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## Nature of Science Study Guide

- Define the term science.
   Science is understanding the world around us.
- What are the 3 branches of science? Provide an example for each.
   Earth/Space lava, soil
   Life human body
   Physical forces and motion
- 3. What is the difference between a scientific law and a scientific theory? (Which can be changed and why?) A scientific theory is an explanation of observations or events that is based on knowledge gained from many observations and investigations.

A scientific law is a rule that describes a pattern in nature.

- Give 1 example of a scientific law & 1 example of a scientific theory? (Lesson 1)
   Examples of scientific laws: Newton's laws of motion and gravity.
   Examples of theories: Big Bang, Plate tectonics, evolution
- 5. What is a fact? What is an opinion?
  A fact is a measurement, observation, or statement that can be checked for accuracy.
  An opinion is a personal view, feeling, or claim about a topic. Opinions are neither true nor false.
- 6. What is a dependent variable?The dependent variable is what is measured in an experiment....for example: plant growth
- 7. What is an independent variable? The independent variable is the factor that is changed by the person doing the experiment. For example: if you wanted to know if sunlight affects plant growth, the sun is the independent variable.
- 8. What is the control? The control is the standard for comparison in an experiment. (what you compare your results to)
- 9. What are constants?

The parts of the experiment that remain the same. (for example, if you are testing if sunlight affects plant growth, the constants would be the same soil, the same type of plants, the same amount of water)

10. What is the importance of the International Systems of Units? All scientists around the world use the same units

List the base unit for the following measurements:

- a. Temperature Kelvin
- b. Mass Gram
- c. Length Meter

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- d. Volume of Liquids Liter
- Describe range, mean, median, and mode.
   Range-the difference between the largest and smallest number in a set of data Mean-the average of all the numbers in a set data Median-the middle number in a set of ordered data Mode-the number that occurs most often in a set of data
- 12. Describe the following scientific tools:
  - a. Thermometer -A tool used to measure temperature.
  - b. Graduated Cylinder measures liquid volume

Describe the steps to read volume 3. read at the meniscus

- c. Triple Beam Balance measures masss
- 13. Steps of the Scientific Method (hint: 6 steps reference Lesson 1):
  - 1. Question
  - 2. Hypothesis
  - 3. Design and conduct experiment
  - 4. Analyze data
  - 5. Draw conclusions
  - 6. Communicate results to others
- 14. How do you test a hypothesis?

You can design and perform an experiment, collect data and record observations, or make a model

- 15. What is the difference between a qualitative observation and quantitative observation?
   A qualitative observation does not involve measurement or numbers.
   A quantitative observation involves measurement or numbers.
- 16. What is an observation and an inference?An obseravation is collecting information using the 5 senses.An inference is an explanation of an observation......why something happened.
- 17. Complete the Metric Conversion Chart. Write the prefixes AND the numeric units.



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Examples:

1. 42 mg = <b>.042</b>	g
2. 12 km = <b>120</b>	hm
3. 0.65 cm =6.5	_ mm
4. 1.89 L = <b>1890</b>	mL
5. 7.4 hg = <b>740</b>	g