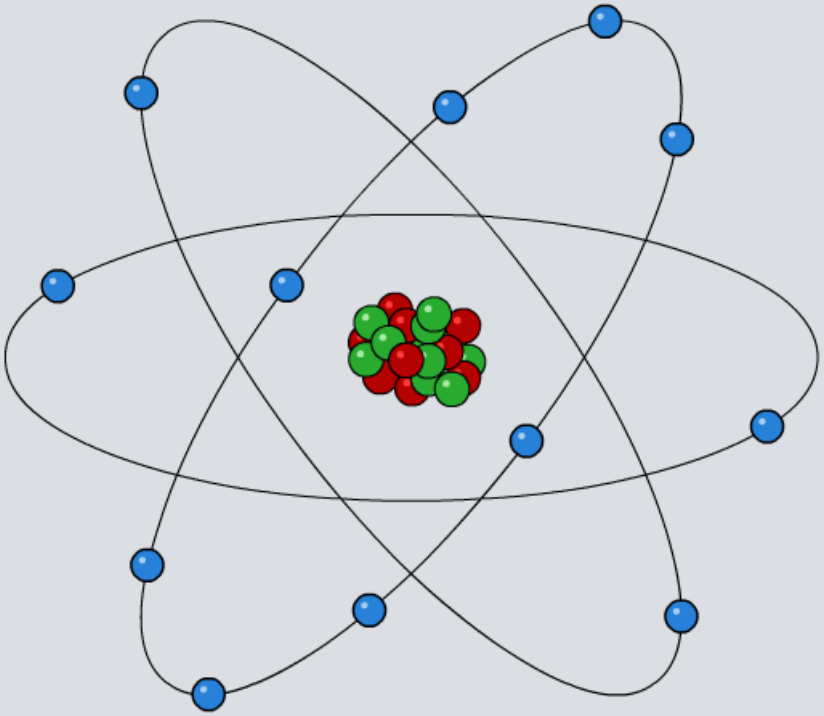
Structure of the Atom



History

Inside the atom

Specific charge

The **specific charge** is the charge per unit mass for a particle. It is calculated using the equation:

$$\text{specific charge} = \frac{\text{charge (C)}}{\text{mass (kg)}}$$

The units are coulombs per kilogram (**C kg^{-1}**)

It can be calculated for particles such as the proton, or for ions, such as the Mg^{2+} ion.

For example, the proton:

$$\text{specific charge} = \frac{1.60 \times 10^{-19}}{1.67 \times 10^{-27}}$$

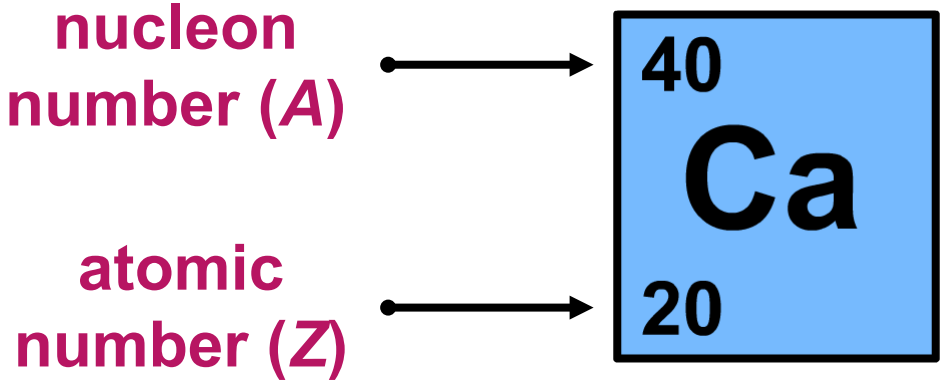
$$= 9.58 \times 10^{7}\ \text{C kg}^{-1}$$

Representing atoms

The number of protons in an atom is known as the **atomic number** or **proton number** and is represented by the symbol ***Z***. This number defines the element to which the atom belongs.

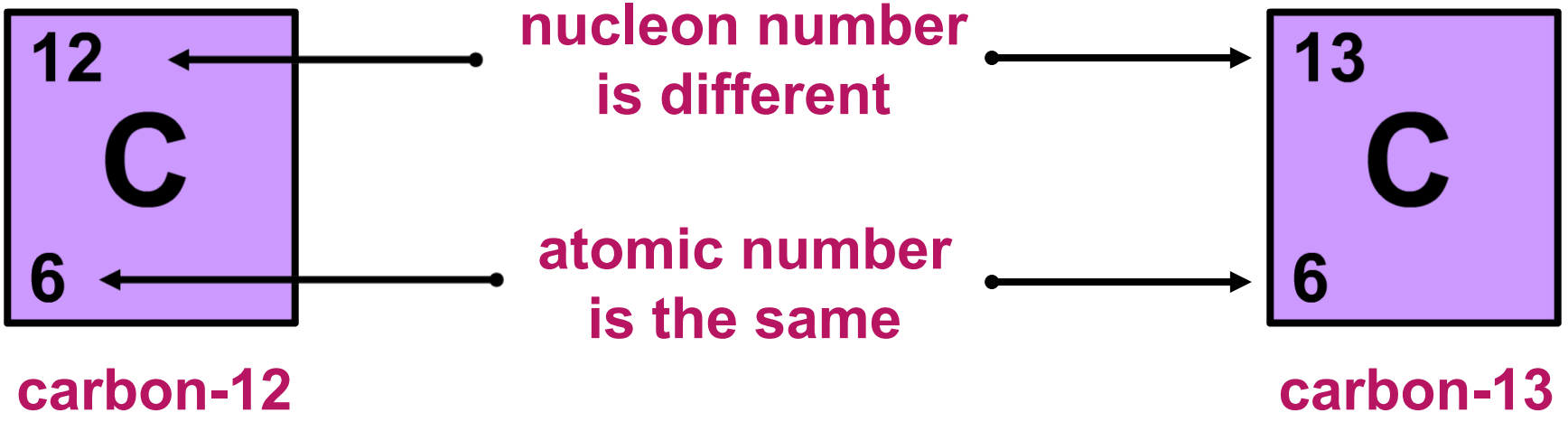
A nucleon is a proton or a neutron, so the **nucleon number** of an atom is the number of protons plus the number of neutrons in the nucleus. It is represented by the symbol ***A***.

An atom can be represented by its chemical symbol, nucleon number and atomic number as shown.



Isotopes

Isotopes are atoms of the same element that contain different numbers of neutrons.



The different masses of the atoms means that the physical properties of isotopes are slightly different.

What makes a nucleus stable?

Radioactive decay

Atomic structure: testing