**The Scientific Method**

* An organized way to solve a problem through \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + *Reality check: there is not a universal research method called, ” the scientific method” it does not exist in actual science laboratories.*

**The Process**

* Define/State the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Collect/Gather \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Form a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Design an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Data
* Form a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ your findings
  + *Reality check: scientist may skip, or omit several steps in this process*

**Define/State the Problem**

* Form a question about a specific \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + Ex: Why is lightening attracted to tall structures?

**Collect/Gather Information**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Make \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Form a Hypothesis**

What is a hypothesis?

* + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ explanation based on your \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Must meet \_\_\_\_\_\_\_\_\_\_\_\_\_ criteria
  + Testable
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_ must be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Can be written as an if, then statement.

**Designing a Controlled Experiment**

* Devise a way to test your hypothesis.
  + How will you perform your experiment?
  + What materials will you need?
  + How will you record your data?
* Must have\_\_\_\_\_\_\_\_\_ key variables:
  + **Independent variable**
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Key words: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + **Dependent variable**
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ variable.
    - It is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ being \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + Key words: measured, observed, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + **Control**
    - Standard for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Does \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ receive the \_\_\_\_\_\_\_\_\_ (no treatment)
  + **Constant(s)**
    - \_\_\_\_\_\_\_\_\_\_\_\_\_ that are kept the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for each test subject
    - Key words: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ amounts

**Collect and Analyze Data**

* What is data?
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ observations or information
* There are two types of data:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_tative (Quality)
    - Uses the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Ex: taste, smell, sound, behavior, etc.
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_itative(Quantity)
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Ex: 10g, 50cm, etc.
* Scientist use the metric system to collect data:
  + Based on units of 10
  + Basic Units of measurement:
    - Volume: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (L)
    - Length: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (m)
    - Mass: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(g)
    - Temperature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (0C)
  + Used in most countries except for the US
* Data is usually recorded in:
  + Tables
    - I.V. listed in the right column
    - D.V. listed in the left hand columns
  + Graphs
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ located on the \_\_\_\_\_\_\_\_\_\_-axis
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ located on the \_\_\_\_\_\_\_\_\_-axis

**Form a Conclusion**

* Should state if your hypothesis was \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Publish Your Findings**

* Write a lab report
* Submit your findings to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ journal

**Theory**

* + Scientific Theory- a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of why things work based on hypotheses that have been tested many times.

Sometimes Theories can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!

* + remember science is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and subject to change as technology advances.

Theory of Spontaneous Generation

* Stated that living things can arise from non-living matter. (Aristole)
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ experiment proved that living things came from other living organisms.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ confirmed that the theory of spontaneous generation was wrong.