Chapter 1 Vocabulary Assignment: Read Chapter 1. Build your vocabulary by defining the following bold face terms in your notes. Each term needs a definition and a picture or diagram. What comes to mind when you think of the vocabulary term?


I. Methods of Science
   A. What is science?
      1. A method for studying the world.
      2. Latin word scientia means knowledge.
      3. Science is a process of gaining knowledge.
   B. Categories or Areas of Science
      1. Life sciences such as the area of biology, anatomy, zoology, botany.
      2. Earth sciences such as geology.
      3. Physical science such as chemistry, physics, physical chemistry etc…

II. Scientific Method
   A. An organized set of investigation procedures, not very rigid but objective to reduce bias in the process.
   B. Steps/sequence of Scientific Method:
      1. Stating a problem or observing something to be explained or studied.
      2. Research or gathering information.
         a. Learning and gathering background information.
         b. Finding previous tests or studies of the subject
      3. Hypothesis.
      4. Experiment = Tests the effect of one thing on another using controlled experiments.
         a. Variables are quantities that have more than a single value
            1. Dependent variables change according to the changes in other variables.
            2. Independent variables is the variable that you change to see how it will affect the dependent variable.
         b. Constant = A factor that does not change when other variables change.
         c. Control = A standard by which the test results can be compared.
      5. Analyzing the data.
      6. Drawing Conclusions or repeating parts of the process as needed.
      7. Scientific Theory = An explanation of things or events based on knowledge gained from many observations and experiments.
8. Scientific Law = A statement about what happens in nature and seems to be true all of the time.

C. Limitations of Science
   1. Science cannot not explain or solve everything.
   2. Most questions about emotions and values are not scientific questions.

D. Technology is the application of science.
   1. Science and technology are not the same.

Section 2: Standards of Measurement!


I. Standards of Measurement
   A. Units and Standards
      1. Accurate measurements are needed in valid experiments, which are based on standards.
         a. Standards = An exact quantity.
      2. Measurement Systems
         1. English system – uses feet, miles, inches, pounds, Fahrenheit.
         3. System International (SI) = An improved version of the metric which is universally accepted by scientists all over the world.
            a. Uses meters (m), kilograms (kg), seconds (s), ampere (A), Kelvin (k), mole (mol).

   Base quantity | Name | Symbol
   --------------|------|------
   length        | meter| m    |
   mass          | kilogram| kg |
   time          | second| s   |
   electric current | ampere| A  |
   temperature   | kelvin| K   |
   amount of substance | mole| mol |
   luminous intensity | candela| cd |

   b. To make converting between large and small quantities easy the SI system uses prefixes:

<table>
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<tr>
<th>Prefix</th>
<th>Symbol</th>
<th>Factor</th>
<th>Numerically</th>
<th>Name</th>
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<tbody>
<tr>
<td>giga</td>
<td>G</td>
<td>$10^9$</td>
<td>1 000 000 000</td>
<td>billion**</td>
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<td>m</td>
<td>$10^{-3}$</td>
<td>0.001</td>
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<td>0.000 001</td>
<td>millionth</td>
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<tr>
<td>nano</td>
<td>n</td>
<td>$10^{-9}$</td>
<td>0.000 000 001</td>
<td>billionth**</td>
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</table>
4. Measuring Distance – Depending on the distance choose the correct unit. A different unit is used to measure the universe compared to the unit used to measure your pencil.

5. Measuring Volume – The amount of space occupied by an object.
   a. $V = \text{length} \times \text{width} \times \text{height}$
   b. Unit is in 3D such as $\text{cm}^3$.
   c. $1 \text{ cm}^3 = 1 \text{ mL}$

6. Measuring Density = The mass per unit volume.
   a. Density = mass / volume = $g/\text{mL}$
   b. $g/\text{mL} =$ derived unit = a combination of SI units

7. Measuring Time = use seconds

8. Measuring Temperature = is it hot in here?
   a. Kelvin (K) = SI unit of temperature.
   b. Ice freezes at 32 F = 0 C = 273 K
   c. 0 K = absolute zero = coldest possible = no atoms are moving.

Section 3: Communicating with Graphs
Terms: No vocabulary terms in this section. Know and be able to use the following types of graphs.

I. Graphs are visual displays of information or data. A picture is worth a thousand words. Different kinds of graphs are appropriate for displaying different types of information.

   A. Line Graphs
      1. Often used to show how a variable changes with time
      2. x-axis = independent variable
      3. y-axis = dependent variable.
      4. Examples:

   B. Bar Graphs
1. Useful for comparing information involving counting.
2. \( x \)-axis = independent variable
3. \( y \)-axis = dependent variable.
4. Example:

United States Female Population - 1997

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C. Circle or Pie Graphs

1. Shows how some fixed quantity is broken down into parts.
2. Example:

   **Percent of Hours of a Day Spent on Activities**

   - **SLEEP** 25%
   - **SCHOOL** 17%
   - **HOMEWORK** 8%
   - **MEALS** 8%
   - **ENTERTAINMENT** 17%
   - **JOB** 8%