

Scientific Inquiry

Scientific Method, Lab Safety & Equipment and The Characteristics of Life

Goal 1



Science

The word "Science" is rendered in a multi-colored, stylized font. The letter 'S' is light blue with a spiral pattern and a small yellow and red icon. The 'i' is green. The 'c' is a blue classical column with a globe on top. The 'e' is orange. The 'n' is red with a sunburst above it. The 'c' is blue with a brushstroke effect. The final 'e' is a yellow lightbulb. A trail of red dots curves above the 'S' and 'i'. Blue wavy lines are at the bottom of the 'c'.

Explore The Possibilities

What is Science?



I. Science

- the observation, identification, description, and explanation of phenomena
- begins with observations

a. Goals of Science

- i. deals only with the natural world
- ii. to collect and organize information
- iii. Propose explanations that can be tested

What is Science?

b. Terms

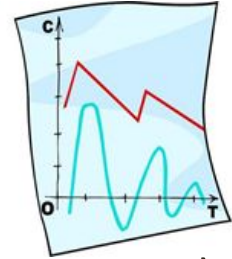
i. **data** – information gathered from observations (using our senses)

a. quantitative – numbers

b. qualitative – descriptive

ii. **Inference** – logical interpretation based on prior knowledge or experience

iii. **Hypothesis** – a proposed scientific explanation



Scientific Method



II. Scientific Method

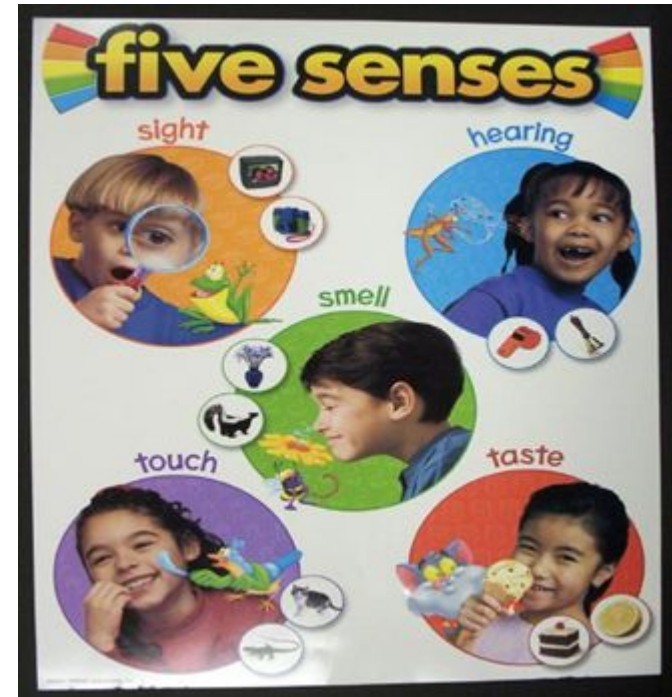
I. Procedure for studying nature

II. Steps:

I. Make an observation

• Uses our 5 senses

1. sight
2. touch
3. smell
4. sound
5. taste



Scientific Method

II. Ask questions

- search for logical explanation



III. Form hypothesis

- statement that gives the best possible response to the question and should be based on already known facts
- MUST be TESTABLE

Testing A
Hypothesis

IV. Set up experiment

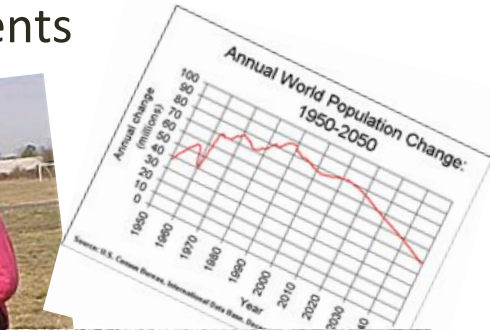
- goal of proving/disproving a hypothesis
- set up to examine 1 condition (variable) at a time
- 3 types of variables:
 - * **independent** – changed or manipulated
 - * **dependent** – being measured or counted; changes in response to independent
 - * **control** – all other factors



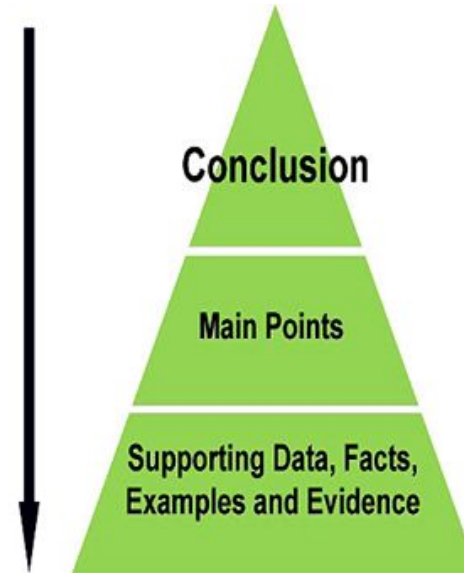
Scientific Method

V. Collect data

- gathered from observations and measurements



VI. Draw a conclusion



Lab Equipment

1. Beaker

- Measure liquids



2. Graduated cylinder

- Measure liquids



Lab Equipment

3. Erlenmeyer flask

- Measure liquids



4. Test tubes

- Hold liquids



Lab Equipment

5. Apron

- Worn to protect clothing



6. Goggles

- Worn to protect eyes



Lab Equipment

7. Stopper



8. Microscope

- Devices that produce magnified images of structures that are too small to see with the unaided eye.
- Types of microscopes
 - Light microscope
 - Stereoscope
 - Scanning electron
 - Transmission electron microscope

Parts of the Microscope



Microscope...

- Magnification
- 3 magnifications
 1. Scanning
 2. Low
 3. High

- Ocular lens (eyepiece) has a magnification
10X
- Each objective will have a written magnification

Microscope...

- Total magnification = ocular X objective

| | Ocular Lens | Objective | Total Magnification |
|----------|-------------|-----------|---------------------|
| Scanning | 10X | 4X | 40X |
| Low | 10X | 10X | 100X |
| High | 10X | 40X | 400X |