

Biology as a Science



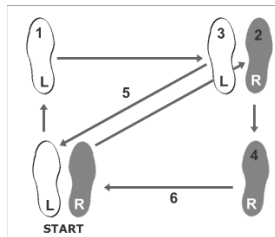
The Nature of Science: method, law & theory



Science is a **process** for learning using observation and experimentation.

What is a **process**?

A **process** is a series of steps to carry out a specific activity.



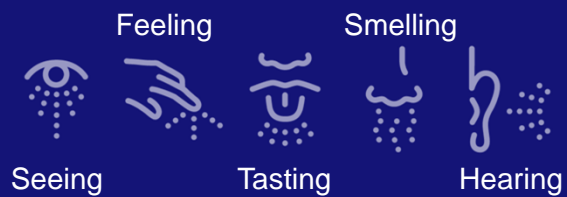
Scientists **observe** and then try to explain the cause.



How can you **observe** something?



Scientists use their **senses** to observe.

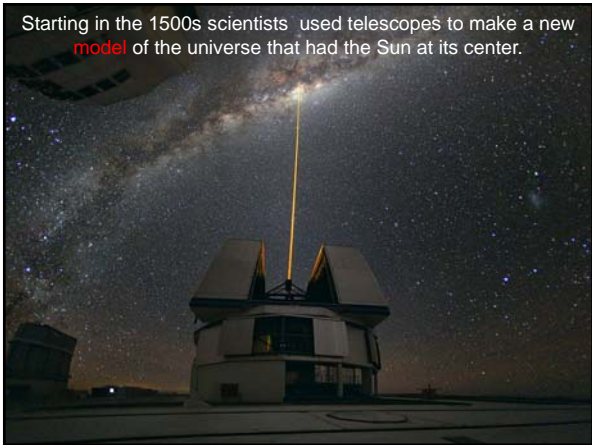


Does the Sun Revolve Around the Earth?

- For over 10,000 years, people believed the sun rotated around the earth

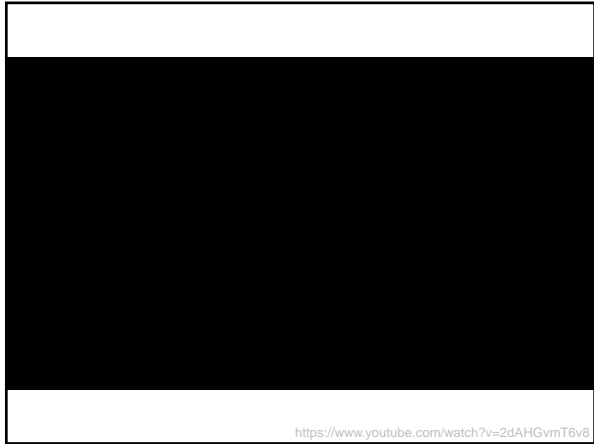


Starting in the 1500s scientists used telescopes to make a new model of the universe that had the Sun at its center.



Using observation we now know the Earth revolves around the Sun





The Scientific Method

- **Science** - an organized **process** of learning about the world.

A goal-directed, interrelated series of actions, events, mechanisms, or steps

- What are examples of **process** in your life?
- At School, Work, Home?
- Describe the process of getting to school.





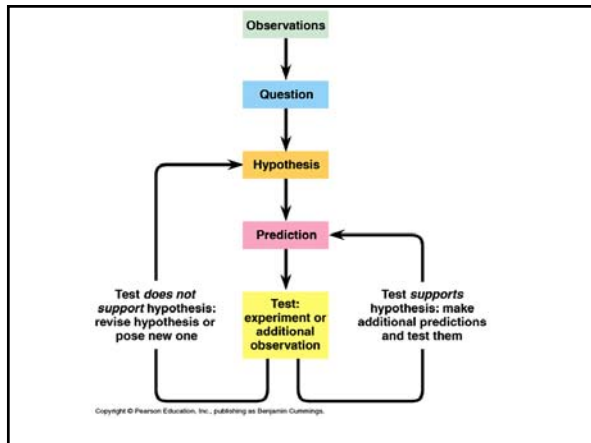
The Scientific Method

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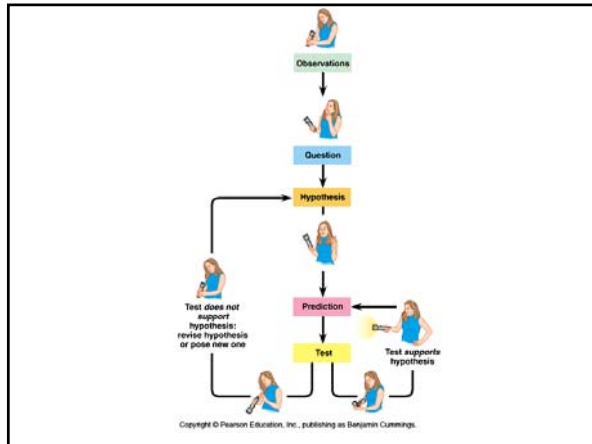
- **Observation**
 - Can lead to the development of a question or problem to be investigated

Relating data and the hypothesis

- **Hypothesis** predicts possible outcome, identifies variables and the control, and relates to the data
- **Data** is collected from observations and experiments
- **Conclusions** are made after scientists interpret data and use reasoning.



A **Controlled Experiment** only changes 1 variable



Theory vs. Law

- Specifically, scientific laws must be simple, true, universal, and always true.

- Theory:** A theory is an **explanation of** a set of related **observations** or events based upon hypotheses supported by large groups of **data** and **verified multiple times** by detached groups of researchers.
- One scientist cannot create a theory; she can only create a hypothesis.

THE DIFFERENCE

A scientist would pull the lever again to see if it was just a coincidence or if the lever actually caused the bolt of lightning.

Science requires that results be repeatable before it accepts the results.

