**Name:**

**Unit/#:**

**NOS Study Guide**

**You will need to complete this study guide on your own sheet of paper. Anything not finished today is homework**

**Define the following in your own words :**

Independent Variable: The variable that the scientist manipulates; the cause

Dependent Variable: The variable that is measured; the effect

Controlled Variable: Any variable kept the same for each test. Ex: bottle shape in our Diet Coke and Mentos experiment

 Control Group: A group of subjects/ test group that does not receive any type of treatment or independent variable. Ex: placebo pills, water in Diet Coke and Mentos

Experiment: A scientific investigation in which a change in a dependent variable is measured against the independent variable. “Does X affect Y?” questions

Systematic Observation: a scientific investigation in which a plan is made to observe a phenomenon without changing any variables “What happens if?” questions

Line Graph: graphs used to track change over some type of spectrum

Bar Graph: graph used to show differences between groups

Pie Chart: graph used to show percentages or other parts of a whole

Non-Science: any field of study or other pursuit that does not fall within the six criteria of science

Pseudoscience: A non-science portrayed as science by its proponents; “fake” science

Tentative: open to change

Hypothesis: A proposed outcome based on evidence available; in the form of “If, then, because”

Scientific Theory: a very well accepted and well supported explanation for a scientific phenomenon

 Scientific Law: A description of an observed phenomenon; often a mathematical statement

**Short Answer**

How do theories and laws differ?

Theories offer explanations for scientific phenomenon, while laws describe them.

Can a theory become a law? Why or why not?

Theories can NEVER become laws. Theories explain why something happens, laws simply describe what is happening. They are related and often go hand-in-hand, but they cannot become eachother.

Why do we say that science is tentative and open to change?

As new evidence becomes available, explanations offered by science must change. Science cannot ignore evidence and, as a result, is constantly changing to keep up with new information.

Why are theories important?

Theories represent the best available explanations, founded on massive amounts of supported research. They account for all available data and are generally the best answers science can provide. Science cannot “prove” anything, but theories are the closest it can get.

Why are control variables important?

Control variables ensure that the only variable that affects the dependent variable is the independent variable. For example, in an experiment measuring change in plant height vs. soil type, plant type, pot size, and water and sunlight amounts should be kept the same to ensure that soil type is the only variable with the potential to affect pant height.

Why are control groups important?

Control groups helps to identify which changes in a test group are as a result of the independent variable and which are as a result of other factors occurring without the independent variable.

Why should experimental procedures be replicable?

Experimental procedures should be replicable so that the data can be verified.

**Complete the Sentences**

Science cannot study matters of faith, artistic expression , or opinion(feeling).

Science cannot prove an idea, only provide supporting evidence.

If test results support a hypothesis, they strengthen that hypothesis but do not prove it. If results of a test fail to support a hypothesis, the hypothesis can be changed or \_\_\_\_\_\_\_\_\_\_discarded.