stars, usually found near large spirals



_____Elliptical_
_Round in shape, no nebula so new stars do not form here._____
_____

S6E1 C – Comparing Planets

1. What mneumonic device helps you remember the order of the planets, closest to the Sun? My Very Eager Mother Just Served Us Nachos.
2. How do the inner or terrestrial planets differ from the outer planets in terms of composition (what the planets are made up of) and size? The inner planets are terrestrial, or small, solid and rocky. The outer planets are gas giants.
3. Which planets have a gravity greater/stronger than Earth? Planets with a greater mass have a stronger gravity.
4. What makes Earth unique and have the ability to support life? (3 reasons) 1. Liquid Water
   2. Oxygen in atmosphere
   3. Moderate Temperatures

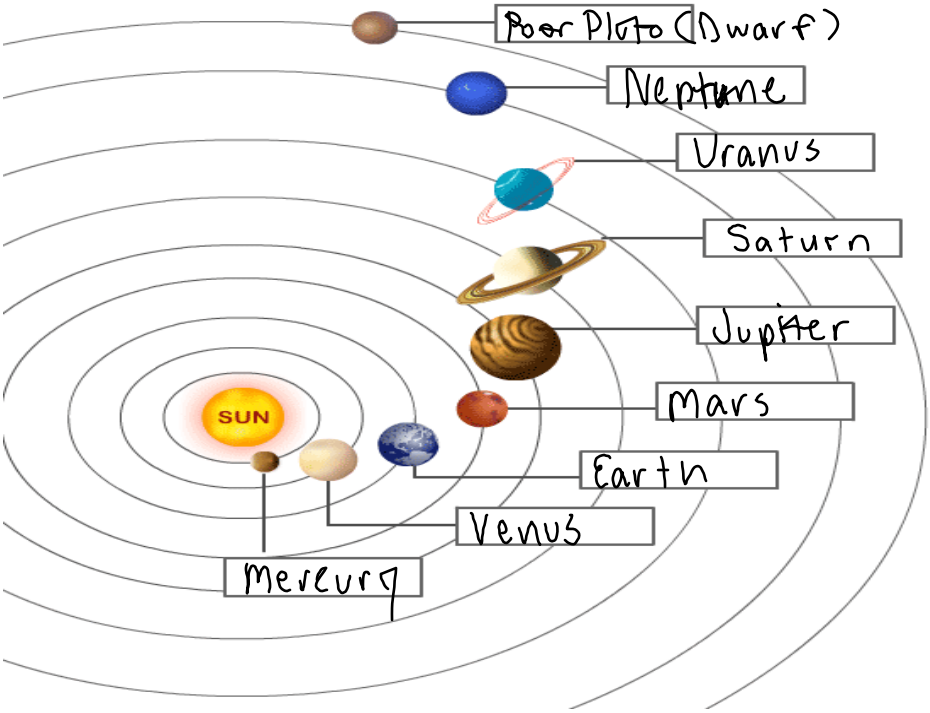
5. Name that Planet:

Jupiter Largest Planet
Venus Earth's Twin Sister
Mars Dried River Beds/Red Planet

Neptune Methane Gas makes it Blue
Uranus Tilted 90 degrees on its axis
Venus Hottest Planet-Thick atmosphere
Jupiter Great Red Spot
Saturn Most Visible Ring System-Ice Crystals

6. Explain orbital velocity in relation to a planets distance from the Sun. (Remember the Ball and String Demonstration!!) Distance from the sun affects the orbital velocity or revolution of a planet. The closer a planet is to the Sun, the faster it revolves. The farther away a planet is from the sun, the slower the revolution.
7. Label the planets of the solar system.

Identify and fill in the names of the planets.



S6E1 D – Motions

1. What is the difference between the terms rotation and revolution? Rotation is Earth spinning on its' axis. This causes day and night. Revolution is the complete orbital path the Earth takes around the Sun.

2. Name that Motion:
   Revolution Earth orbiting the Sun
   Rotation Earth spinning on its axis
   Rotation Makes stars appear to move across the night sky
   Revolution 365 ¼ days or One Earth Year
   Rotation 24 hours, or One Day
   Rotation Causes the Sun to appear to rise and set each day

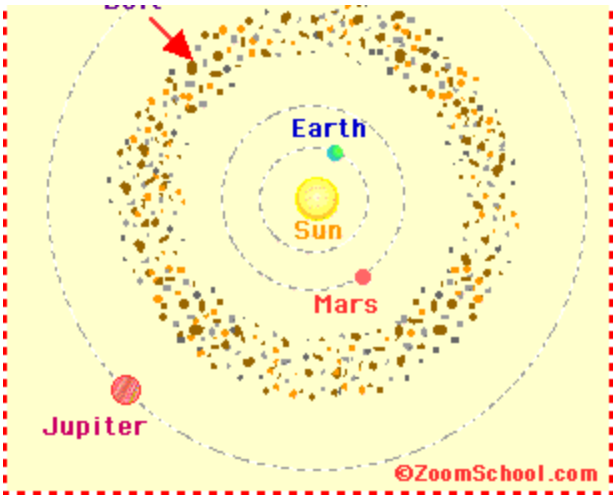
3. How many degrees is Earth tilted on its axis? 23.5 degrees
4. What does Earth's tilt cause? Seasons
5. Why do we have more hours of daylight in the summer than in the winter? Because we are tilted towards the Sun
6. What percentage of Earth is illuminated or lit up at any given time? Half 50%
7. What percentage of Earth is dark, or having night at any given time? Half 50%

S6E1 E – Gravity

1. What is the force that governs motion in the solar system? Gravity
2. What two factors affect the gravitational force between two objects? Mass and Distance
3. Why do the planets revolve around the Sun? Gravity
4. Why does the moon revolve or orbit Earth instead of the Sun?
5. If Earth was larger in mass, how would the gravitational force be affected? Earth's gravitational force would increase.

S6E1-F Asteroids, Comets, Meteors

1. Identify the object in the diagram and explain where they are located. Asteroids-chunks or rock and metal that orbit the Sun.



2. Draw and explain the difference between a meteoroid, meteor, and meteorite.

Meteoroid	Meteor	Meteorite
 Small chunks of asteroids that broke during a collision or comet remains that are moving in space.	 Known as a shooting star; pieces of rock or dust that burn up in the atmosphere due to friction.	 A meteoroid that hits the surface of the Earth

4. What are comets? Dirty Iceballs
5. Where do they form? Beyond Pluto in the Oort Cloud
6. Why does a comets tail always point away from the Sun?

Solar wind causes the comet's tail to point away from the Sun.

7. Name that object!

Asteroid A large chunk of rock/metal orbiting between Mars and Jupiter

Meteoroid A piece of an asteroid that has broken off and is moving in space

Meteor A meteoroid that is burning up in the atmosphere; a shooting star

Meteorite A chuck of rock or metal that hits the surface of a planet; creating a huge crater on impact

8. Identify the parts of a comet.