Developing Models of Matter

About 450 BC

- Greek Philosopher Empedocles
- Earth, Air, Wind, Fire

About 400 BC

- Democritus
- matter made of tiny particles
- called them *atoms*

About 350 BC

- Aristotle
- very influential because he was educated
- Empedocles model accepted for nearly 2000 years

AD 500-1600

- Alchemists-part philosopher, mystic, magicion and chemist
- developed many of our current procedures and tools but still accepted the 4 element model

About 1650

- Robert Boyle
- developed a new definition for "element"
- " a pure substance that cannot be broken down into simpler substances"

About late 1700's

- Priestly, Lavoisier and Cavendish
- isolated oxygen and later hydrogen and recognised them as elements

1808

- John Dalton
  - All matter is made of tiny particles
  - Each element has its own kind
  - Compounds are created when elements combine
  - atoms cannot be created or destroyed

1800's

- 1831-Michael Faraday
  - matter must contain positive and negative charges
  - opposite charges attract, like charges repel
  - atoms combine to form compounds because of electrical attractions

1904

- JJ Thomson
- "raison bun" model

  - atoms contain particles called electrons
  - electrons are very small and negative
  - remainder is a sphere with a positive charge
  - electrons are "embedded" in this sphere, resulting in an uncharged atom

1911

- Ernest Rutherford
- gold foil experiment
  - a tiny dense postive core called the nucleus
  - surrounded by mostly empty space containing the rapidly moving negative electrons