

A brief history of atoms:

1) **Democritus (400 B.C.)**

Democritus thought matter could not be divided indefinitely.

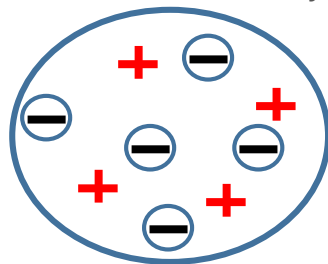
2) **John Dalton (1800)**

He proposed:

- All matter is made of atoms.
- Each element has different atoms.
- Atoms of different elements combine in constant ratios to form compounds.
- His ideas account for the law of conservation of mass (atoms are neither created nor destroyed) and the law of constant composition (elements combine in fixed ratios).

3) **J.J. Thomson**

He used **Crookes** ray tube with a magnet and discovered that the green beam it produced was made up of negatively charged material. He determined that these negatively charged electrons needed something positive to balance them out. So, he determined that they were surrounded by positively-charged material. This became known as the '**plum pudding**' model of the atom. The negatively charged plums were surrounded by positively charged pudding.

4) **Ernest Rutherford**

He fired a beam of positively charged particles called alpha particles at a very thin sheet of gold foil. But some were deflected back by the gold foil.

Rutherford claimed that this also shows that the atom consists mostly of empty space and that all the positive charge is not evenly spread throughout the atom (based on the Thomson model) but instead squished into a teeny **tiny nucleus** in the center of the atom.

