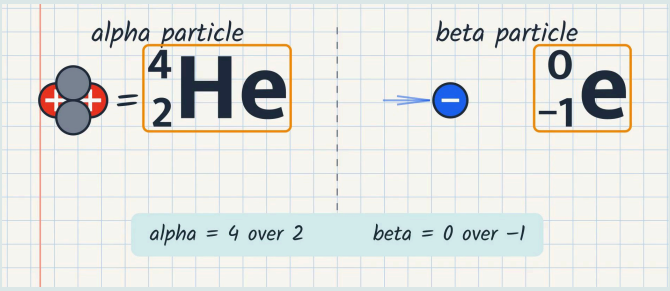
Nuclear equations

balancing alpha and beta decay

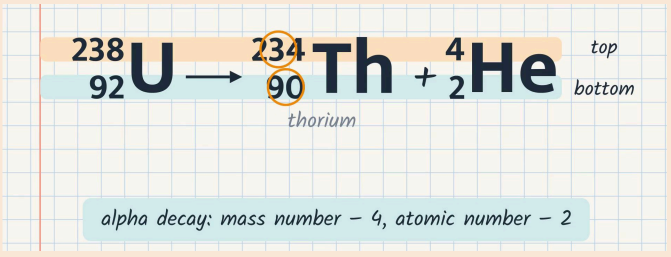
sansara academy
Summary sheet

1 The symbols



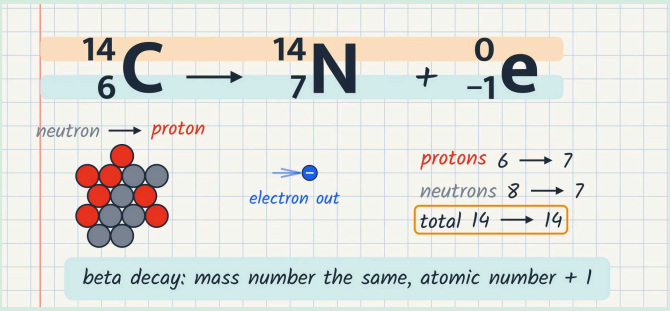
- Nuclear symbols: **mass number on top, atomic number on the bottom**. Radiation is written the same way.
- **Alpha** = 2 protons + 2 neutrons = a helium nucleus: **He, 4 over 2**. **Beta** = an electron: mass number 0, charge −1, so **e, 0 over −1**.

2 Alpha decay



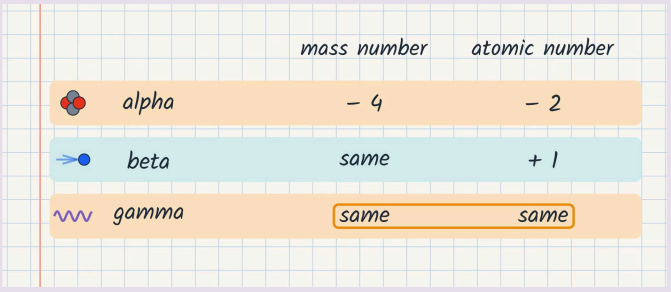
- **The rule**: the top numbers add up to the same on both sides, and so do the bottom numbers.
- Uranium-238 (92) gives out an alpha particle: 238 − 4 = **234**, 92 − 2 = **90**, so thorium-234. Alpha decay: **mass number − 4, atomic number − 2**.

3 Beta decay



- Carbon-14 (6) gives out a beta particle: top 14 = ? + 0, so **14**; bottom 6 = ? + (−1), so **7**: nitrogen-14.
- A neutron turns into a proton: one more proton, same total. Beta decay: **mass number the same, atomic number + 1**.

4 Gamma



- **Gamma** is a wave with no mass and no charge, so **neither number changes**. The nucleus only loses some energy.

Exam tip

Check your answer: add up the top row and the bottom row. If both balance, your equation is right.

Check yourself

- 1 Radium-226 (atomic number 88) gives out an alpha particle. New mass number and atomic number?
- 2 Iodine-131 (atomic number 53) gives out a beta particle. New numbers?

Answers: 1. 222 and 86 2. 131 and 54