# CP6 Radioactivity

## CP6a Atomic models

| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
|---|---|---|---|---|
| 7th | Describe the structure of an atom (in terms of nucleus and electrons). | ☐ | ☐ | ☐ |
| 7th | State where most of the mass of an atom is found. | ☐ | ☐ | ☐ |
| 7th | State the sizes of atoms and small molecules. | ☐ | ☐ | ☐ |
| 8th | Describe an early model of the atom. | ☐ | ☐ | ☐ |
| 8th | Describe how and why our model of the atom has changed over time, including the plum pudding model and the Rutherford alpha particle scattering. | ☐ | ☐ | ☐ |

## CP6b Inside atoms

| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
|---|---|---|---|---|
| 7th | State what is meant by an isotope. | ☐ | ☐ | ☐ |
| 8th | Represent isotopes using symbols. | ☐ | ☐ | ☐ |
| 8th | Explain how atoms of different elements are different (in terms of numbers of electrons and protons). | ☐ | ☐ | ☐ |
| 7th | Recall the charges and relative masses of the three subatomic particles. | ☐ | ☐ | ☐ |
| 8th | Explain why all atoms have no overall charge. | ☐ | ☐ | ☐ |

## CP6c Electrons and orbits

| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
|---|---|---|---|---|
| 7th | Describe where electrons are found inside atoms (in terms of shells). | ☐ | ☐ | ☐ |
| 8th | Describe when electrons can change orbit. | ☐ | ☐ | ☐ |
| 7th | Recall what an ion is. | ☐ | ☐ | ☐ |
| 8th | Describe how ionisation occurs. | ☐ | ☐ | ☐ |
| 8th | Describe some of the evidence for the Bohr model of the atom. | ☐ | ☐ | ☐ |

## CP6d Background radiation

| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
|---|---|---|---|---|
| 9th | Explain what background radiation is. | ☐ | ☐ | ☐ |
| 9th | Describe how radiation measurements need to be corrected for background radiation. | ☐ | ☐ | ☐ |
| 8th | List some sources of background radiation. | ☐ | ☐ | ☐ |
| 8th | Describe how photographic film can be used to detect radioactivity. | ☐ | ☐ | ☐ |
| 9th | Describe how a Geiger-Müller tube works. | ☐ | ☐ | ☐ |
| 8th | Describe how the amount of radioactivity can be measured (in terms of the darkness of photographic film or by attaching a counter to a GM tube). | ☐ | ☐ | ☐ |

## CP6e Types of radiation

| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
|---|---|---|---|---|
| 8th | List five types of radiation that are emitted in random processes from unstable nuclei. | ☐ | ☐ | ☐ |
| 8th | State that the five types of radiation are ionising radiations. | ☐ | ☐ | ☐ |
| 8th | Describe what alpha and beta particles are. | ☐ | ☐ | ☐ |
| 8th | Describe the nature of gamma radiation. | ☐ | ☐ | ☐ |
| 11th | Compare the penetrating abilities of alpha, beta and gamma radiation. | ☐ | ☐ | ☐ |
| 11th | Compare the ionisation abilities of alpha, beta and gamma radiation. | ☐ | ☐ | ☐ |

## CP6f Radioactive decay

| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
|---|---|---|---|---|
| 9th | Describe the process of $\beta^-$ decay. | ☐ | ☐ | ☐ |
| 9th | Describe the process of $\beta^+$ decay. | ☐ | ☐ | ☐ |
| 10th | Explain how the proton and mass numbers are affected by different kinds of radioactive decay. | ☐ | ☐ | ☐ |
| 9th | Describe what happens during nuclear rearrangement after radioactive decay. | ☐ | ☐ | ☐ |
| 10th | Balance nuclear equations for mass and charge. | ☐ | ☐ | ☐ |

## CP6g Half-life

| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
|---|---|---|---|---|
| 8th | Describe how the activity of a substance changes over time. | ☐ | ☐ | ☐ |
| 8th | State how half-life can be used to describe the changing activity of a substance. | ☐ | ☐ | ☐ |
| 8th | Recall the unit of activity. | ☐ | ☐ | ☐ |
| 8th | Describe how half-life can be used to work out how much of a substance will decay in a certain time. | ☐ | ☐ | ☐ |
| 10th | Carry out calculations involving half-life. | ☐ | ☐ | ☐ |

## CP6h Dangers of radioactivity

| Step | Learning outcome | Had a look | Nearly there | Nailed it! |
|---|---|---|---|---|
| 8th | Describe the hazards of ionising radiation in terms of tissue damage and possible mutations. | ☐ | ☐ | ☐ |
| 9th | Explain the precautions taken to reduce the risks from radiation and ensure the safety of patients exposed to radiation. | ☐ | ☐ | ☐ |
| 9th | Explain the precautions taken to reduce the risks from radiation and protect people who work with radiation. | ☐ | ☐ | ☐ |
| 9th | Describe the differences between contamination and irradiation effects. | ☐ | ☐ | ☐ |
| 11th | Compare the hazards of contamination and irradiation. | ☐ | ☐ | ☐ |