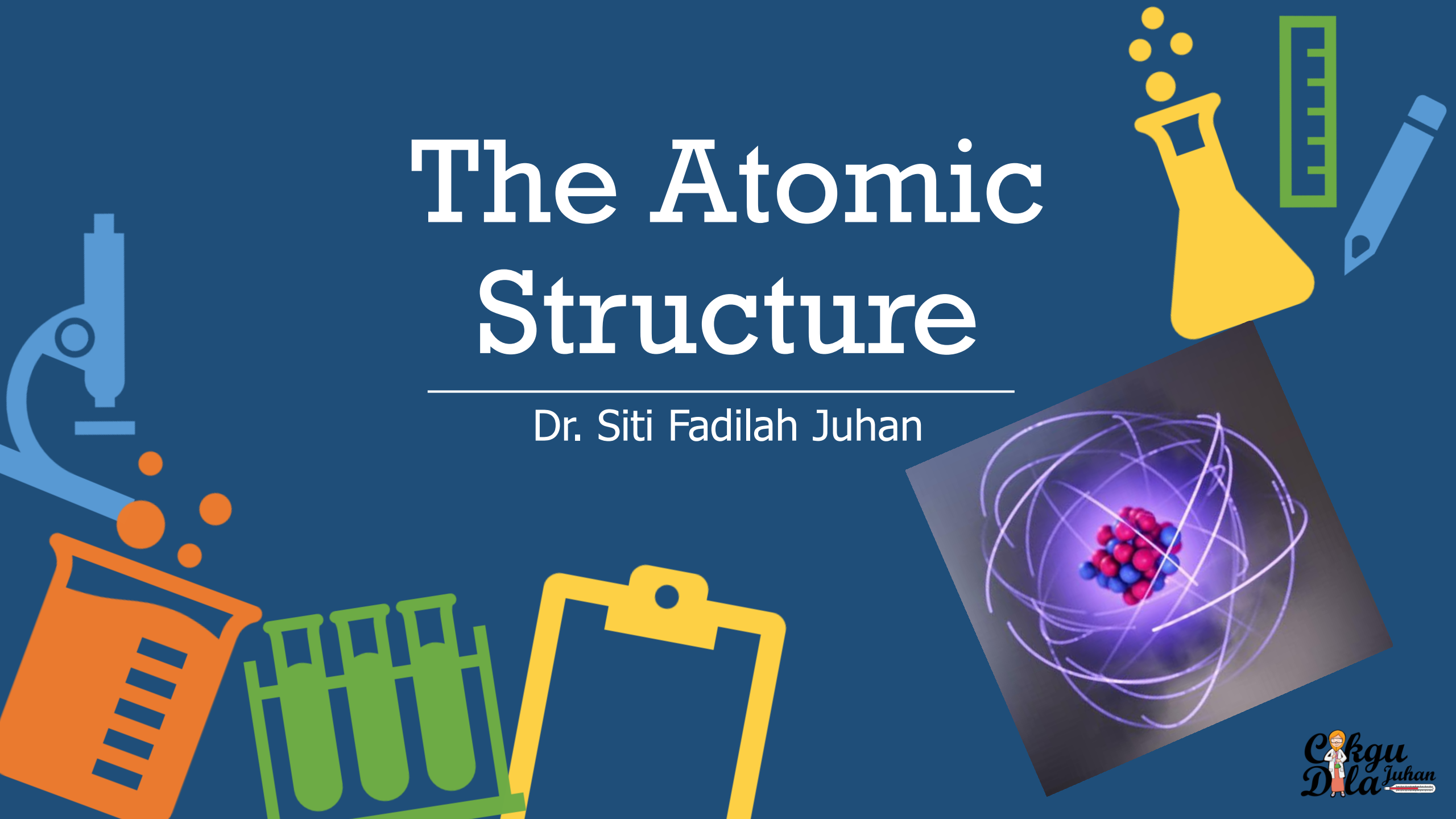


# The Atomic Structure

Dr. Siti Fadilah Juhan



# Sub-atomic Particles

## Electron

Symbol:  $e^-$

Charge: Negatively Charged

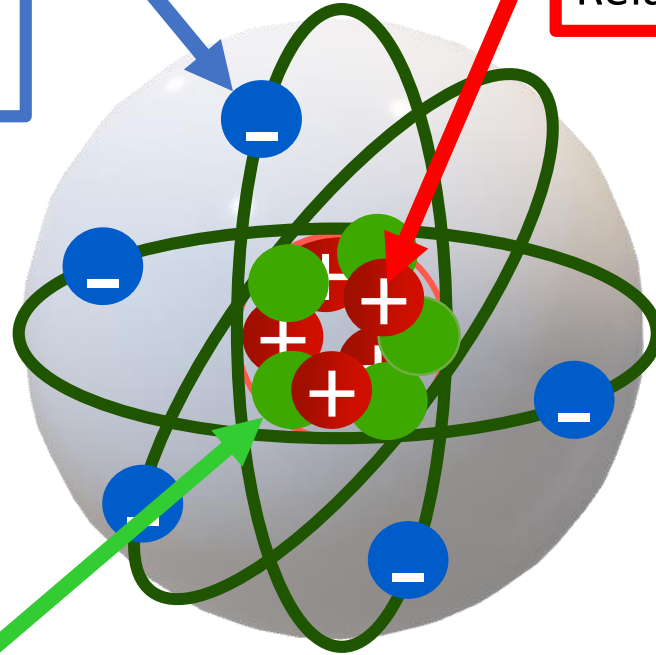
Relative mass:  $\frac{1}{1840}$  unit

## Proton

Symbol:  $P^+$

Charge: Positively Charged

Relative mass: 1 unit



## Neutron

Symbol:  $n$

Charge: Neutral

Relative mass: 1 unit



# Proton Number and Nucleon Number

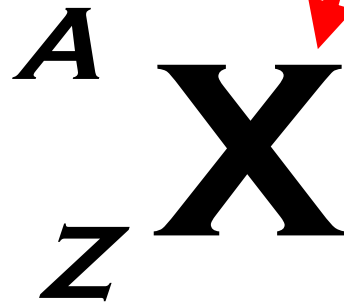
**Nucleon Number:**

Proton number + Neutron number

**Symbol of element  
for oxygen**

**Neutron number:**

Nucleon Number - Proton number



**Proton number = Atomic number = Number of electron in neutral atom**



# Example

**Nucleon Number:**

Proton number + Neutron number

**Neutron number:**

Nucleon Number - Proton number

$$16 - 8 = 8$$

16

8

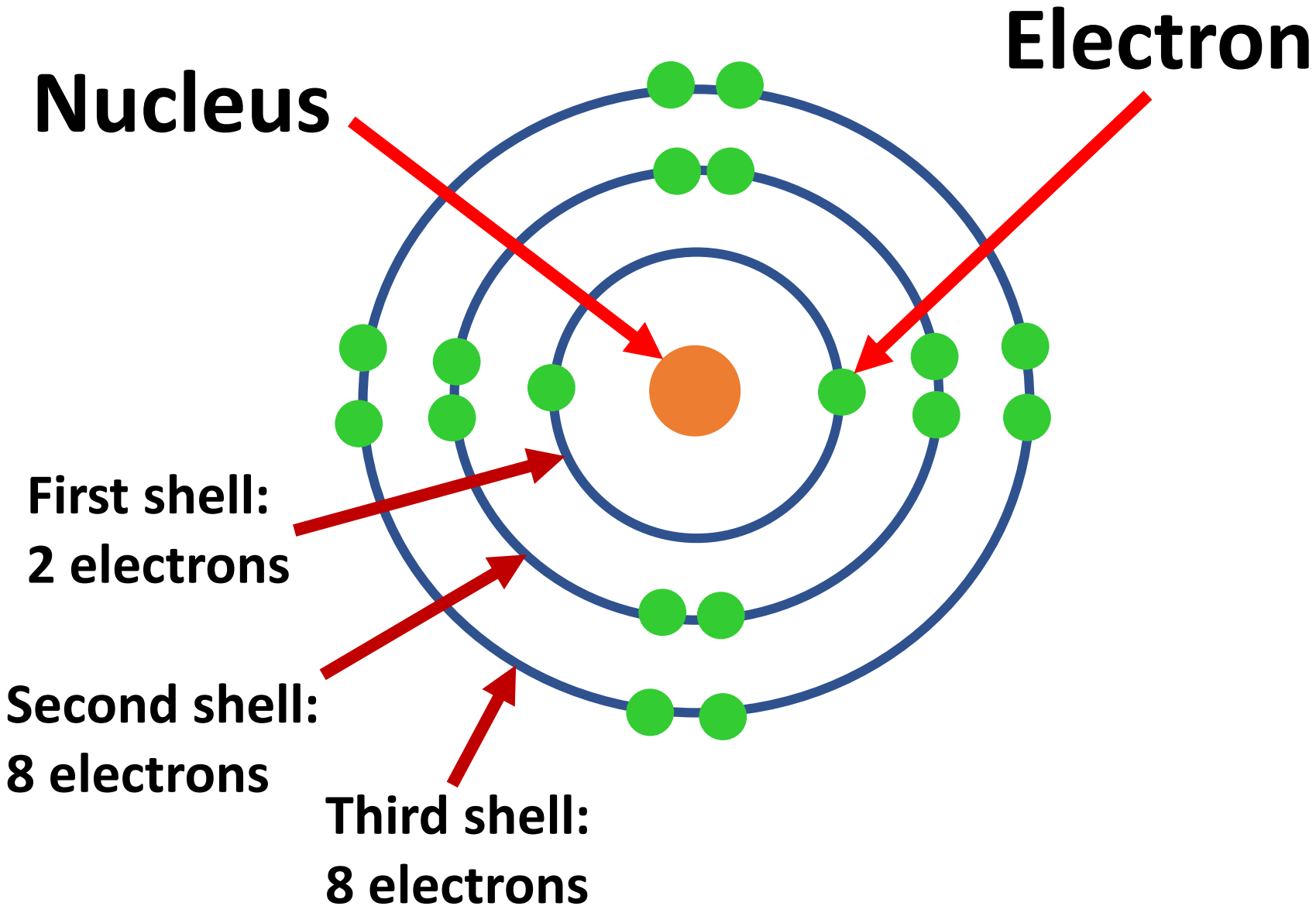
O

**Symbol of element  
for oxygen**

**Proton number = Atomic number = Number of electron in neutral atom**

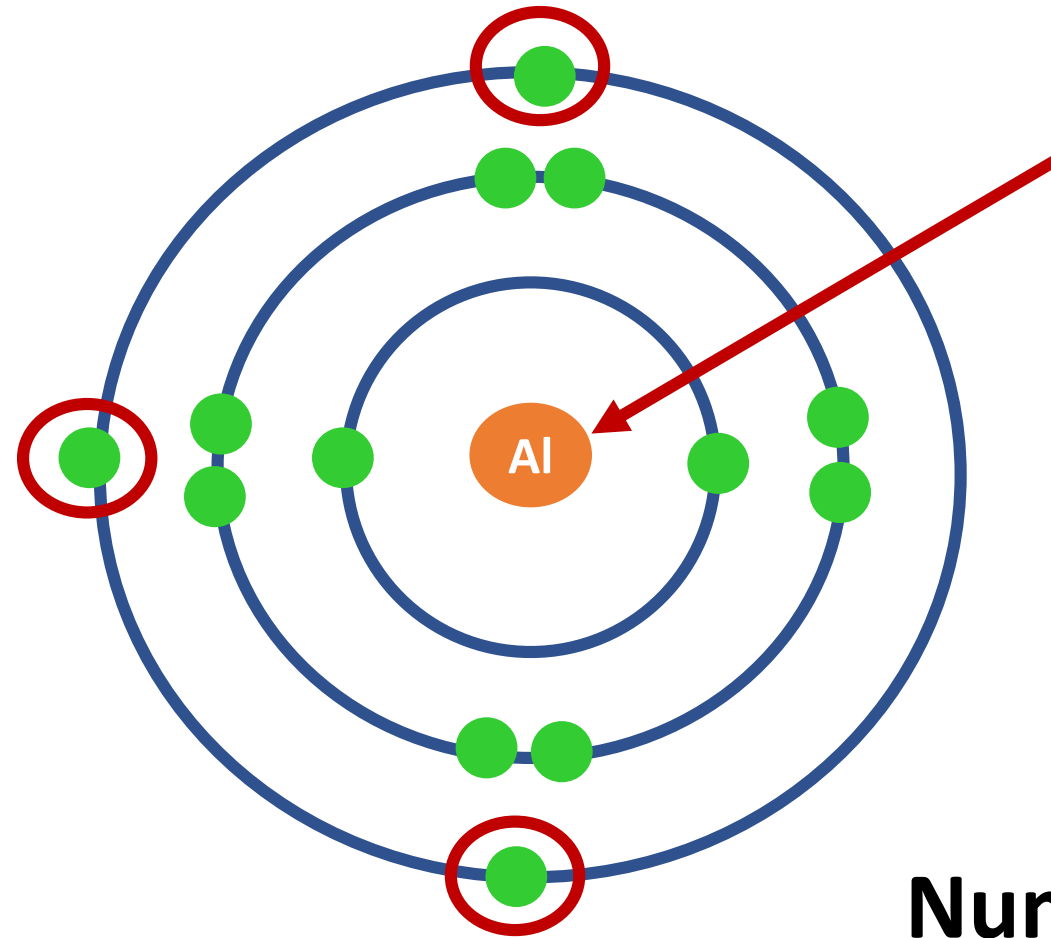


# Atomic structure



The third shell can be filled with a maximum of 18 electrons for elements with proton number exceeding 20

# Example: Electron arrangement of aluminium atom

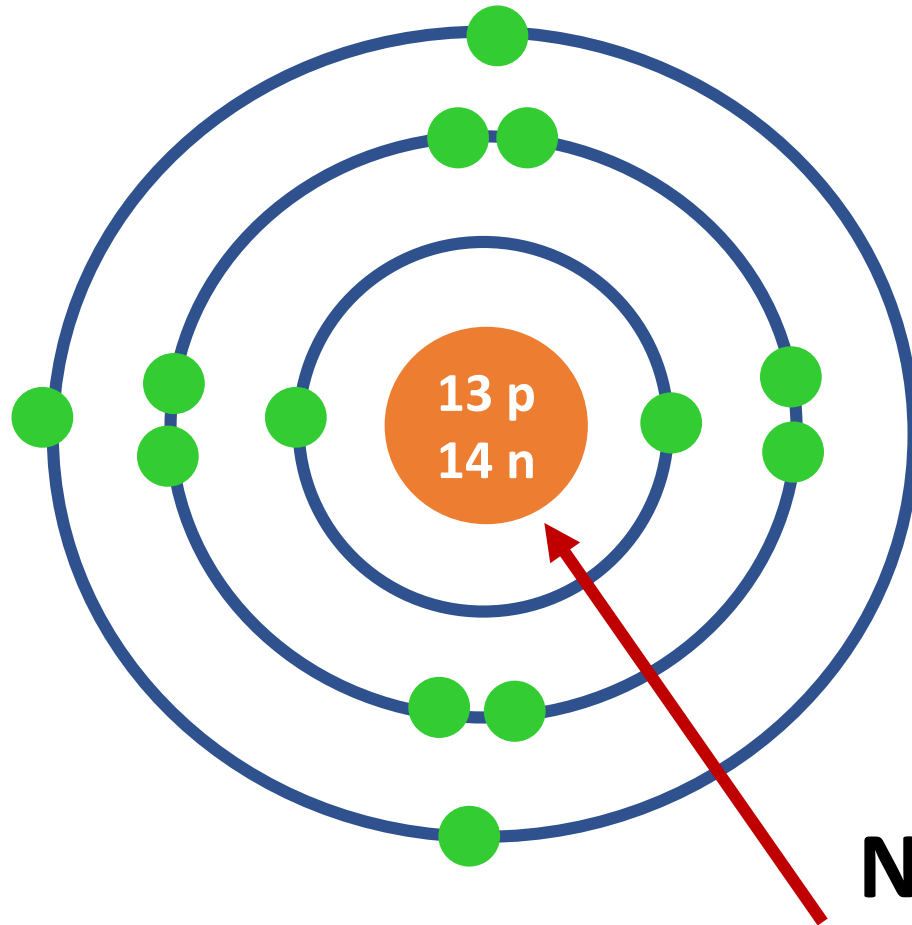


Symbol of the atom

2.8.3

Number of valence electrons

# Example: Atomic structure of aluminium atom



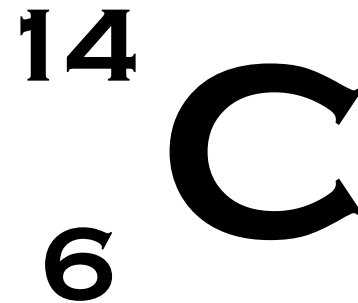
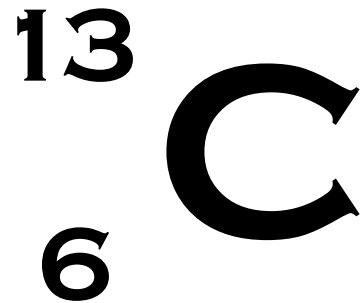
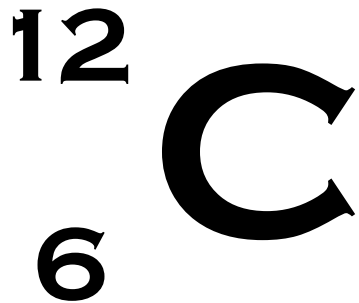
**Number of protons and  
neutron in the nucleus**

# Isotopes

Same element

Same number of protons

Different numbers of neutrons



Same chemical properties because of similar electron arrangement.

Different physical properties because of different number of neutron.



# Uses of Isotopes

## Medicine

### Cobalt-60

- In radiotherapy to kill cancer without surgery.
- Sterilizing surgical tools

### Iodine

- Treatment of thyroid disorder

## Engineering

### Sodium-24

- In detecting leakage in underground pipes.

## Agricultural

### Phosphorus-32

- Study of plant metabolism

## Archaeology

### Carbon-14

- Estimation of artifacts or fossils' age

### Lead

- In determining the age of sand and earth layer up to 80 years

## Nuclear

### Uranium-235

- Generating electricity through nuclear power generator.

## Industry

### Hydrogen-3

- As a detector to study sewage and liquid wastes.





# Thank you

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(by Dr. Siti Fadilah Juhan)

