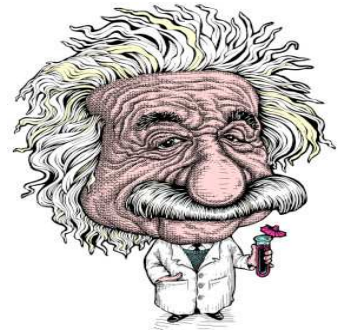


I. What is Science?

- Organized way of using evidence to learn about the _____
- Science is an ongoing process or a search for a degree of understanding that is as close to _____ as possible
- It is NOT based on faith or religion.

II. Goal of Science

- To _____ the _____ around us
 - EX. Does life appear from non-living matter?
- To _____ events by making _____
 - EX. Life doesn't appear from non-living matter.
- To _____ predictions
 - EX. Setting up an experiment to see if life comes from non-living matter, or from living things



III. Observation & Inference

a) Observations: gathering evidence

- information gathered through _____
 1. **Quantitative:**
 - Observation using _____ and _____
 - EX. 40 grams, 10 cm
 2. **Qualitative:**
 - Observation that doesn't involve numbers
 - EX. The color or shape of an object

b). Inferences: interpreting the evidence

- _____ based on observation and prior knowledge or experience

IV. Steps of the Scientific Method:

- | | |
|-------------------------------|------------------|
| 1. State the Problem/Question | 5. Analyze _____ |
| 2. _____ | 6. Conclusion |
| 3. Controlled _____ | 7. _____ the |
| 4. _____ | Results |

1. State the Problem

- This is the question you want answered; also called the “_____”.

2. Form a hypothesis

- A suggested _____ to the problem; _____ an outcome
- Must be _____
- Sometimes written as an “if then....” statements
- Example: If _____ rise, then _____
_____ will increase.

3. Set up a Controlled Experiment

- Develop and follow a procedure that tests your _____.
- Include a detailed materials list
- Conduct several trials to _____
- A good or “valid” experiment will contain only **one** variable



Important Terms- What are variables?

- **Variable:**
 - Things that can be _____
 - A controlled experiment tests _____ variable, while the others must stay the same
- **Independent Variable:**
 - _____ (CHANGED) by _____
 - _____
 - I am testing **INDEPENDENT**
- **Dependent Variable:**
 - _____
 - The “things” the scientist is _____
 - _____, DEPENDENT-DATA, DEPENDENT-DATA

Important Terms- What makes it a controlled experiment?

- **Controlled Variables:**
 - Things that must be kept _____ during experiment
 - If altered, can affect results and be used to show error in experiment.
- **Control Group:**
 - Experimental setup that does _____ receive the variable that is being tested
 - All other groups are _____ with the results of this group to see if there is any change to the test subject
 - Often called the “standard for comparison”

4. Collect Data

- This section includes all of the data and _____ collected.
- How do you present your data? _____, _____, _____,

➤ **Graphing:** Placement of Variables on Axis

- Independent Variable: goes on the _____
- Dependent Variable: goes on the _____

5. Analyze Results

- After your data is organized you must be able to interpret the data
- _____ the procedure if needed.
- Confirm the results by _____.

6. Conclusion

- Was your _____ correct?
- Accept or _____ (refute)
- Make recommendations for further study and possible improvements to the procedure.

7. Communicate the results:

- Can your experiment be retested and always get same results?
- Expect questions from the audience. ... _____

V. Scientific Theory

- A hypothesis that is so well supported by many different scientific investigations
- A well tested explanation that unifies a broad range of observations.
- Remember: Theories can be _____

VI. Measurement Skills....Tools for measurement

- **Calibrated**...Synonym for _____

1. Measuring Length

- Metric ruler or meter stick
- Units are centimeters (cm) or _____: **1cm = 10mm**
- Micrometers (um) are very tiny units that are used to measure objects through the microscope:
1000um = 1mm

2. Measuring Volume

- _____
- The amount of _____ something occupies.
- Graduated Cylinders are calibrated in milliliters (mL) or _____

Meniscus

- _____ surface when measuring fluids when placed in the narrow tube of a graduated cylinder.

3. Measuring Temperature

- Measured in degrees Celsius.
- Freezing point of water is _____
- Boiling point of water is _____
- Human body temperature is _____

4. **Measuring Mass**

- Mass = the quantity of _____ in something
- Measured with a _____ Triple Beam or Electronic balance

5. **Compound Light Microscope**

- allows _____ to pass through
- uses _____ form image
- 1 _____ and _____

a) **Calculating total Magnification** = _____ Power X _____ Power

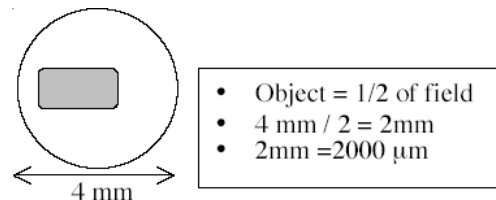
Ex: A microscope has a 20 X ocular (eyepiece) and two objectives of 10 X and 43 X respectively.

a) Calculate the low power magnification of this microscope. Show your formula and all work.

b) Calculate the high power magnification of this microscope. Show your formula and all work.

b) **Measuring object in microscope**

1. Determine field of view width
2. Estimate how much of the field the object takes up
3. Divide to get length of object
4. _____



c) **Measuring length with a Scope:**

- Remember: 1000 μ m = 1mm
 - mm to μ m: move decimal 3 places to the right
 - μ m to mm: move decimal 3 places to the left

Ex 1. This flea can jump 65 microns at a time. How far (in mm) could the flea go after 10 jumps.

Ex. 2 The mosquito “sucks” blood using a proboscis. This mosquito has a proboscis that measures 1.34 mm. How large is the proboscis in microns?