Steps in the Scientific Method

1. Observations
   - quantitative
   - qualitative
2. Formulating hypotheses
   - possible explanation for the observation
3. Performing experiments
   - gathering new information to decide whether the hypothesis is valid

Outcomes Over the Long-Term

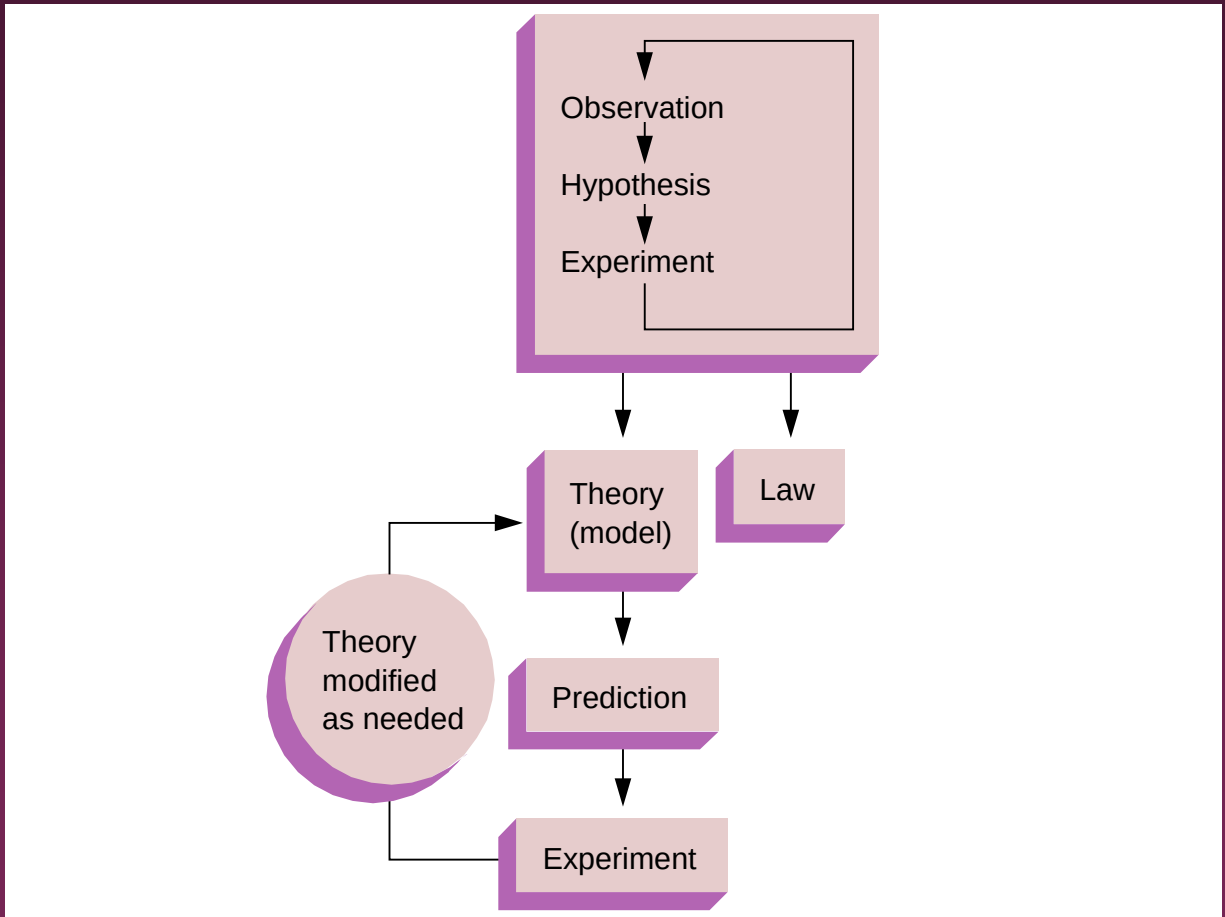
Theory (Model)

- A set of tested hypotheses that give an overall explanation of some natural phenomenon.

Natural Law

- The same observation applies to many different systems
- Example - Law of Conservation of Mass

Outcomes Over the Long-Term



Law v. Theory

A law summarizes what happens; a theory (model) is an attempt to explain why it happens.

Matter: Anything occupying space and having mass.

Classification of Matter

Three States of Matter:

Solid: rigid - fixed volume and shape

Liquid: definite volume but assumes the shape of its container

Gas: no fixed volume or shape - assumes the shape of its container

Types of Mixtures

Mixtures have variable composition.

A homogeneous mixture is a solution (for example, vinegar)

A heterogeneous mixture is, to the naked eye, clearly not uniform (for example, a bottle of ranch dressing)

Pure Substances

Can be isolated by separation methods:

- Chromatography
- Filtration
- Distillation

Compound: A substance with a constant composition that can be broken down into elements by chemical processes.

Element: A substance that cannot be decomposed into simpler substances by chemical means.

Organization of matter