

CHEMISTRY HONS

CHAPTER 1 : MEASUREMENTS

- 1.1 The scientific method
- 1.2 Units of measurement
- 1.3 Uncertainty in measurement –precision and accuracy
- 1.4 Significant figures and calculations
- 1.5 Dimensional analysis

1.1



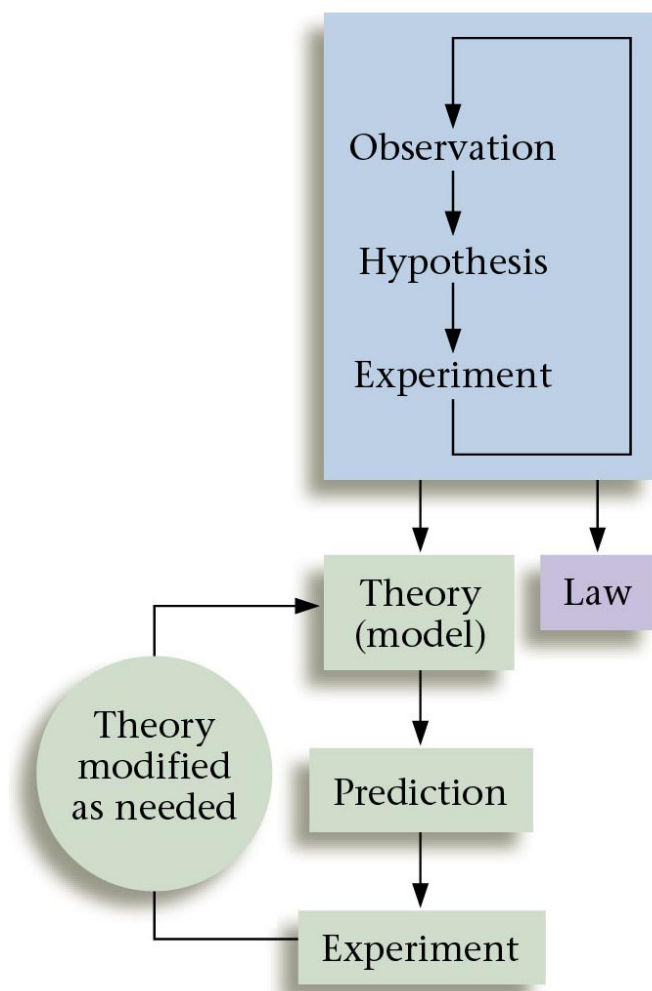
1.1 : THE SCIENTIFIC METHOD

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1.1 THE SCIENTIFIC METHOD

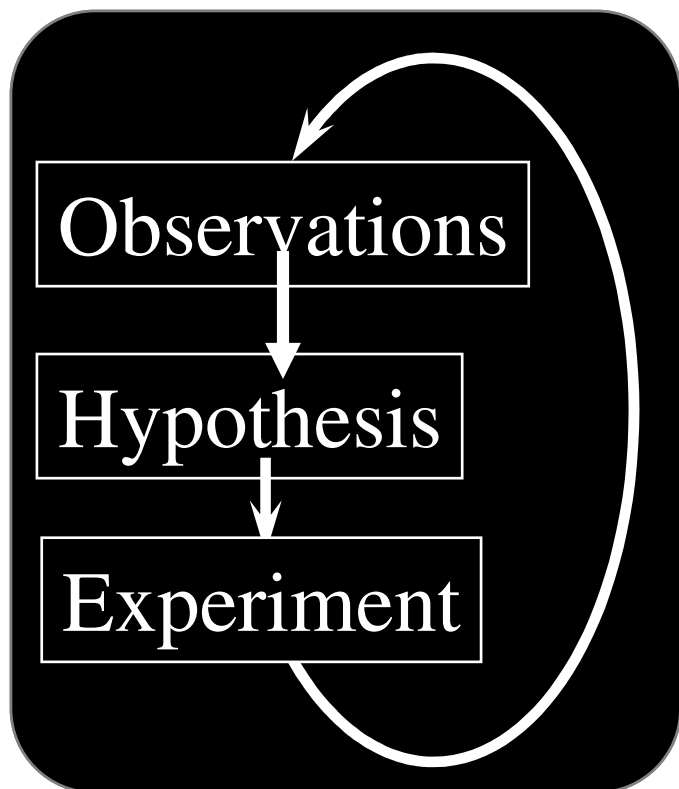


- A way of solving problems or answering questions.
- Making observations (collecting data)
- Making a prediction (formulating hypothesis)
- Doing experiments to test the prediction (testing hypothesis)

Scientists call this process the **scientific method** .



Observations



- Starts with observation- noting and recording facts

- **Types of observations**

Qualitative- descriptive, but not true measurements

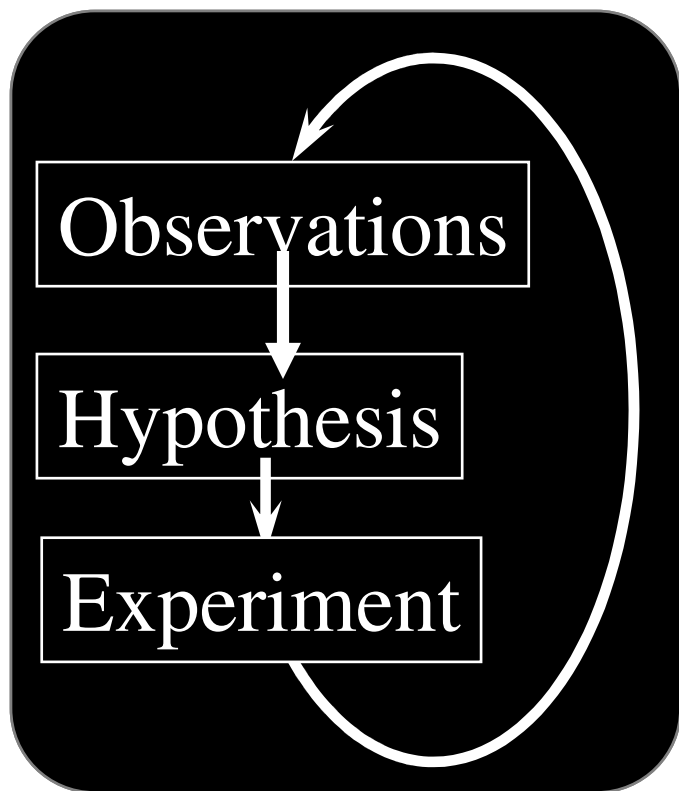
- Hot
- Large

Quantitative- describe with numbers and units

- 100°C
- 15 meters



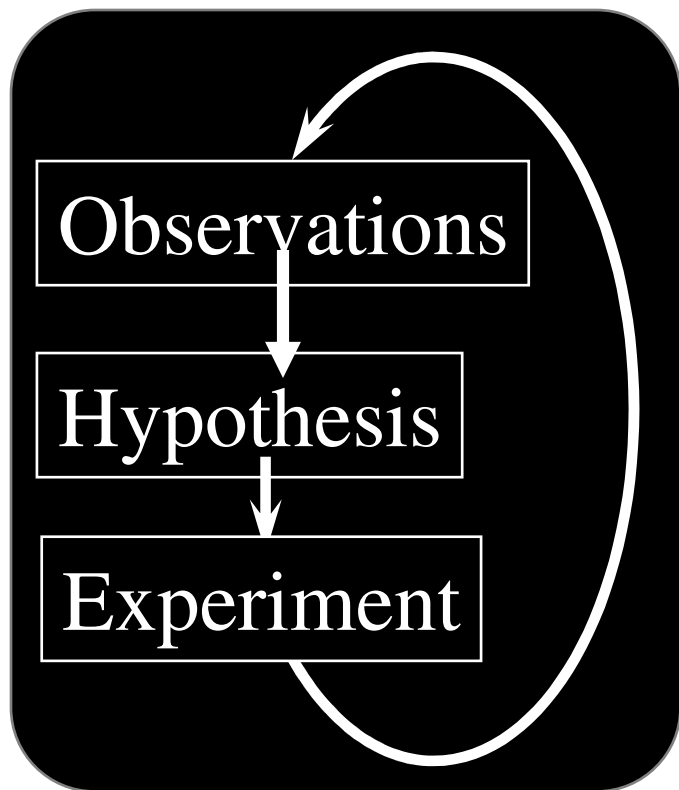
Hypothesis



- **Hypothesis-** a possible explanation as to the cause of the observation, based on research and previous knowledge



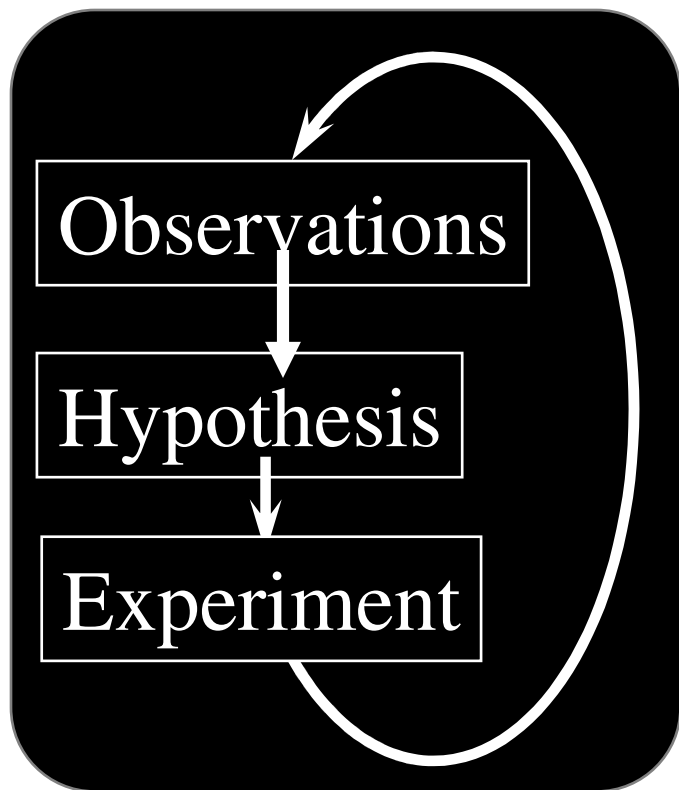
Experiment



- **Experiment-** designed to test the hypothesis
- **Generates data -observations** from experiments.
- **only two possible answers**
 - hypothesis is right
 - hypothesis is wrong
- **Modify hypothesis - repeat the cycle**



Theory



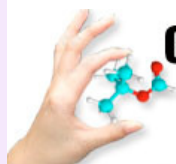
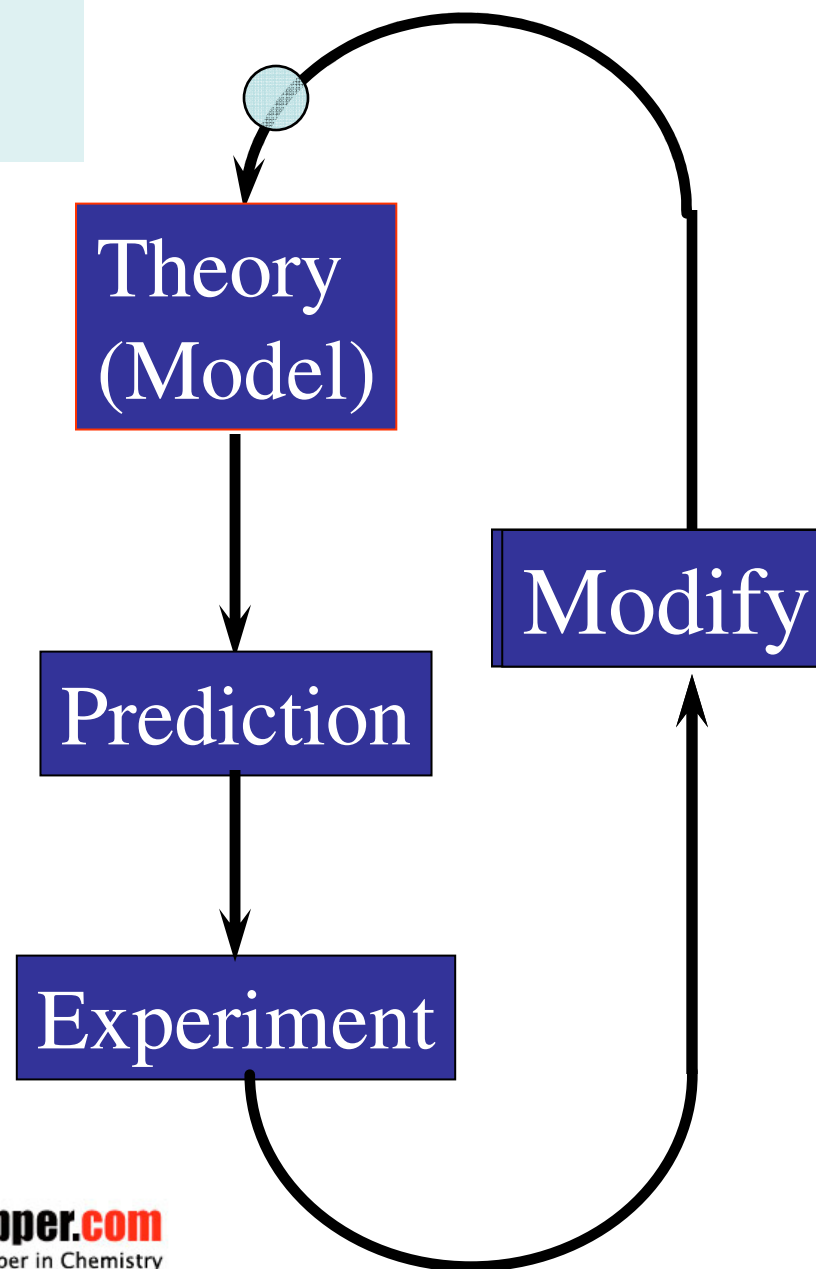
- Cycle repeats many times.
- The hypothesis gets more and more certain.
- Becomes a **theory**
- A thoroughly tested model that explains why things behave a certain way.



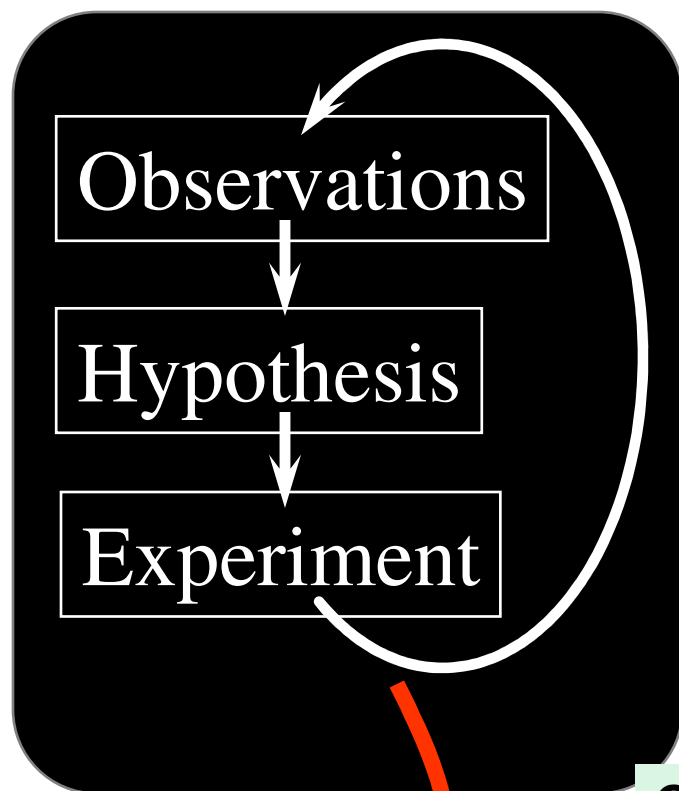
Theory –is why ?

- Theory can never be proven.
- It is the best explanation for why is it happening
- Useful because they predict behavior
- Help us form mental pictures of processes (models)

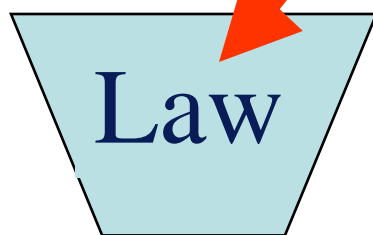
•A theory , which is often called a model , is a set of tested hypothesis ,that gives an overall explanation of some natural phenomenon .



Law –is how

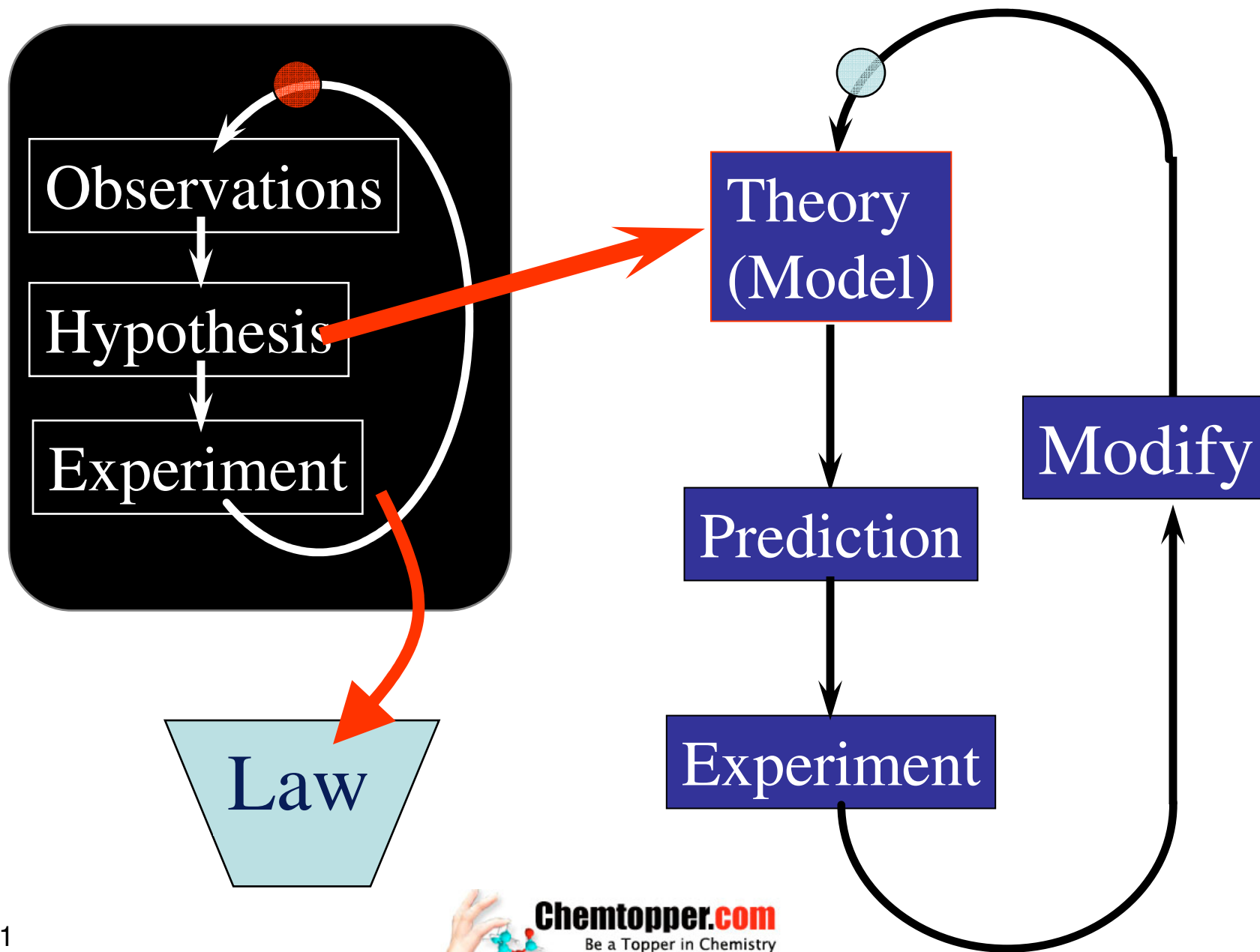


- Another outcome is that certain behavior is repeated many times
- Scientific Law is developed
- Description of how things behave
- Usually an equation
- Law - how
- Theory- why



Generally observed behavior is formulated into a statement called a natural law.
e.g law of conservation of mass is based on the observation that total mass remains unchanged during a chemical reaction .





1.1

