Last Name _____ First Name _____ Period # _____ Date _____

Scientific Inquiry & Graphing Learning Targets

*These Learning Targets will replace the traditional "study guide" or "review sheet" that you may be accustomed to getting as you study for a test. You should use these to guide your learning and to prepare for upcoming assessments.

Target	Before we start	Still don't know	Know some of it	Can Teach it
1. I can state the steps of scientific inquiry in order.				
2. I can explain what is done during each step of scientific inquiry.				
3. I can write an appropriate example of each step of scientific inquiry.				
4. I can identify all the variables in an experiment.				
5. I can identify the independent & dependent variables in an experiment.				
6. When given an example experiment, I can identify each step of scientific inquiry.				
7. I can label the parts correctly on a graph including title, label for each axis, unit in which I measured, and label for each piece of collected data.				
8. I can calculate the most appropriate interval for the y-axis.				
9. I know that when numbering a graph that the numbers should always be on the line rather than in the space between the lines.				
10. I know the difference between creating a bar graph and creating a line graph.				
11. I can accurately plot data on a graph.				

Key Vocabulary Terms: Study your flashcards!!!

Conclusion – a summary of the information gained from testing a hypothesis

Controlled Experiment – an experiment that has only one independent (changed) variable and everything else is kept the same.

Data – Facts, figures, and evidence collected during an experiment

Dependent Variable – the factor you observe or measure during an experiment

Disprove – proven wrong

Hypothesis – Possible explanation for the question and observations that can be tested by scientific investigation

Independent Variable – the factor that you want to test, ("I change…")

Infer – To make logical explanation of an observation that is drawn from prior knowledge

Observation – the acto of using one or more of your senses to gather information and noting what occurs (senses=sight, hearing, touching, smelling, tasting)

Prediction – a statement of what will happen next in a sequence of events

Question – the first step in scientific inquiry

Scientific Inquiry – a process that uses a set of skills to answer questions or test ideas

Variable – any factor that can affect an experiment

Targets 1 -3:
List in order the seven steps of the Scientific Inquiry. Explain this step:

1. **Question**	**Scientists usually begin an investigation with this**
2. **Observation**	**Using one or more of your senses to gather information**
3. **Inference**	**Make a logical explanation of an observation that is drawn from prior knowledge**
4. **Hypothesis**	**Possible explanation for the question and observations that can be tested by scientific investigation**
5. **Test/Experiment**	**Plan your experiement by identifying the variables, plan the dependent and independent variables**
6. **Analysis**	**Facts, figures and other evidence collected in an experiment; displayed in the form of diagrams, tables, graphs, etc**
7. **Conclusion**	**A summary of the information gained from testing a hypothesis**

Write an example for each of the following steps as it relates to either the helicopter lab or the penny drop lab we did

Q: **What will make a paper helicopter travel downward to the ground faster?**

O: 1.**The helicopter is made out of paper.**
2.**There is writing on the helicopter paper.**

I: 1. **Because the helicopter is made of paper, it will float slowly to the ground.**
2.**Because there is writing on the helicopter paper the writing must be directions for making the paper helicopter.**

H: **If I cut the blades shorter, then the paper helicopter will fall faster.**

Targets 4 & 5:

List several variables for the experiment you just did the Q, O, I, and H.

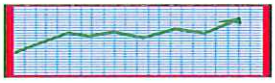
dropping from the same height,
starting and stopping the timer appropriately
same space
use of paperclip
holding the helicopter the same way,
material used for helicopter,
length of blades

What would an appropriate independent variable be for this experiment? **Length of blades**

What would an appropriate dependent variable be for this experiment? **Time the helicopter took to reach the ground**

Target 6 - Identify each step in the following experiment:

Conclusion In my experiment, I was testing to see which type of cat food my cat would prefer. I tested meat, fish, chicken and veggie flavored food. My hypothesis was that my cat will not have a preference but will eat all types of food in about the same amounts. For five days, I measured out the same amount of food from each type and placed the portions in similar bowls. I left the food in the same area and fed my cat at the same time each day. The only variable I changed was the flavor of food. After five days of testing, my data showed that my cat ate 5 cups of beef flavored food, 4 cups of chicken flavored food, 4 cups of fish flavored food and 2 cups of veggie flavored food. This data did not support my hypothesis because my cat has a clear preference for meat flavored food. My next experiment will be to test which brand of meat flavored food my cat will prefer.

Analysis 

Question Which cat food will cats prefer, beef, fish, chicken or veggie flavored foods?

Test/Experiment In my experiment, the independent variable is the type of food offered to my cat, and the dependent variable is the amount of food eaten. I will offer the same amount of beef, fish, chicken, and veggie flavored foods and measure the amount left over after my cat eats.

Hypothesis If I offer all types of food, then my cat will eat them all and not prefer one flavor over the other.

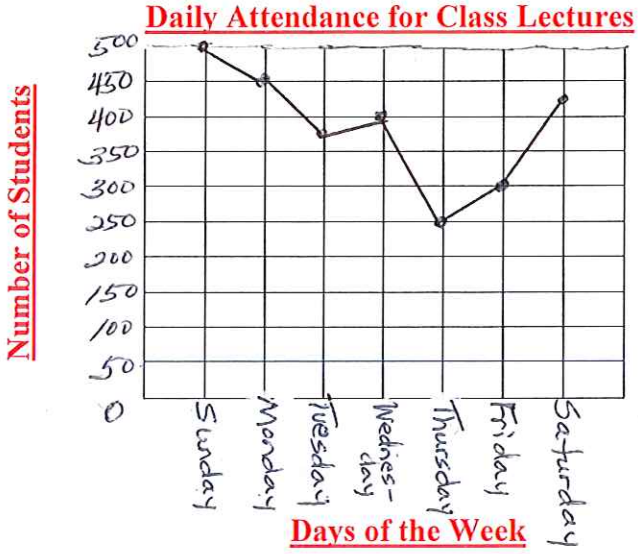
Observation My cat sleeps longer after he eats beef flavored food.

Inference My cat is well rested and happy.

Targets 7 – 11:

Create a line graph for the daily attendance for class lectures:

Sunday – 500
Monday – 450
Tuesday – 375
Wednesday – 400
Thursday – 250
Friday – 300
Saturday - 425



Create a bar graph for the number of mold spores on bread:

Piece 1 – 20
Piece 2 – 40
Piece 3 – 60
Piece 4 – 50
Piece 5 - 35