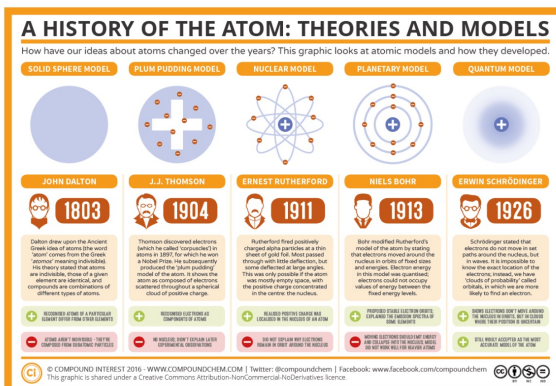


Studying Matter...

All materials on earth and the universe are made of matter. In this unit we will study the basic underpinning of matter...

The ATOM



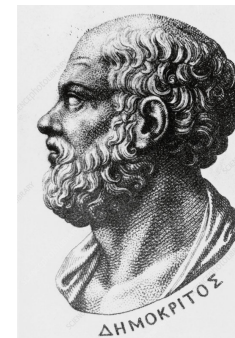
2

From Matter to Atoms

Democritus Theory of Matter

Democritus: Fifth Century BC (460 – 370BC)

If matter is divided into the smallest possible pieces you will eventually reach the smallest division of matter - "Atomos" – The atom



The Basic Elements

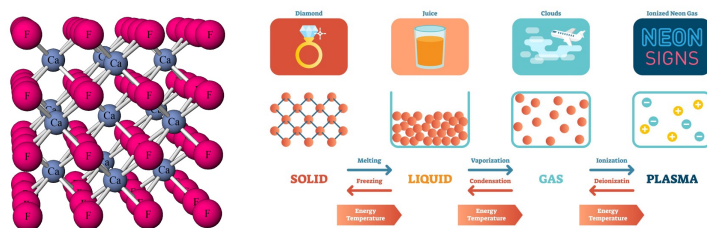
Prior to Democritus philosophers believed everything was made of Fire, Earth, Wind, Water, and Ether

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From Matter to Atoms

Preliminary Atomic Theories

Democritus (400BC): The Atom Greeks (200BC): States of Matter



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From Matter to Atoms

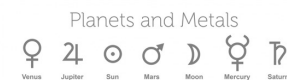
Alchemy and The Chemical Reaction

Alchemy (1500s)

Alchemists believed gold could be **transmuted** (*changed*) from more common elements using fundamental characteristics of atomic theory.

A **chemical reaction** is a process in which atoms are changed (*rearranged*) to make new combination of atoms (*compounds and molecules*)

Alchemical Symbols



Alchemy defined the first elements / atomic symbols

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From Matter to Atoms

Preliminary Laws of Matter

Law of Conservation of Matter

Matter is neither created or destroyed just rearranged in new ways

Law of Conservation of Mass

The physical mass of matter is constant

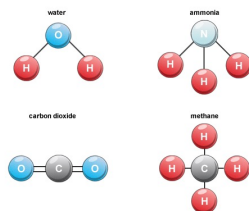
Law of Definite Composition (Proust's Law)

All combinations of atoms contain the same ratio (by mass) of all atoms that make up the matter

Compounds and Molecules

All combination of atoms are formed from existing atoms in definite proportions

Water is always 1 oxygen and 2 hydrogen [H_2O]



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From Matter to Atoms

Dalton's Four Principles of the Atom

Matter and the atom is defined based on the basic principles of matter. His principles were:

First Principle of Atoms

All Matter is Made of Indivisible Atoms

Second Principle of Atoms

All Atoms of the same type have the same properties, including mass (*elements*)



John Dalton

English Chemist
1766 – 1844AD

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From Matter to Atoms

Dalton's Four Principles of the Atom

Dalton used the scientific method in this principles and was the first to write down the basic ideas in his principles of matter

Third Principle of Atoms

Compounds and Molecules are combinations of two or atoms combined together

Fourth Principle of Atoms

A Chemical Reaction occurs when atoms are rearranged forming new atom combinations



John Dalton

English Chemist
1766 – 1844AD

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