

WHAT IS CHEMISTRY?

- Chemistry is the science that deals with the materials of the universe, and the changes they undergo.
- *Materials* of the universe can be of several forms:

Gas: air, oxygen

Liquid: water, gasoline, vinegar, orange juice,

Solid: rocks, charcoal, table salt, sugar, wood, baking soda

- Some examples of **changes**:

Burning of charcoal

charcoal + oxygen \longrightarrow carbon dioxide

Burning of gasoline

gasoline + oxygen \longrightarrow carbon dioxide + water vapor

Fermentation of grape juice

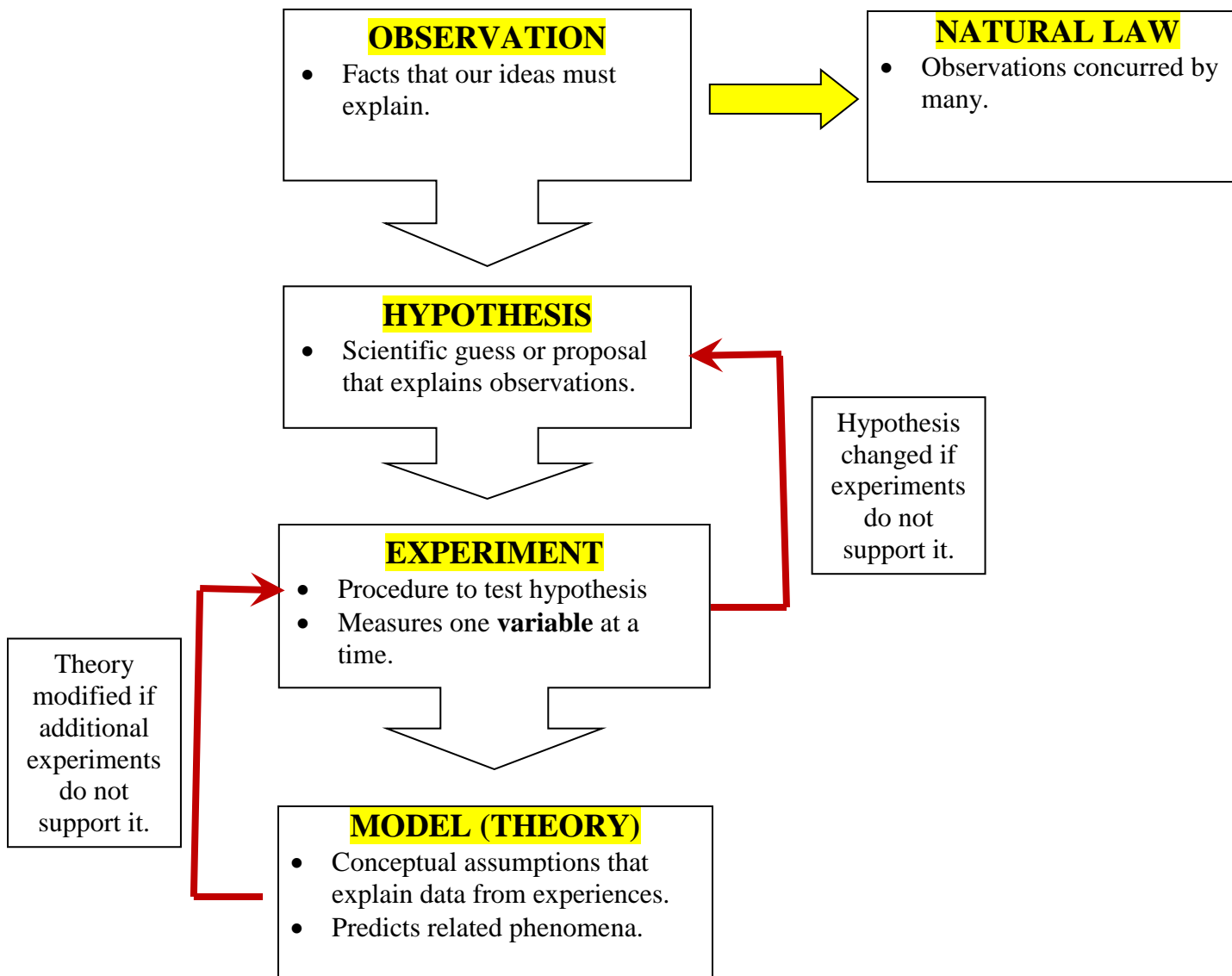
glucose \longrightarrow ethyl alcohol + carbon dioxide
(in water) (in water)

Souring of wine

ethyl alcohol + oxygen \longrightarrow acetic acid
(in water) (from air) (in water)

THE SCIENTIFIC METHOD

- The scientific method is a **process** of creative thinking and testing aimed at **objective** and **verifiable** discoveries. It is generally composed of the following steps:



Examples:

- Which statement below describes a law? Which describes a theory?
 - It explains why observations occur.
 - A summary of previous observations that can be used to predict the results of future related experiments.
- Classify each statement below as an observation, a law, or a theory:
 - All matter is made of small particles called atoms.
 - When iron rusts in a closed container, the mass of the container and its content does not change.
 - In a chemical reaction, matter is neither created nor destroyed.
 - When a match is burned, heat is released.
- A student prepares several samples of the same gas and measures their mass and volume. The results are tabulated below:

Mass of Gas (in grams)	Volume of Gas (in L)
22.5	1.60
35.8	2.55
70.2	5.00
98.5	7.01

Which statement(s) below describe the relationship between the mass and volume of the gas:

- The mass of the gas is inversely proportional to its volume.
- The mass to volume ratio of the gas is constant.
- The mass to volume ratio of the gas is not constant.
- The mass of the gas directly proportional to its volume.

Examples (cont'd):

4. Identify each of the following as an *observation*, a *hypothesis*, an *experiment* or a conclusion:
- a) Drinking coffee at night keeps me awake. _____
- b) I will try drinking coffee only in the morning. _____
- c) If I stop drinking coffee in the afternoon, I will be able to sleep at night. _____
- d) When I drink decaffeinated coffee, I sleep better at night. _____
- e) I am going to drink only decaffeinated coffee. _____
- f) I sleep better at night because I stopped drinking caffeinated drinks. _____