Theories and Models
SNC2D

An **inference** is a _____.

e.g., It is accepted that in the presence of starch, iodine solution turns from yellow to bluish-black

Observations: Test tube 1: yellow
Test tube 2: bluish-black

Inferences: Test tube 1: _____

Test tube 2: _____

The Conclusion to an experiment, however, _____

(typically, by describing the relationship between the _____).

e.g., Purpose: How does temperature affect the rate of a chemical reaction?

Conclusion: _____

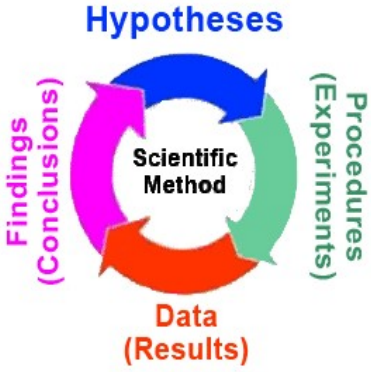
_____

If the conclusion verifies the prediction, it _____

_____ that led to that prediction.

A hypothesis that is supported by multiple experiments is very likely to be true. But it takes only one (good) experiment to

_____ a hypothesis.



Repeated observations of the same phenomenon under a variety of conditions may lead scientists to propose a **scientific law**, a general _____ of something that always happens.

Scientific laws do not attempt to explain the "why," only the "_____."

e.g., the *Law of Conservation of Mass*: in a chemical reaction, the mass of the chemicals before is always equal to the mass of the chemicals after.

An _____ of why is called a **scientific** _____.

e.g. *Atomic Theory* explains the *Law of Conservation of Mass*.

Theories are developed based on the results of many experiments (they have to explain _____ the facts in the data base) and are often developed to replace earlier theories that had been disproven.

Good theories make _____ about the results of experiments that have not yet been done – but will be done to test the theory.

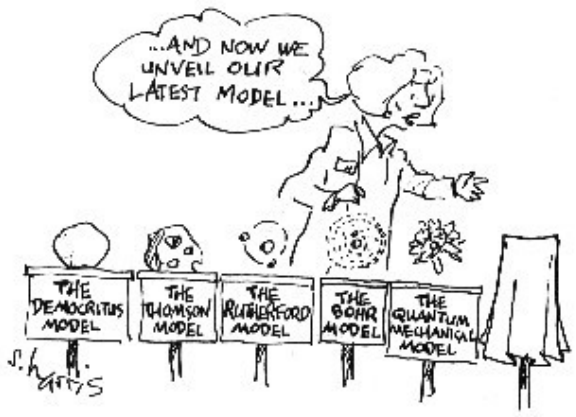
e.g., Newton's *Law of Universal Gravitation* described the gravitational attraction between any two objects (the Earth and an apple or the Earth and the Sun) . . . but it did not explain why this attraction existed. Nor could it account for a discrepancy in in the orbital path of Mercury (the shifting of its orbit). Einstein's *Theory of Universal Gravitation*, based on his Theory of General Relativity, could explain this discrepancy and further predicted that massive objects like the Sun could deflect light by a measurable amount. A expedition to West Africa to observe the 1919 solar eclipse confirmed that the light from distant stars was indeed being deflected as it passed near the Sun.

So most current scientific theories are not "just" theories: they not only explain the data base but their

predictions have been _____.

Many theories are **models**, descriptions of things that _____ with the human senses.

e.g., the model of the atom itself



Models are particularly susceptible to modification as new data becomes available.

To gain some understanding of the process of developing a model for something that cannot be observed directly, you will be performing the investigation, "Models and Indirect Evidence," which will introduce the **black box**.