

# Warm-up: DO NOT TOUCH THE LAB BENCHES!!!

- Turn in “Are Viruses Alive” Response on the front counter
- Pick up a *Warm-up: Graphing & Intro to Science* worksheet on the front counter
  - Get started on the warm-up

# Warm-up: Answers

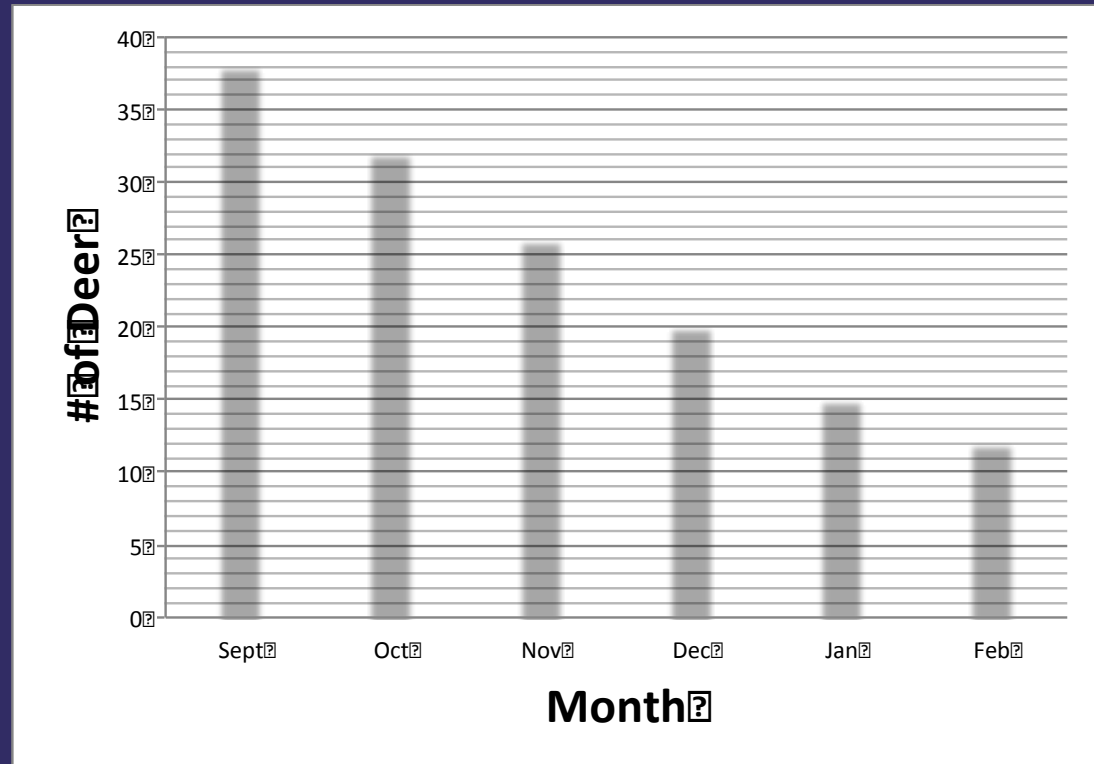
Graph A:

Independent variable –

Month

Dependent variable –

# of Deer



# Warm-up: Answers

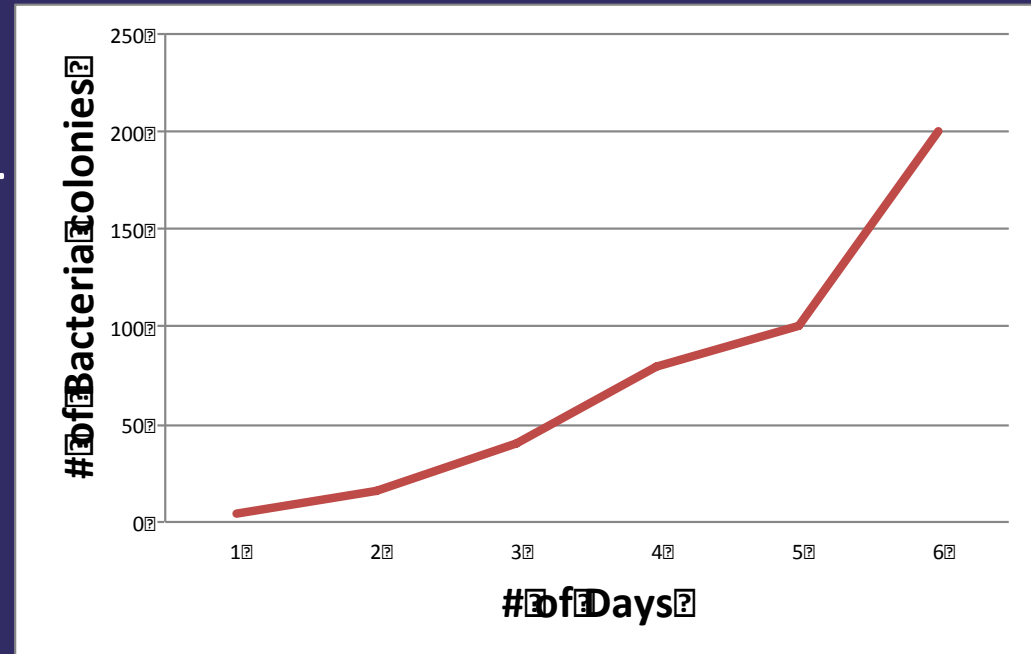
Graph B:

Independent variable –

# of Days

Dependent variable –

# of Bacteria colonies



# Scientific Method

1. Problem/Question
2. Research (Background info)
3. Hypothesis
4. Experiment
5. Observations/Data
6. Analysis/Conclusions

# How do you design an experiment?

## 1. Problem/Question

- The question the lab will answer
- Identifies the independent and dependent variables

Independent variable – the factor the scientist changes from group to group

Dependent variable – the factor the scientist measures to see the effect of the independent variable

# How do you design an experiment?

## 2. Research/Background Info

- Lets the reader learn about the topic
- Helps the scientist develop an educated hypothesis

## 3. Hypothesis

- An educated prediction
- Can be tested, proven false, and agrees with previous research



# How do you design an experiment?

## 4. Experiment

- Steps must be precise and detailed
- Has one control group
  - Normal conditions or absence of independent variable
  - Used for comparison
- Experimental group(s) have only one changing variable (which is the independent variable)

# How do you design an experiment?

## 5. Observations/Data

- Must be objective.
  - » Good Example: The bacterial colony is yellow.
  - » Bad Example: The bacterial colony is nasty.
- Use measurements whenever possible.
  - Good Example: There are 50 bacterial colonies.
  - Bad Example: There are a whole bunch of colonies.



# How do you design an experiment?

## 6. Analysis/Conclusions

- Answers the purpose question.
- Accepts or rejects the hypothesis.
- Explains what can be inferred from the data.

# What are the characteristics of life?

-How do you know something is living?

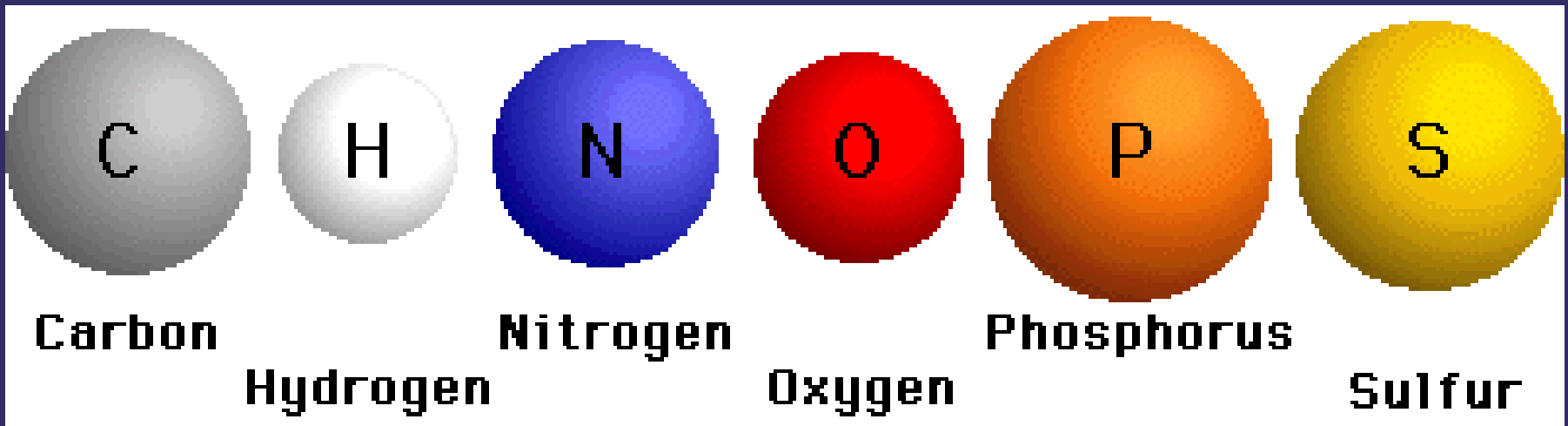
- Station Rotation- Draw this chart in your notes

Station #	Item	Living vs. Non-living?	Why?
1			
2			
3			
4			
5			
6			

# How do you know something is alive?

All living things need six essential elements:

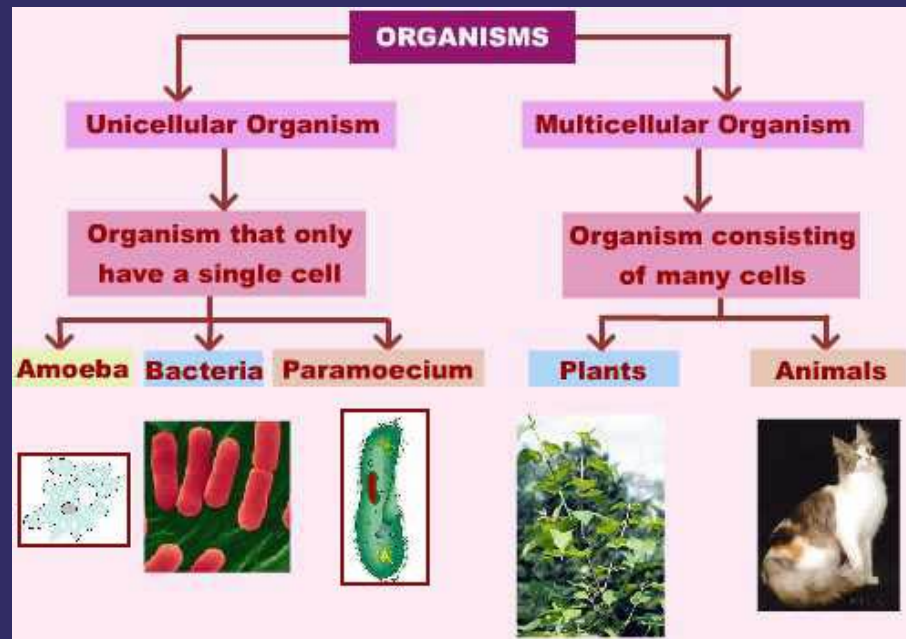
Carbon, Hydrogen, Nitrogen, Oxygen, Phosphorus, Sulfur  
(CHNOPS)



# Characteristics of Life (CARSMOG):

## C = Cells

- All living things are made of cells.
  - One-celled organism – unicellular
  - Many-celled organism - multicellular

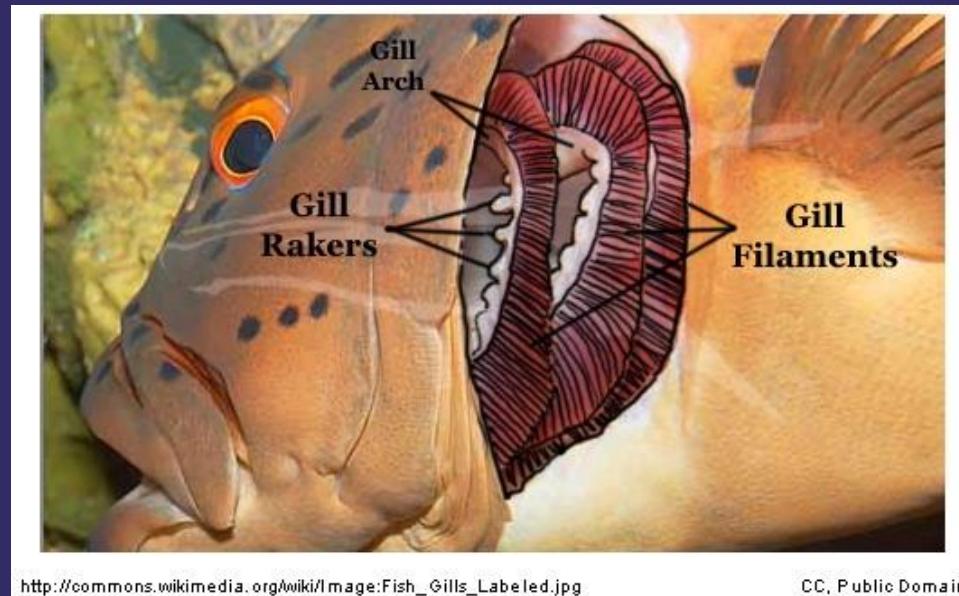


# Characteristics of Life (CARSMOG):

## A = Adapt

- An adaptation is an inherited structure, behavior, or internal process that enables organisms to better survive an environment.

E.g. Gills on a fish



# Characteristics of Life (CARSMOG):

## R = Reproduce

- Organisms must replace themselves so the entire species will survive.
- May be asexual (only one individual contributes genetic material) or sexual (two individuals contribute genes).

# Characteristics of Life (CARSMOG):

## S = Stimulus and Response

- A quick, non-permanent change
- Stimulus – any condition that causes an organism to react.

E.g. A loud noise (stimulus) causes your dog to run under the bed (response).



# Characteristics of Life (CARSMOG):

## M = Metabolism

- Energy Use

- Organisms need energy constantly to build molecules (synthesis) and cells and to break down (digest) substances (such as breaking down food for nutrition)
- Organisms must transport nutrients to be used in cellular respiration to produce energy.
- An organisms' chemical reactions are called its metabolism

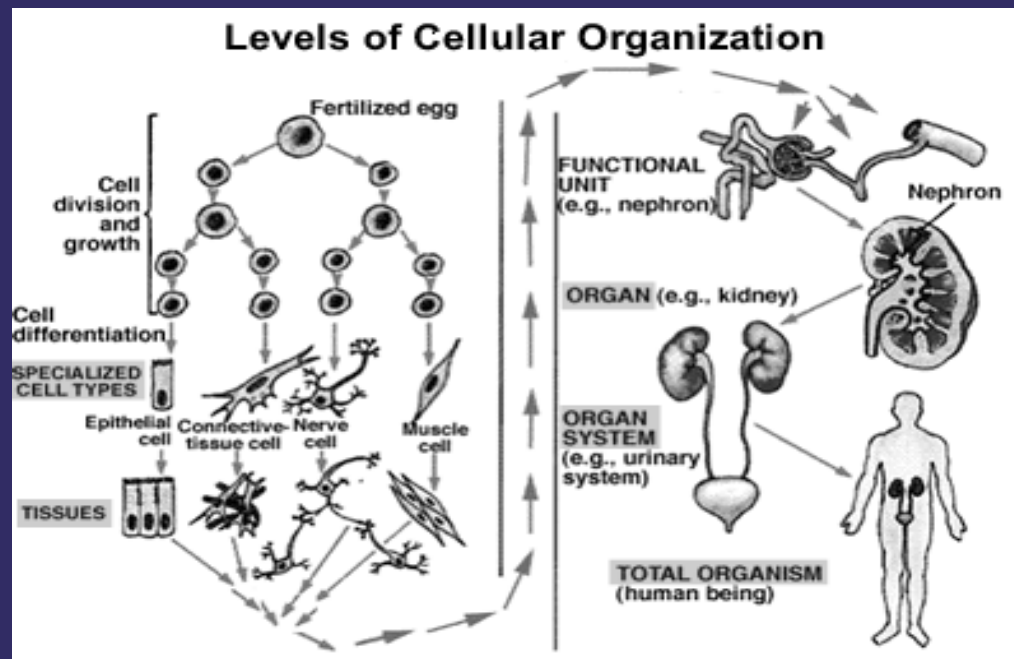


# Characteristics of Life (CARSMOG):

## O = Organized

- Molecular and cellular organization
- Organize simple into complex
- Organize cells at several levels

E.g. Tissue < Organ < Organ system < Organism



# Characteristics of Life (CARSMOG):

## G = Growth and Development

- Growth – to increase in size. Increases the number of cells of a multicellular organism.
- Development – change that takes place in structure and function of an organism during its life cycle.

E.g. Embryo becomes a fetus

