

7A Science - Midterm Review

Scientific Method and Experimental Design

1. Gather Information: Observations - using any of the 5 senses to gather information.
2. State the problem: What is the effect of _____ on the _____?
3. State the Hypothesis: "Educated Guess" If..... than..... statement.
4. Test the hypothesis: Experiment (see below)
5. Analyze data
6. State Conclusions
7. Retest: Redo same experiment and compare results to original.

Theory - an explanation to observed phenomena that are supported by many experiments.

Helpful hints for designing and performing an Experiment

- Experiment must test only one variable. (fertilizer on plant growth)
- Experiment must be controlled. (Same type of plant, same amount of water, same amount of soil, etc....)
- Appropriate sample size. (large number of plants tested, greater the number in the sample = better results)
- Experiment must contain an "Experimental Group" and a "Control Group". (Experimental group receives the variable, control group does not. Control group is for comparison, to see any differences between the experimental(receives variable) and control(does not receive variable))
- For good results, the experiment must be repeated. After repeating the experiment several times with the same results you can make a conclusion based on those results.

Helpful hints for collecting, organizing, and graphing data.

- Title your graph. You can often use the same title you used on the data table
- Dependent variable is on the vertical axis (Y).
- Dependent variable is what you are measuring or the data you collect. (height in cm of the plants)
- Independent variable is on the horizontal axis (X). H=horizontal, I=Independent, H comes before I in the alphabet.
- Independent variable is the thing that "I" control, therefore I=independent variable. ("I" control the amount of fertilizer, therefore fertilizer is the independent variable.

- Mark an appropriate scale on each axis. Determine the scale before you put it on the graph. Each line must have the same value. Common scales are 1,2,3,4, etc..., 2,4,6,etc..., 5,10,15,20,etc..., 10,20,30,etc..., 25,50,75,etc..., 50,100,150,200,etc....
- Label each axis accordingly.
- Plot points accurately.
- Connect data points. Only connect the line to zero if you have a data point of 0,0.
- Always use pencil when making a graph.

I. Metric System -

a. Length -

b. Volume -

c. Mass -

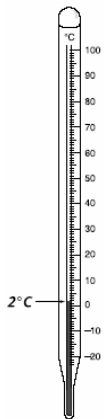
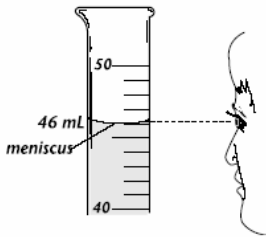
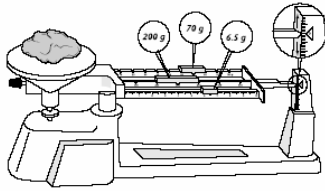
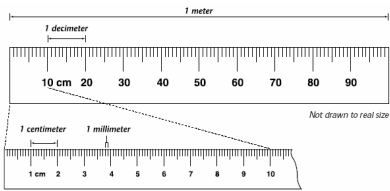
d. Density -

Dimensional Analysis

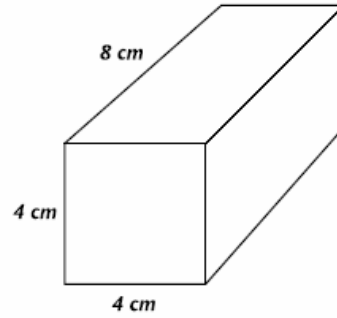
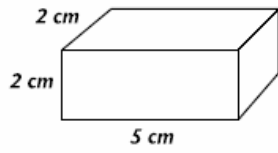
Kids i L o	Have e c t o	Dirty e k a	Mouths Lips Gums (Units)	Drinking e c i	Chocolate e n t i	Milk i l l i
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Kilo	Hecto	Deka	Unit	Deci	Centi	Milli
1000	100	10	1	1/10	1/100	1/1000

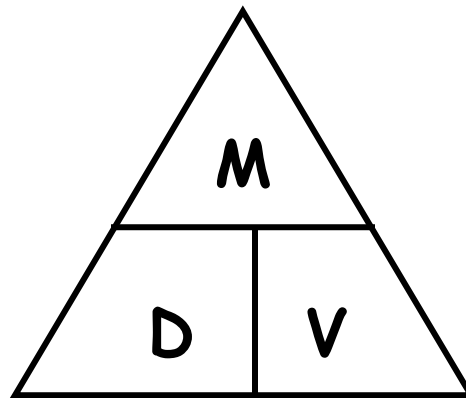
Tools for Measurement



I. Volume (regular shaped object) -

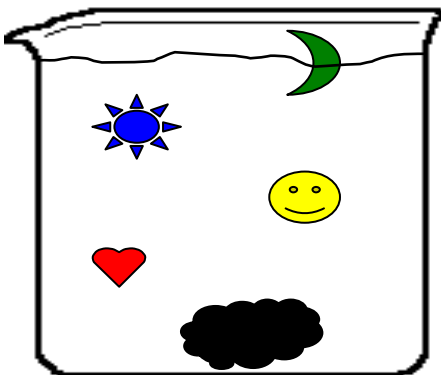


II. Density -



Density Pyramid

What object has the greatest density? Least?



Matter - any substance that has mass and takes up space.

A. Complete the chart below with your partner based on your answers above.
Answer yes or no.

Phase	Characteristics	
	Definite Shape	Definite Volume
Solid		
Liquid		
Gas		

Physical vs. Chemical Changes of Matter

Phase Changes

Solid to Liquid _____

Liquid to Gas _____

Gas to Liquid _____

Solid to Gas _____

Liquid to Solid _____

Atom - made up of protons, neutrons, and electrons.

Protons -

Neutrons -

Electrons -

1st Energy Level = _____ 2nd Energy Level = _____ 3rd Energy Level = _____

Atomic Number - the number of protons in the nucleus of an atom

Mass Number - sum of protons and neutrons in the nucleus of an atom

The Periodic Table

I. Design of the Periodic Table

A. Columns in the Periodic Table

1. **Groups or Families** - elements within the same group or family have similar but not identical properties .

i.e. Lithium (Li), Sodium (Na), Potassium (K), and other members of family 1 are soft, white shiny metals. They are all highly reactive elements, which means they readily combine with other elements to form compounds.

B. Rows in the Periodic Table

1. **Period** - unlike elements in the same family, elements in the same period are not alike in properties. The properties of the elements change greatly across any given row.

Family 1 = Alkali Metals

Family 2 = Alkaline Earth Metals

Metalloids - elements that contain properties of both metals and nonmetals

i.e.: B, Si, Ge, As, Sb, Te, Po, At

Family 17 = Halogens

Family 18 = Noble Gases

Properties of Metals -

Properties of Nonmetals -

Properties of Alkali Metals -

Properties of Noble Gases -

Chemical Reactions

Chemical Reaction	Reactants	Products
$A + B \longrightarrow AB$		
$AB \longrightarrow A + B$		

Law of Conservation of Mass -

