WHAT IS SCIENCE?

6th Grade Earth Science

WHAT IS SCIENCE?

A. **Science**—an organized way of studying things and finding answers to questions.

B. **Critical thinking**—a process that uses certain skills to solve problems.

THINKING LIKE A SCIENTIST…

- **Observe!** Use your senses to gather information.
- **Infer!** Try to explain the things that you have observed in a reasonable way.
- **Predict!** Make a guess of what will happen that is based on experiences and/or evidence.

THE SCIENTIFIC METHOD

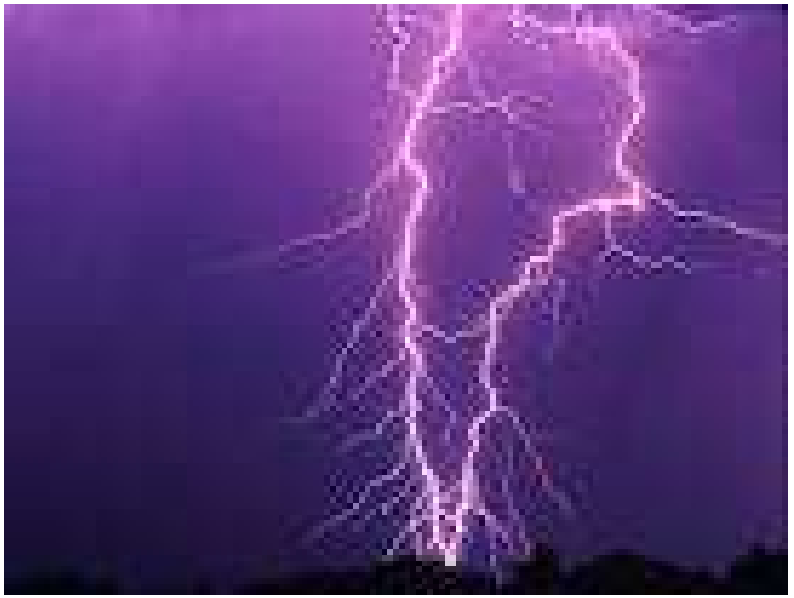
The scientific method is a process used to find answers to questions about the world around us.

- **There is *not just one* scientific method.**
- **Different scientists use different methods of conducting experiments.**
- **Some have more steps than others, but they all begin by identifying a problem or question.**
- **They all provide an organized method for conducting and analyzing an experiment.**

STEPS OF THE SCIENTIFIC METHOD…

1. Problem or Purpose

This is where you state the questions or problems that have come from observations and inferences that you make or maybe just from your curiosity.



An example is when Benjamin Franklin asked, "What is lightning?"

The problem or purpose is <u>the reason you are performing the experiment.</u>

STEPS OF THE SCIENTIFIC METHOD…

2. **Research**

- **Think about what you know.**
- **Read and study about the topic.**
- **Consult experts for help.**
- **Gain knowledge so that you have a good idea about what may happen.**

STEPS OF THE SCIENTIFIC METHOD…

3. Hypothesis

Form an <u>educated GUESS,</u> <u>by using your research,</u> that you think will answer your problem or purpose that was stated in step 1.

The hypothesis must be testable so that you can carry out an experiment to support or disprove it.

Benjamin Franklin knew that both lightning and electrical sparks produced light, followed crooked paths, and made crackling noises. His hypothesis was that lightning was electricity.

STEPS TO THE SCIENTIFIC METHOD…

4. Experiment

- **Create the hands-on portion of the scientific method. These are the steps you take to figure out if your hypothesis is correct.**

VARIABLES?

In a 'controlled experiment' the scientist creates the conditions to test the hypothesis. *Variables are factors that change in the experiment*. There are two types of variables…

Independent Variable (Manipulated Variable)

Dependent Variable (Responding Variable)

STEPS TO THE SCIENTIFIC METHOD…

5. Analyze the Data

Data are the facts, figures, and other evidence gathered throughout the observations.

Data is represented or shown in tables and graphs.

STEPS TO THE SCIENTIFIC METHOD…

6. **Conclusion**

- **This is a paragraph that is written to communicate what you have learned from an experiment.**
- **It tells whether your hypothesis was supported (correct) or refuted (incorrect).**
- **Either way, it is a valuable experiment! You learn something!**

SCIENTIFIC THEORIES AND LAWS

Scientific theory—an explanation of things or events based on scientific knowledge; the result of *many* observations and experiments.

Scientific law—a statement about how things work in nature