

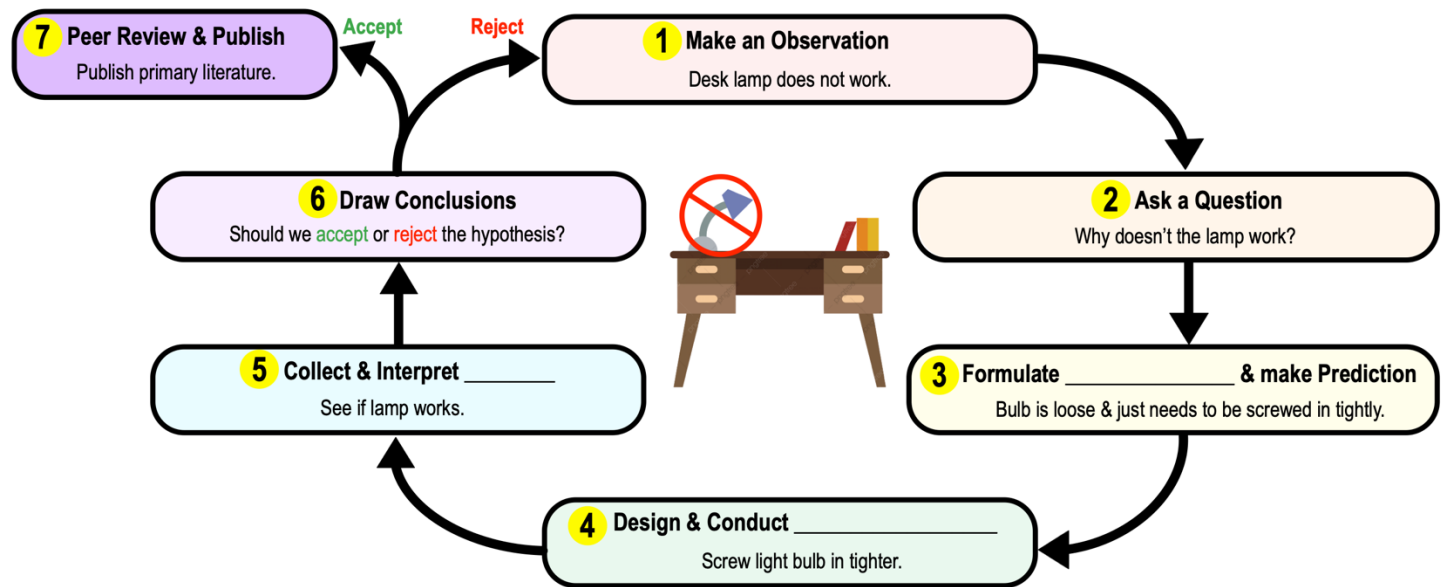
## CONCEPT: SCIENTIFIC METHOD

● **Question:** How can you trust the information that you learn from your textbook?

□ You can trust it because the info in your textbook has been subject to the \_\_\_\_\_ method.

● **Scientific Method:** a procedure used to \_\_\_\_\_ questions, \_\_\_\_\_ ideas, & \_\_\_\_\_ scientific knowledge.

□ Scientific method starts with an \_\_\_\_\_ & a \_\_\_\_\_.



## Predictions, Hypotheses, & Theories

● \_\_\_\_\_: an expected *outcome* of an event that can either be correct or incorrect.

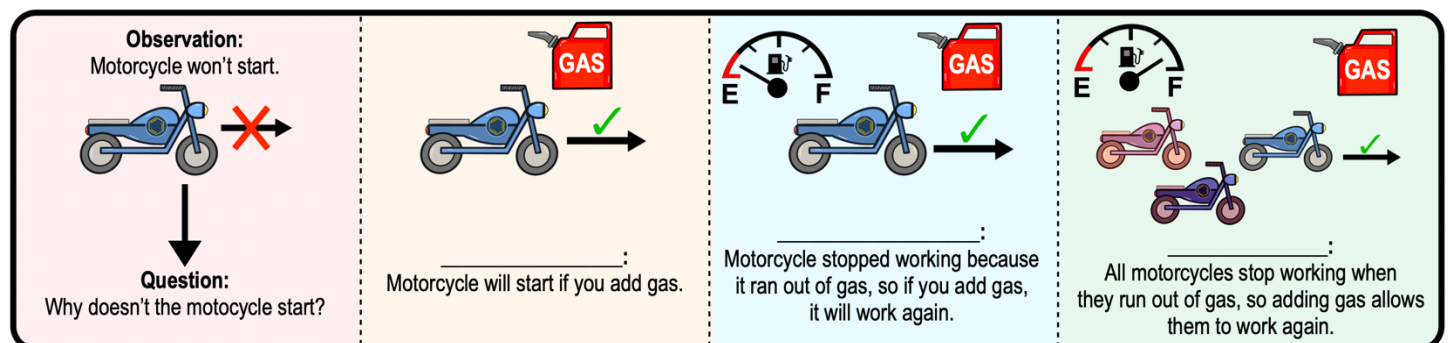
□ Predictions *only* address the answer to “\_\_\_\_\_ will happen?”

● \_\_\_\_\_: a proposed & *testable explanation* for an observation.

□ Hypotheses address the answers to “*what* will happen?” & “\_\_\_\_\_ it will happen?”

□ Therefore, a good *hypothesis* \_\_\_\_\_ a *prediction*.

● \_\_\_\_\_: a testable & \_\_\_\_\_ hypothesis of many observations, supported by a large body of evidence.



□ Technically, hypotheses & theories can never be proven correct, but they can be *falsified* (proven incorrect).

## CONCEPT: SCIENTIFIC METHOD

**EXAMPLE:** A scientist observed a new phenomenon and wonders how it happens. What is the next step in their study?

- a) Observe.      b) Experiment.      c) Design experiment.      d) Peer review.      e) Hypothesize.

**PRACTICE:** Which of the following shows the best order of steps of the scientific method?

- a) Observation → Data Analysis → Hypothesis → Conclusion → Peer Review & Publish → Experiment.  
b) Observation → Hypothesis → Experiment → Peer Review & Publish → Analysis → Conclusion.  
c) Observation → Hypothesis → Experiment → Data Analysis → Conclusion → Peer Review & Publish.  
d) Experiment → Hypothesis → Observation → Data Analysis → Conclusion → Peer Review & Publish.

**PRACTICE:** A scientist observes that even after sterilizing a broth, cells reappear in the broth over time. The scientist then asks: “Why do cells reappear in the broth after sterilization?” and designs/conducts an experiment. Considering this, appropriately label each of the following blanks as either a “prediction, hypothesis or theory.”




\_\_\_\_\_: Cells will only appear in the broth exposed to a source of preexisting cells.

\_\_\_\_\_: Cells appear only when preexisting cells grow & divide; therefore, cells only appear in exposed broths.

\_\_\_\_\_: All organisms consist of cells & all cells come from preexisting cells.

## Basic Theories of Biology

- There are \_\_\_\_\_ basic theories of biology:

Theory	Concept
1 _____	All organisms are made of cells, & all cells come from <i>preexisting</i> cells. 
2 _____	All organisms maintain a relatively consistent internal environment. 
3 _____	All organisms <i>evolved</i> from a single common ancestor. 

**PRACTICE:** Which of the following statements about the cell theory is false?

- a) All living organisms are made of cells.      b) All cells arise spontaneously.  
c) Cells are the basic structural & functional unit of life.      d) All cells arise from preexisting cells.