Scientific Method/Lab equipment Review

SM

1. Scientific Law: a rule that describes a repeatable pattern in nature. (or natural phenomenon – like weather)
Scientific Theory: based on years and years of experiments. While scientific theories can be challenged, they are usually considered to be "facts", like the Big Bang Theory and the Cell Theory because they are so well documented.

2. List the 6 steps of the SM in order

   1. Observation
   2. Question
   3. Hypothesis
   4. Experiment
   5. Results
   6. Conclusion

3. Know what you use to make observations?
   Your 5 senses

4. Know what is an hypothesis statement/ how do you write one.

A possible explanation for a set of observations or answer to a scientific question. It must be testable. – Use If, then..

5. Know what you design to help you test your hypothesis.

An experiment

6. Know how many independent variables should you have in your experiment? ONE

7. Know what are controlled variables? (not control group)

The variables that are the <u>same</u> in both the experimental and control groups.

8. Know if the control group and the experimental group both receive the controlled variables? YES, they do

9. Know which group receives the independent variable?

EXPERIMENTAL

10. Know if you can have a dependent variable without an independent variable? NO, you can't

11. Know how to show your results?

GRAPHS OR CHARTS (VISUAL)

12. Know what to do in your conclusion.

Accept or reject your hypothesis, restate your hypothesis, use data to prove your statement

13.   Know what variable goes on which axis.

The x axis is the INDEPENDENT variable and the y axis is the DEPENDENT variable

14.   Know how to write a graph title.

Y vs X or dependent vs independent

15.   Know when to use a trend line.

A TREND line can be used if your data is scattered. Use a ruler to put one in and have equal points above and below the line.

16. What to do if your hypothesis is incorrect or your experiment fails.

Remember that good science practice when your hypothesis is incorrect is to try again or collect more data or research. You should not consider your experiment a failure if it doesn't work!

Identify the independent and dependent variables:

1.   If I give my dog ice cream, then he will get sick.

Independent Var_Give dog ice cream

Dependent Var _Get sick

2.   How well I do on a test depends on the amount of time I study.

Independent Var Amount of time studying

Dependent Var how well you do on test

3.   I decided to test how my frogs would like a new type of cricket and if they would eat them more quickly. So for 2 weeks I kept the water temperature at 25 degrees C, the water level in the tank at 12 cm, the time I fed them at 6 pm, and the amount of crickets they received a day at 12. Then I watched how quickly they ate them. For the first week I fed them the old crickets. The second week I fed them the new crickets. Below are my results. They ate all the crickets eventually.

	Sun	Mon	Tue	Wed	Thurs	Fri	Sat
Week1	25	33	27	48	22	30	18

	min	min	min	min	min	min	min
Week2	12 min	15 min	19 min	13 min	20 min	14 min	11 min

Write a hypothesis statement for this experiment.

If I feed my frogs a new type of cricket, then they will eat them more quickly.

What is the independent variable? Type of cricket

What is the dependent variable? Time to eat the crickets

List the controlled variables: water temp, water level, time of feeding, amount of crickets given

Which week is the experimental group? Week 2

Which week is the control group? Week 1

Based on the data, what should I conclude?

The frogs seem to prefer the new crickets because each day they ate them at a quicker pace than they did the old crickets. For example on day one, they ate them 13 minutes quicker and on day seven they ate them 7 minutes quicker.

4. Stink bugs where tested to see if the color of house affected how they infested it. Data was collected and you need to graph it.

Which axis will be the independent variable? (x axis)

Which axis will be the dependent variable? (y axis)

What will the label be for the X axis? (think about what is being tested)

House color

What will the label be for the Y axis? (think about what is the result of the test)

Amt of stink bugs

Write a title for this graph.

Amount stink bugs vs color of house

Lab Equipment (label)

Beaker   Erlenmeyer flask   testtube   forceps

Funnel   **graduated cylinder**   **triple beam balance**

Test tube rack   **pipette**   **thermometer**

Study your notes, review lab equipment, and look over your experiment sheets and Spongebob & the plant problem, so you can ID independent and dependent variables (also the Ind/Dep worksheet)