

# Section 3-1 The Atom: Philosophy to Science

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**Democritus** – Greek thinker who coined term atom in 400 BC. Atom meant indivisible

**Aristotle** – did not believe in atoms, believed that all matter was continuous. Idea lasted 2000 years.

Earth, Wind, Water, Fire, etc.

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## Late 1700 – Study of reactions led to new ideas...

**Law of Conservation of Mass** – Mass can't be created or destroyed by ordinary chemical or physical reactions.

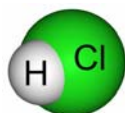
**Law of Definite Proportions** – a compound contains the same proportions of mass regardless of size or source.  
Ex. NaCl will always be 39.3% Na and 60.1% Cl

**Law of Multiple Proportions** – if two or more compounds of the same two elements exists, then the ratio of masses are ratios of whole numbers

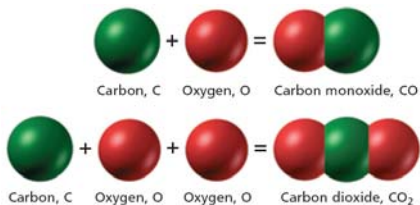
Ex. C and O can combine to form both CO and CO<sub>2</sub>

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## Law of Definite Proportions



## Law of Multiple Proportions



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## John Dalton 1766 - 1844



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## Dalton's Atomic Theory (Early 1800s)

- 1) All matter is made of atoms
- 2) Atoms of an element are all the same, atoms of a different element will differ
- 3) Atoms can't be subdivided, created, or destroyed
- 4) Atoms of different elements form compounds in whole number ratios
- 5) In reactions, atoms are combined separated, or rearranged

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## Modern Atomic Theory

Slight changes to Dalton's Theory...

- 1) Atoms of the same element can differ (isotopes and ions)
- 2) Nuclear reactions can split an atom

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