

# **Grade 12 Chemistry**

SCH4U

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# Chapter 1

## Unit 1

### 1.1 Intro to Quantum

#### 1.1.1 Gold Foil Experiment

- Rutherford's concluded that the atom is mostly empty space with a very dense, positively charged nucleus
- Electrons rotate around the nucleus like planets around the sun
- Thomson's Model of atom: There are only -e in an atom
- By Dalton, elements consist of indivisible small particles (atoms)

#### 1.1.2 Niels Bohr

He suggested that there are stable orbits around the nucleus, where electrons can orbit indefinitely without losing energy

- When Given energy, electrons can "jump" to a higher energy level.
- Energy levels are discrete, a specific amount of energy is required
- So the atom will release/absorb a specific wave length, in other words, a specific color of light

#### 1.1.3 Photoelectric Effect)

Ejection of electrons did not depend upon light intensity, but rather its frequency  
Most importantly, light can be either wave or elections.

#### 1.1.4 Heisenberge Uncertainty Principle

Quantum is probability, you do not know the exact position of Quantum.  
Balling ball example by Mr. Cheung.

### 1.1.5 Electron Cloud

Shrodinger's Equation describes the behaviour of an electron in 3 dimensional space.  
You need four parameters:

$$(n, l, m_l, m_s) \tag{1.1}$$

$n$  describes the energy levels  
 $l$  describes which kind of house  
 $m_l$  describes which room  
 $m_s$  describes which people