ATOMIC THEORY

GREEKS → DEMOCRATOS → DISCONTINUISTS

ARISTOTLE, PLATO → CONTINUISTS

→ 4 elements (earth, air, fire, water)

Lavoisier France 1790's

→ Law of Conservation of Mass

1808 Davy's "ATOMIC THEORY" billiard ball model

- elements are composed of atoms
- in a chemical reaction, atoms are rearranged
- atoms of one element are distinguishable from atoms of another element
- compounds are composed of atoms of different elements combined in simple whole number ratios (Law of Definite Proportions)

\[ H_2O \rightarrow 11.98 \text{ H, } 89.80 \text{ by mass} \]

atom - the basic unit of an element that can be combined with another element to form a compound

1890's J.J. Thompson → electrons cathode ray tube (-)

Millikan → discovered mass of e−
**ATOMIC THEORY**

**GREEKS** → **DEMOCRITUS** → **DISCONTINUISTS**

L → 'Atomos''

**ARISTOTLE, PLATO** → **CONTINUISTS**

L → 4 elements (earth, air, fire, water)

**LaVosier France 1790's**

→ **Law of Conservation of Mass**

1808 Dalton "ATOMIC THEORY"

- elements are composed of atoms
- in a chemical reaction the model atoms are rearranged
- atoms of one element are distinguishable from atoms of another element
- compounds are composed of atoms of different elements combined in small whole number ratios (law of definite proportions)

\[ H_2O \rightarrow 11.98\text{H}, 18.01\text{O by mass} \]

**atom** → the basic unit of an element that can be combined with another element to form a compound

1890's J.J. Thompson → **electrons**

cathode ray tube (→)

Millikan → **discovered mass of e-**
1895 Roentgen X-rays emit radiation

Thompson → plum pudding model

Bequerel/Curie → radioactivity \(\xrightarrow{\text{spontaneous}}\) emission

\(\xrightarrow{\text{\(\alpha\) particle (+)}} \frac{4}{2}\text{He}\)

\(\xrightarrow{\text{\(\beta\) particle (-)}} \text{e}^-\)

\(\xrightarrow{\gamma \text{ rays}} \text{e}^- \rightarrow \uparrow \text{p}^+ + \downarrow \text{e}^-\)

1910 Rutherford's "gold foil experiment" → nuclear model

**Atomic Number** \((Z) = \# \text{p}^+ \text{ in nucleus}\)

**Mass Number** \((A) = \# \text{p}^+ + \# \text{n}^0\)

\[ A = Z \neq \# \text{n}^0 \]

Isotopes → atoms of the same element with different masses → different \(\# \text{n}^0\)

Isotope symbols: \(^{12}\text{C}, ^{13}\text{C}, ^{14}\text{C}\)

\(^{14}\text{C} \rightarrow \uparrow \text{\(\beta\)} + \uparrow \text{\(\text{N}\)} + \downarrow \text{\(\text{D}\)}\)