Isotopes
and
radioactive decay

What do the symbols used for an isotope mean?

In beta-decay, a neutron in the nucleus decays into three particles – a proton, an electron, and a ghostly particle called a neutrino.
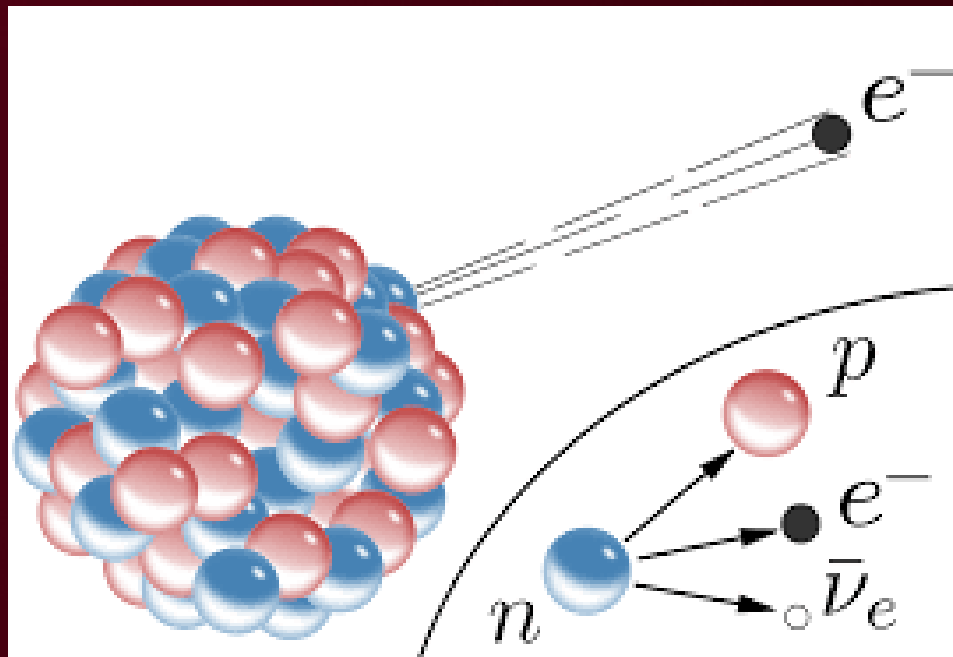
Beta-decay
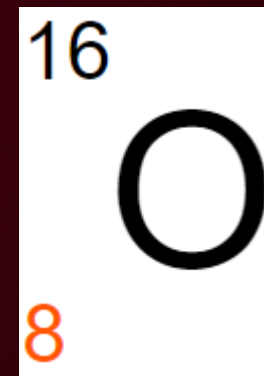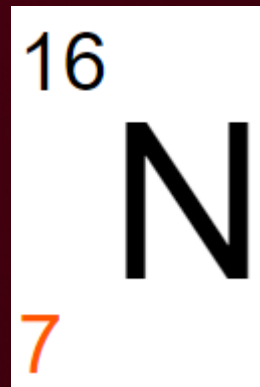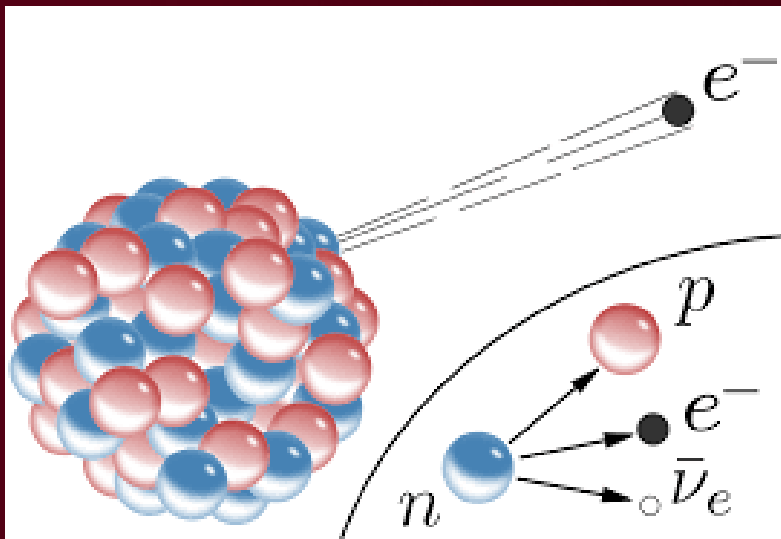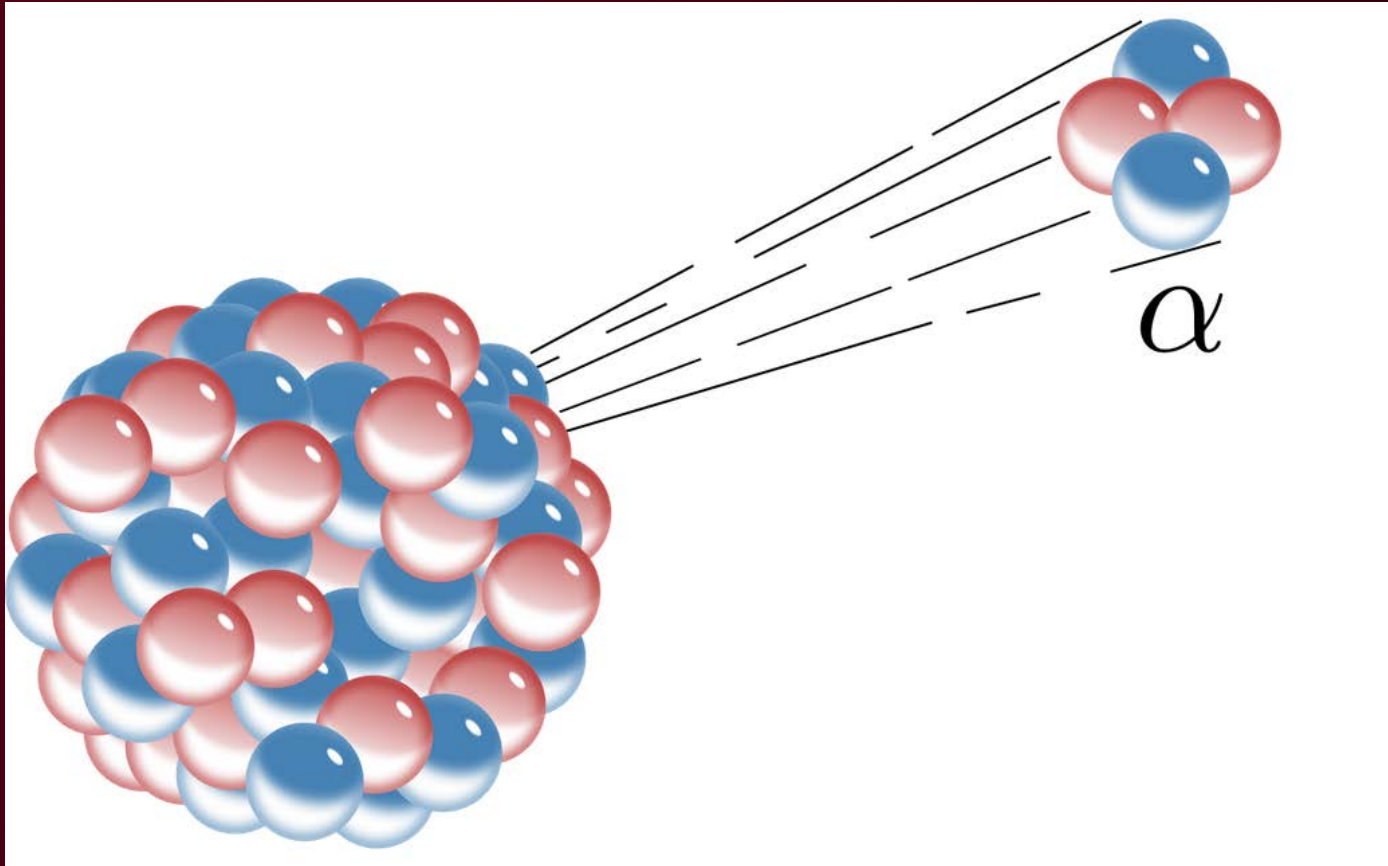
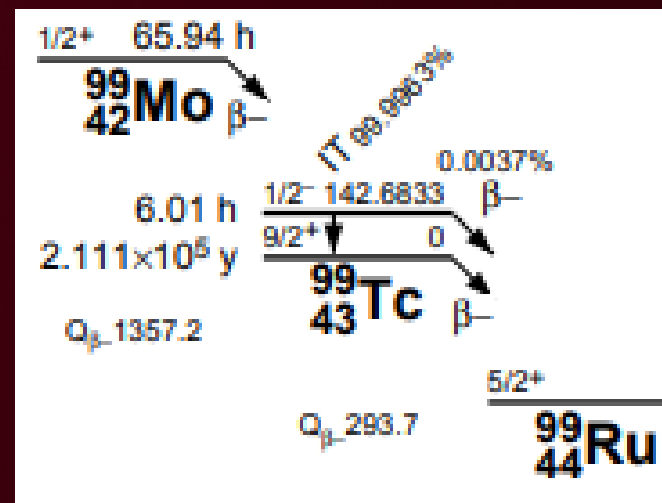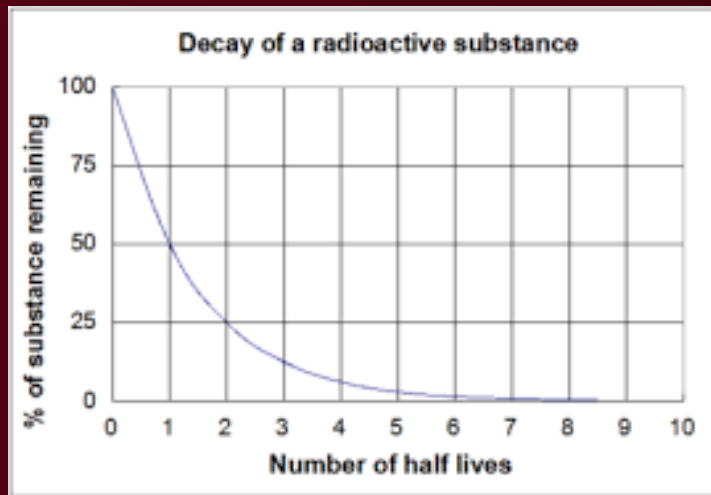# In alpha-decay, a Helium-4 nucleus is removed from the nucleus.

In alpha-decay, a Helium-4 nucleus is removed from the nucleus.

$$^{222}_{86}Rn_{136} \rightarrow {}^{218}_{84}Po_{134} + {}^{4}_{2}He_{2}$$

(210)	84	(210)	85	(220)	86
812.1 2.00		890.0 2.20		1037.0	
Po	+6 +4 +2 -2	At	+1 -1	Rn	
Polonium		Astatine		Radon	
[Xe] 4f¹⁴ 5d¹⁰ 6s² 6p⁴		[Xe] 4f¹⁴ 5d¹⁰ 6s² 6p⁵		[Xe] 4f¹⁴ 5d¹⁰ 6s² 6p⁶	

Half-life

Half-life

Decay of a radioactive substance
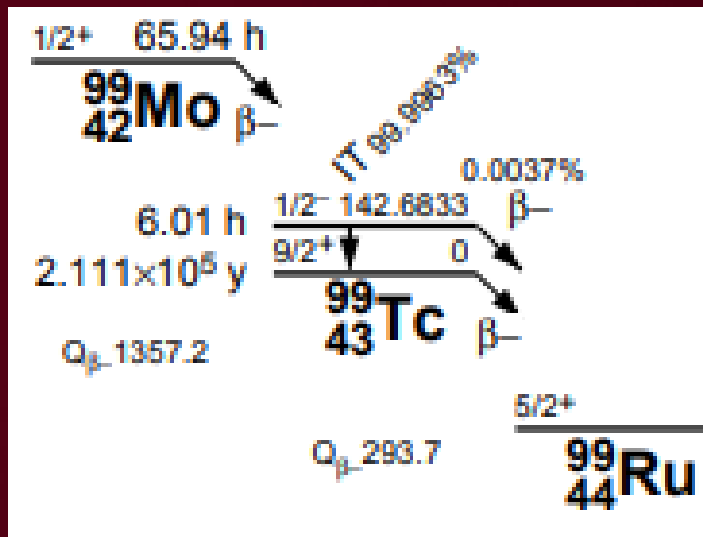
$$N = N_0 \, (1/2)^{[(\text{time})/(\text{half-life})]}$$

How much of the ⁹⁹Mo produced in the Netherlands radioactively decays during an 8-hour flight from Amsterdam to Atlanta?

$$N = N_0 \, (1/2)^{[(time)/(half\text{-}life)]}$$

$$N/N_0 = (1/2)^{[(8 \text{ hr})/(65.94 \text{ hr})]}$$

$$= .919$$

So 8.1% loss.