CHAP. 1 THE WORLD OF PHYSICAL SCIENCE Page 1

NOTE TAKING: 1. Put the date on the paper.
2. Fill in all the notes
3. Add notes from the board, etc.
4. Add information from the text.

I EXPLORING PHYSICAL SCIENCE:

A. That's Science !

1. What is science? Process of gathering information about the natural world

B. What is Physical Science?

1. Physical science is the study of matter & energy
2. Matter is the "stuff" that everything is made of.
3. Energy is the ability to do work .

C. Branches of Physical Science: (3 main ones)

1. Chemistry-study of matter
2. Physics-study of matter and energy
3. Biology- study of life

D. Physical Science: All Around You:

1. 4 more sciences:

a)Astronomy-the study of the universe

b)Zoology- the study of animals

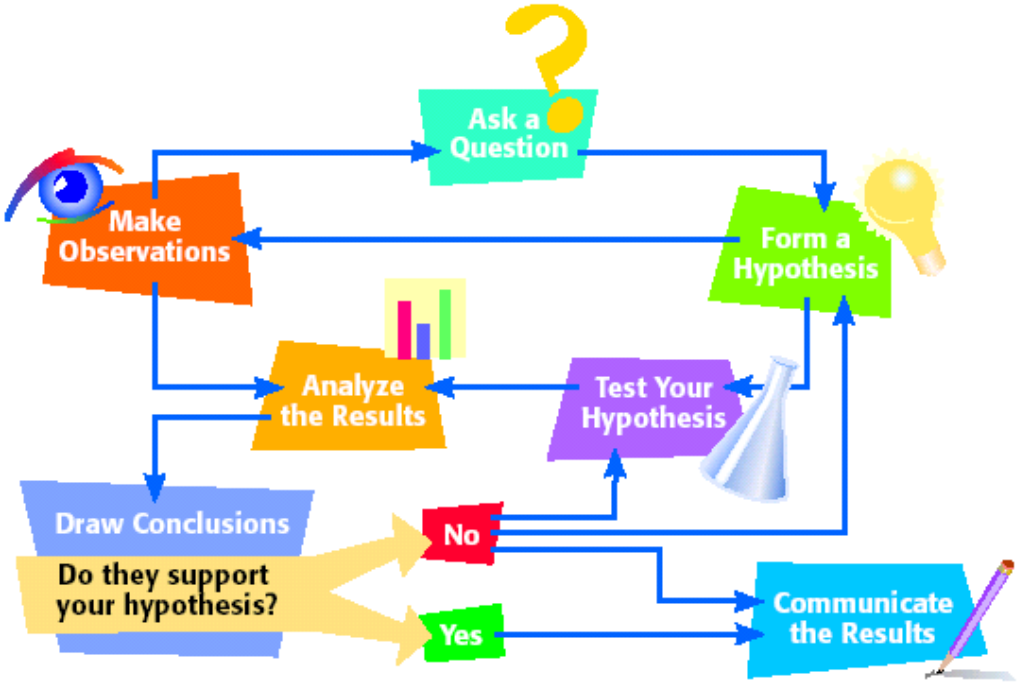
c)Meteorology-the study of weather

d)Entomology-study of insects

II SCIENTIFIC METHODS:

A. What are Scientific Methods?

1. They are the ways that scientists answer questions and solve problems.



B. Asking a Question

1. Helps focus on the purpose of an investigation
2. Usually asked after many observations.
3. An observation is any use of the 5 senses to gather information

C. Forming a Hypothesis

1. It is a possible explanation or answer to a question.
2. A good hypothesis is testable
3. Scientists often make a prediction before they test the hypothesis.

D. Testing the Hypothesis

1. A controlled experiment compares the results from a control group with an experimental group.
2. Independent variable – the one thing that you change.
3. Dependent variable- the response to the independent one.

D. Analyzing the Results

1. After you collect & record data, you must analyze them.
2. You must find out if the results support the hypothesis.
3. Graphs & Tables are useful.

E. Drawing Conclusions

1. Does it support hypothesis?
2. Doesn't support hypothesis?
3. Need more info

III SCIENTIFIC MODELS:

A. Models in Science

1. A model is a representation if an object or a system.
2. Three common kinds of scientific models:
   a. Physical-globe, plastic skull
   b. Mathematical – equations, W=fxd
   c. Conceptual – ideas (Big Bang Theory)

B. Using Models

1. They can also be used to help learn new information.
2. Theory-lots of evidence, explains many hypotheses and observations (MOST AGREE)
3. Scientific law- fact that explains hypotheses (ALL AGREE)

IV TOOLS, MEASUREMENT: Chap. 1 - Page 4

A. Tools in Science

1. One way to collect data is to take measurements.
2. Some tools are: ruler thermometer balance

B. Making Measurements

1. SI is the International System of Units
2. Two reasons why it is a good system:
   a. based on multiples of 10
   b. easy to go from 1 unit to another

Common SI Units

Length 	**meter (m)** kilometer (km) decimeter (dm) centimeter (cm) millimeter (mm) micrometer (μm) nanometer (nm)	 1 km = 1,000 m 1 dm = 0.1 m 1 cm = 0.01 m 1 mm = 0.001 m 1 μm = 0.000001 m 1 nm = 0.000000001 m
Volume 	**cubic meter (m^3)** cubic centimeter (cm^3) liter (L) milliliter (mL)	 1 cm^3 = 0.000001 m^3 1 L = 1 dm^3 = 0.001 m^3 1 mL = 0.001 L = 1 cm^3
Mass 	**kilogram (kg)** gram (g) milligram (mg)	 1 g = 0.001 kg 1 mg = 0.000001 kg
Temperature 	**Kelvin (K)** Celsius (°C)	 0°C = 273 K 100°C = 373 K

3. Length: how long something is

   Tool: ruler Units: meter

4. Mass: triple beam balance Units: grams
5. Volume: amount of space an object takes up

   Tool: graduated cylinder Units: cm^3, liter,
6. Temperature: how hot or cold something is

   Tool: thermometer Units: °celsius

C. Metric Ruler:

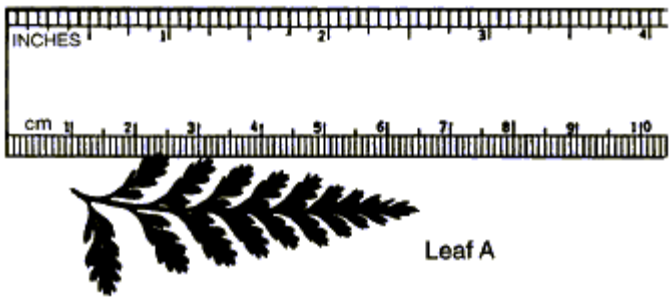
1. When reading the metric ruler, remember:

   a. There are 10 mm in 1 cm.

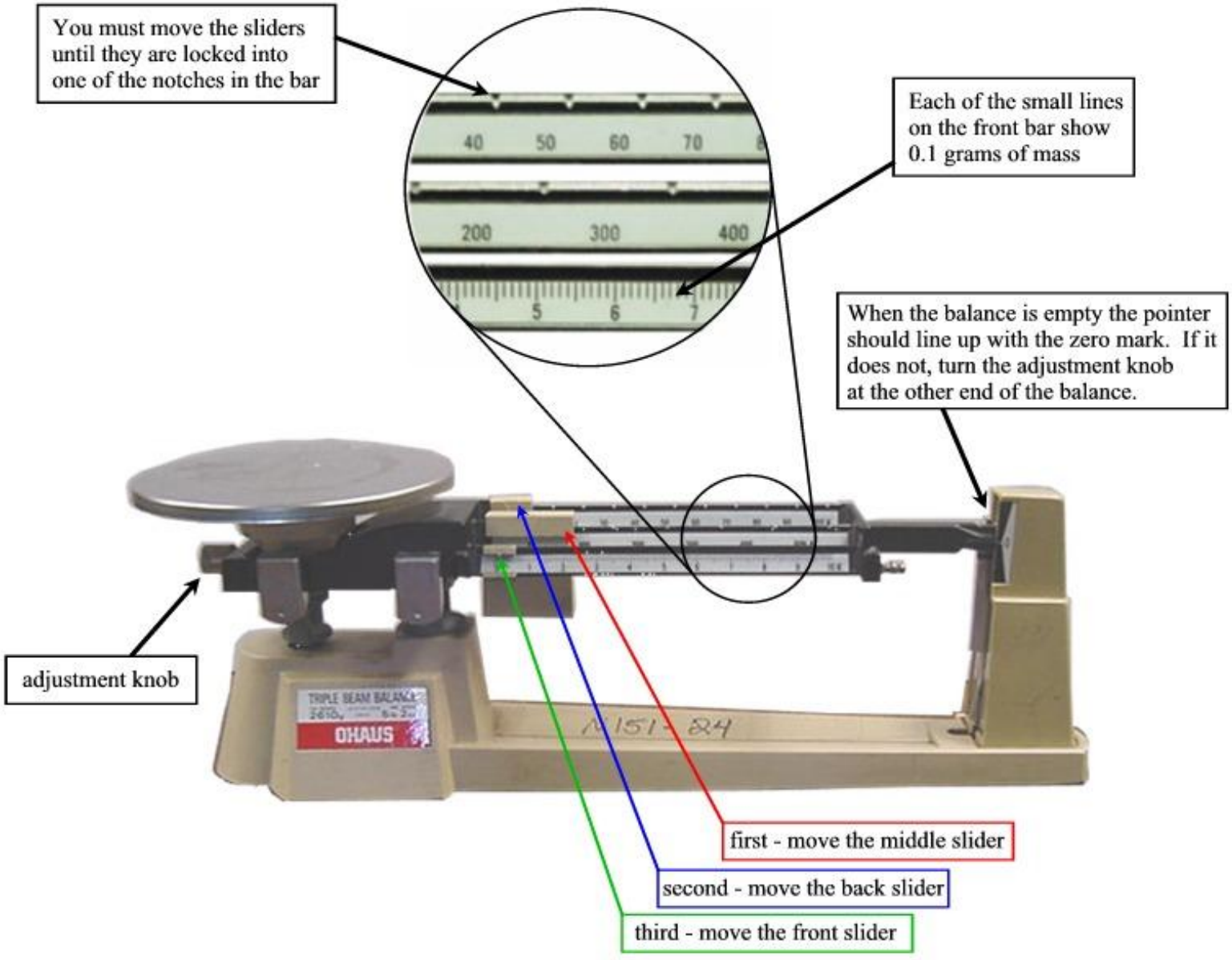
   b. The leaf at right is :

      55 mm or 5.5 cm

   c. Be careful, the leaf starts at the 1 cm mark.



D. Triple Beam Balance:



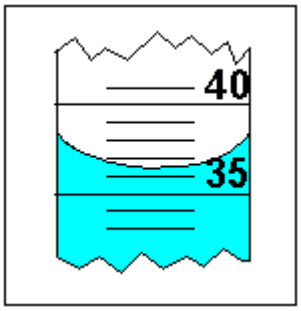
E. Graduated Cylinder:

1. When measuring liquid, hold the graduated cylinder so you are at eye level with the level of the liquid.
2. Notice the liquid is curved downward:

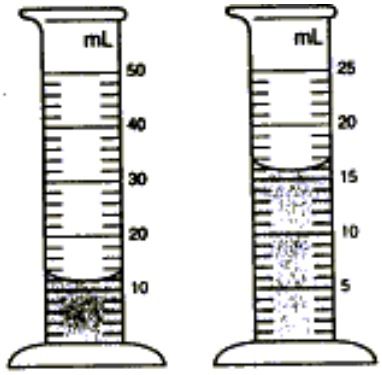
   This is called the meniscus

   The reading on the picture at right is

   36.5 mL.



3. Sometimes graduated cylinders have lines for every mL and sometimes for every two mL. Look at the cylinders below:

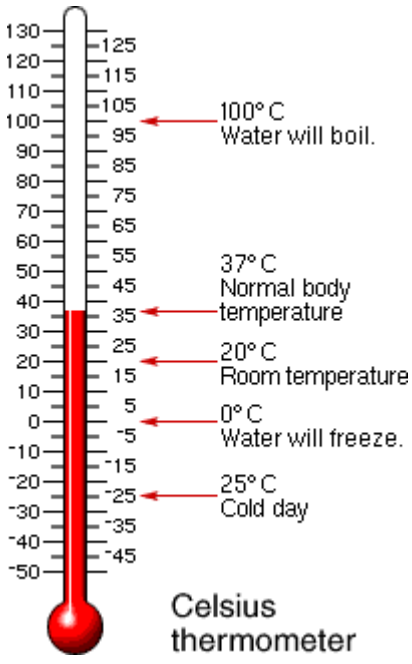


   a. What is the volume of liquid for the graduated cylinder on the…

      LEFT: 12 ml

      RIGHT: 16 ml

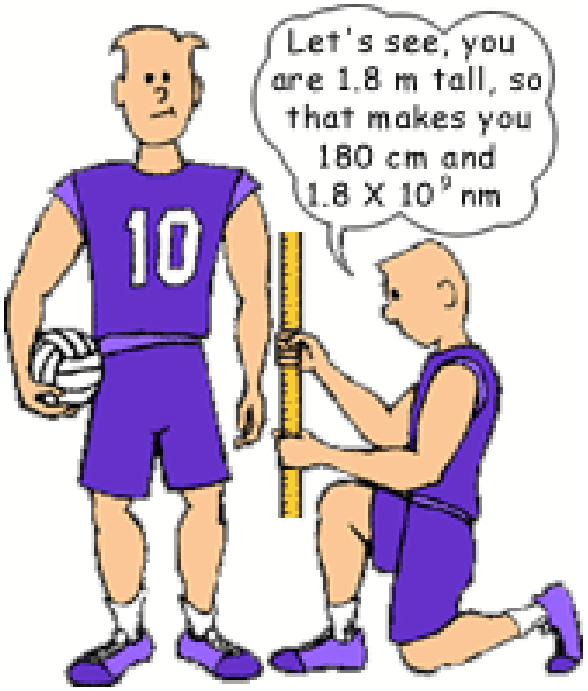
F. Thermometer:



On the Celsius Scale:

1. Water boils at 100°C
2. Water freezes at 0°C
3. Normal body temperature is 37°C

H. Metric Conversions:



1. The metric system is easier to use because:
   a. It is based on 10
   b. You only have to move the decimal point left or right.
2. The prefixes used the most are:
   Kilo: 1000
   Deka: 10
   Deci: 1/10
   Centi: 1/100
   Milli:1/1000
3. Look at the PREFIX table below:

KILO	HECTO	DEKA	Gram Liter Meter	DECI	CENTI	MILLI
1000	100	10		.1	.01	.001

   a. When you convert, use this table to know which way to move the decimal point and how many places.
4. Example:
   a. If you have 23 centimeters, how many millimeters is that?
      Start at the Centi box in the table, move to the Milli box. You went one place to the right, so the decimal point goes one place to the right. The answer is:_____

a. 1200 grams = 1.2 kilograms

b. 35 kilograms = 350 hectograms

c. 4.5 kilograms = 4500 grams

d. 13 millimeters = 1.3 centimeters

e. 13 millimeters = 0.013 meters

f. 54 centimeters = 0.54 meters

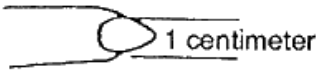
g. 76 decimeters = 7.6 meters

h. 85 centimeters = 8.5 decimeters

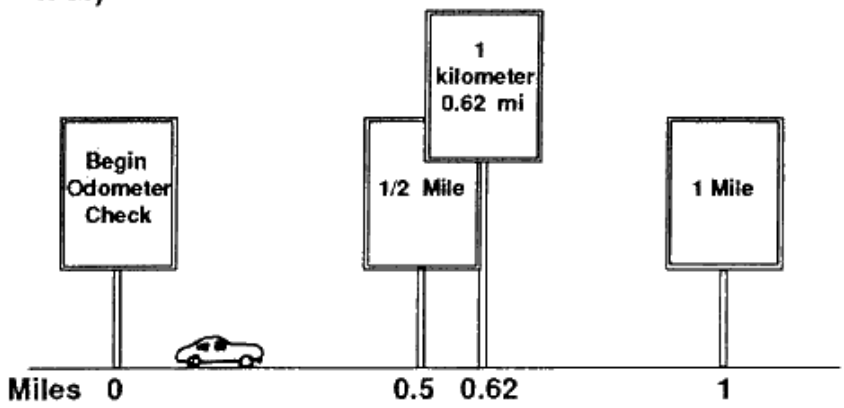
i. 4800 meters = 4.8 kilometers

j. 5734 centimeters = .5734 hectometers

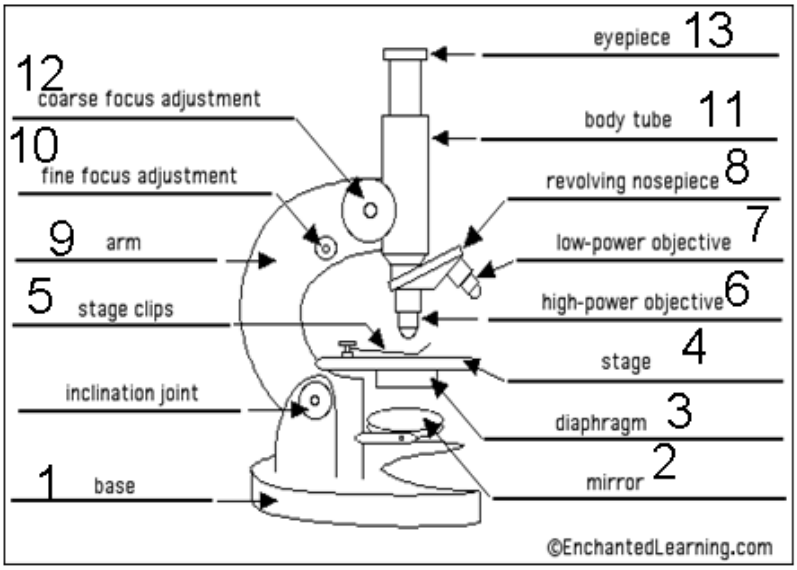
1 centimeter (or 1 cm) = the width of some part of your smallest finger or fingernail



1 kilometer (or 1 km) = a little more than half a mile (pronounced KILL-oh-meet-ur not kill-AHM-it-ur)



1. Diagram:



2. Parts:

a. Eyepiece: what you look through (10x)

b. revolving nosepiece: holds the objectives, spins→ click different objectives into place

c. objectives:lenses, red (4x), yellow (10x), blue/black (40x)

d. stage: Platform

e. diaphragm: circular disc that controls the amount of light that pass through the microscope

f. coarse focus knob:used first to focus, this moves the body tube a lot

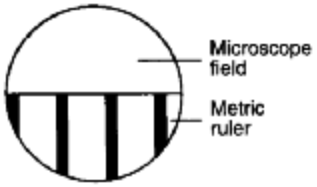
g. fine focus knob: used second, this moves the body tube just a little to allow for small adjustments in focus

3. Image:

   a. Due to the way the lenses bend the light waves, the image you see is upside down and backwards

   b. When you look into the microscope, you see a round area of light. This is called the field of view

   c. On low power, the field of view is approximately 3 mm in diameter.



4. Rules for using the microscope:

   a. click in the red objective

   b. crank the body tube all the way down

   c. crank up slowly with coarse knob

   d. Use fine focus

   e. Use stage clips

   f. Click in the other objectives

4. When you are finished with the microscope, do the following:

   a. Turn off light

   b. Click back to red objective

   c. Crank it all the way down

   d. Move to center of desk