Chapter 1: Science Skills Study Guide

1.) What is science?
   Science is a system of knowledge and the methods you use to find that knowledge.

2.) What is technology?
   Technology is the use of knowledge to solve practical problems.

3.) How are science and technology related?
   Science and technology are interdependent. Advances in one lead to advances in the other.

4.) List the 5 main branches of science AND give a description of each.
   - Chemistry – the study of the composition, structure, properties, and reactions of matter.
   - Physics – is the study of matter and energy and the interactions between the two through forces and motion.
   - Geology – the study of the origin, history, and structure of Earth.
   - Astronomy – the study of the universe
   - Biology – the study of living things.

5.) What is the scientific method AND what are the steps to the scientific method?
   The scientific method is an organized plan for gathering, organizing, and communicating information.
   The steps are make an observation, create a hypothesis, test your hypothesis, and create a conclusion.

6.) List and describe the two types of observations.
   Quantitative observations are observations that are measurable or countable. Qualitative observations are describable.
   Examples: Quantitative – 3 flowers, the table is 2m.
   Qualitative – the flowers are red, it smells like fresh baked cookies.
7.) **What is a hypothesis?**
   A proposed answer to a question

8.) **Explain what a scientific model is, and give an example of one.**
   Scientific models are used to make it easier to understand things that might be too difficult to observe directly. Examples: map, globe, atomic model.

9.) **Every experiment has variables. What are the two types of variables? Explain each one.**
   Independent Variable (manipulated variable) – the variable that causes change in the other.
   Dependent Variable (responding variable) – the variable that changes in response to the manipulated variable.

10.) **What is the difference between a scientific theory and a scientific law?**
    A scientific theory is a well tested explanation for a set of observations or experimental results. A scientific law describes an observed pattern found in nature without attempting to explain it. The explanation of such a pattern is provided by a scientific theory.

11.) **What are the standard units for mass, length, temperature, and time?**
    Mass– kilograms (kg)
    Length – meters (m)
    Temperature – Kelvin (K)
    Time – seconds (s)

12.) **What is the difference between precision and accuracy?**
    Precision is gauge of how exact a measurement is and accuracy is the closeness of a measurement to the actual value of what is being measured.

13.) **Circle the most precision time:** 2s  2.33s  4.5678s
14.) What are the components that a good line graph should have?

A good graph should have a specific title, your x-axis should be your independent variable and your y-axis should be your dependent variable, both axes should be labeled, use appropriate scales, use the entire graph, and your scales should be evenly spaced.

15.) What is the difference between an observation and an inference? Give an example of each.

An observation is any information collected with your senses and an inference is a conclusion or deduction based on your observations.

Example: Observations: I hear people screaming, I smell popcorn, and I see a lot of people. Possible inference could be you are at Cedar Point.

16.) Convert the following:
   a. 1200 g = 1.2 kg
   b. 1 cm = 0.00001 km
   c. 7.071 m = 70.71 dm
   d. 500 cg = 5 g
   e. 6.01230 daL = 60.1230 L
   f. 100.1 mm = 0.001001 hm
17.) Velocity vs Time Graph

0.7-0.8  a. At what time was the car stopped?

0.2-0.4  b. At what time did the car have the greatest velocity?

60 km/h  c. What was the greatest velocity?

0.0-0.2 and 0.8-1.0 d. At what time(s) was the car accelerating?

40 km/h  e. How fast was the car going at 1.0h?

18.) Hoke bought three pea plants to test which would grow the most pea pods. He placed one plant outside, one plant in the kitchen next to his kitchen window, and the last plant in a box in his basement. He gave them all the same amount of water, soil, and fertilizer.

What is the independent variable: places where Hoke is putting the plants

What is the dependent variable: The pea plants

What are the controlled variables: water, soil, and fertilizer

Hypothesis:
Possible Hypothesis: If Hoke puts three pea plants in different locations, then the pea plant outside will grow the most pea pods because it will be receiving the perfect amount of sunlight and shade.
After one week, Hoke observed that the pea plant that was left in the kitchen by the window had the most pea pods. Write a conclusion based on your hypothesis.

My hypothesis was “If Hoke puts three pea plants in different locations, then the pea plant outside will grow the most pea pods because it will be receiving the perfect amount of sunlight and shade.” My hypothesis was not supported because the pea plant that was in the kitchen window grew the most pea pods. The plant in the kitchen window grew the best because it was not in the extreme elements of the warm, summer sun.