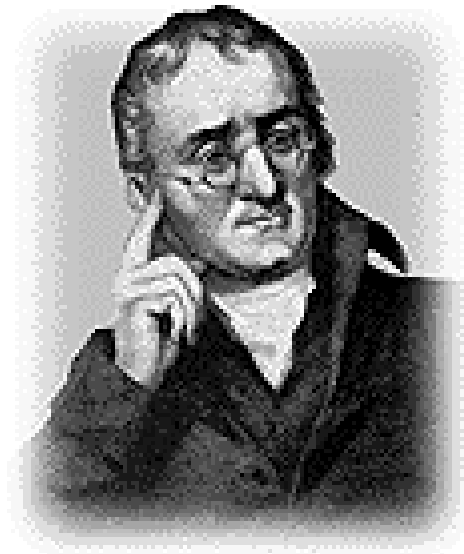


The Dalton Model



In 1803, John Dalton proposed the theory that all modern chemistry is based on. It is called the Atomic Theory of Matter. He stated the following:

- ☆ Matter is made of small particles called atoms.
- ☆ Atoms are indestructible. They cannot be created or destroyed during chemical or physical changes.
- ☆ Atoms of an element are identical. They have the same mass.
- ☆ Atoms of different elements have different masses.
- ☆ Compounds are formed by combining atoms of different elements.

The idea of atoms was not new, even in 1803. It was proposed centuries earlier, around 460 BC, by Democritus, a Greek philosopher. Dalton's ideas were different than those of Democritus because they were supported by quantitative data.



Following is an example of the type of data Dalton analyzed. Examine the data. Then explain in your own words what the data might mean.

Sample Data for Dalton's Experiment

Experiment 1

- ☆ 30 g of carbon are burned in the open air where there is plenty of oxygen. 110 g of carbon oxide forms.
- ☆ How much oxygen does this mean the carbon combined with? _____

Experiment 2

- ☆ 30 g of carbon are burned in a closed container under conditions of low oxygen. 70 g of carbon oxide forms.
- ☆ How much oxygen does this mean the carbon combined with? _____

1. What is the ratio of the masses of the oxygen combined with carbon in *Experiment 1* and *Experiment 2*? _____

2. Is the ratio of masses of combined oxygen in *Experiment 1* and *Experiment 2* an integer or an irrational number? _____
3. How might this data be explained? _____

