# PLANNING SUPPORT BOOKLET

**J249**

**For first teaching in 2016**

This support material booklet is designed to accompany the OCR GCSE (9–1) specification in Physics A and Combined Science A (Gateway Science).

***DISCLAIMER***

This resource was designed using the most up to date information from the specification at the time it was published. Specifications are updated over time, which means there may be contradictions between the resource and the specification, therefore please use the information on the latest specification at all times.If you do notice a discrepancy please contact us on the following email address: [resources.feedback@ocr.org.uk](mailto:resources.feedback@ocr.org.uk)

# Introduction

This support material is designed to accompany the OCR GCSE (9-1) specification in Physics A (Gateway) for teaching from September 2016.

The Planning Guidance table on the following pages sets out *suggested* teaching times for the topics within the specification. Note that we always recommend that individual centres plan their schemes of work according to their individual needs. Actual teaching times for topics will depend on the amount of practical work done within each topic and the emphasis placed on development of practical skills in various areas, as well as use of contexts, case studies and other work to support depth of understanding and application of knowledge and understanding. It will also depend on the level of prior knowledge and understanding that learners bring to the course.

The table follows the order of the topics in the specification. It is not implied that centres teach the specification topics in the order shown, centres are free to teach the specification in the order that suites them.

## Delivery guides

The column ‘Delivery guides’ refers to individual teacher guides available from the GCSE Physics A qualification page.

These Delivery guides provide further guidance and suggestions for teaching of individual topics, including links to a range of activities that may be used and guidance on resolving common misconceptions.

## Practical Work

Specification topic p9 (Practical skills) is not included explicitly in the Planning Guidance table. The expectation is that the practical skills are developed throughout the course and in support of conceptual understanding.

Suggestions for where the PAG techniques can be are included throughout the table. This is by no means and exhaustive list of potential practical activities.

| **Topic** | **Teaching hours**  separate / combined | **Delivery Guides** | **PAG opportunities** | |
| --- | --- | --- | --- | --- |
| **Topic 1: Matter** | | | | |
| 1.1 The particle model | 3 / 3 hours | Matter – delivery guide | PAG1: Determine the densities of a variety of objects both solid and liquid | |
| 1.2 Changes of state | 5 / 5 hours | Matter – delivery guide | PAG5: Determine the specific heat capacity of a metal (Activity 1)  PAG5: Kettle design (Activity 2) | |
| **1.3 Pressure (separate science only)** | 6 / 0 hours | Matter – delivery guide |  | |
| **Total for topic 1 = 14 / 8 hours** | | | | |
| **Topic 2: Forces** | | | | |
| 2.1 Motion | 5 / 5 hours | Forces and Motion – delivery guide | PAG3: Investigate acceleration of a trolley down a ramp (Activity 1)  PAG3: Investigating fluid flow (Activity 2) | |
| 2.2 Newton’s laws | 12 / 11 hours | Forces and Motion – delivery guide |  | |
| 2.3 Forces in action | 8 / 4 hours | Forces and Motion – delivery guide | PAG 2: Investigate the effect of forces on springs (Activity 1)  PAG 2: Investigating the effects of forces on the compression of a sample (Activity 2) | |
| **Total for topic 2 = 25 / 20 hours** | | | | |
| **Topic 3 Electricity** | | | | |
| 3.1 Static and Charge | 4 / 3 hours | Electricity – delivery guide |  | |
| 3.2 Simple circuits | 7 / 7 hours | Electricity – delivery guide | PAG6: Investigate the I-V characteristics of circuit elements (Activity 1)  PAG6: Mystery circuit elements (Activity 2)  PAG7: Investigate the brightness of bulbs in series and parallel | |
| **Total for topic 3 = 11 / 10 hours** | | | | |
| **Topic 4 Magnetism** | | | | |
| 4.1 Magnets and magnetic fields | 5 / 5 hours | Magnetism – delivery guide |  | |
| 4.2 Uses of magnetism | 8 / 2 hours | Magnetism – delivery guide |  | |
| **Total for topic 4 = 13 / 7 hours** | | | | |
| **Topic 5 Waves** | | | | |
| 5.1 Wave behaviour | 7 / 4 hours | Waves – delivery guide | PAG4: Measuring the speed, frequency and wavelength of a wave (Activity 1)  PAG4: Tsunami (Activity 2)PAG4: Measuring the speed, frequency and wavelength of a wave | |
| 5.2 The electromagnetic spectrum | 4 / 4 hours | Waves – delivery guide |  | |
| 5.3 Wave interactions | 5 / 1 hours | Waves – delivery guide | PAG8: Investigate the reflection of light off a plane mirror and the refraction of light through prisms (Activity 1)  PAG8: Reflection within a material (Activity 2) | |
| **Total for topic 5 = 16 / 9 hours** | | | | |
| **Topic 6 Radioactivity** | | | | |
| 6.1 Radioactive emissions | 6 / 6 hours | Radioactivity – delivery guide |  | |
| 6.2 Uses and Hazards | 5 / 1 hours | Radioactivity –delivery guide |  | |
| **Total for topic 6 = 11 / 7 hours** | | | | |
| **Topic 7 Energy** | | | | |
| 7.1 Work done | 5 / 5 hours | Energy – delivery guide |  | |
| 7.2 Power and efficiency | 6 / 6 hours | Energy – delivery guide |  | |
| **Total for topic 7 = 11 / 11 hours** | | | | |
| **Topic 8 Global Challenges** | | | | |
| 8.1 Physics on the move | 5 / 4 hours | Global challenges – delivery guide |  | |
| 8.2 Powering Earth | 6 / 5 hours | Global challenges – delivery guide |  | |
| **8.3 The Earth and beyond (separate science only)** | 8 / 0 hours | Global challenges – delivery guide |  | |
| **Total for topic 8 = 19 / 9 hours** | | | | |
| **Total teaching hours = 120 / 81 hours** | | | |

🗹 This symbol indicates content that is found only in the physics separate science qualification.

# Outline Scheme of Work: P6 – Radioactivity

## Total suggested teaching time – 11 / 7 hours

### P6.1 Radioactive emissions (6 / 6 hours)

|  |  |
| --- | --- |
| Links to KS3 Subject content  * a simple (Dalton) atomic model * differences between atoms, elements and compounds * atoms and molecules as particles | |
| Links to Mathematical Skills  * M1b * M1c * M3c * M3d * M4a * M4c * M5b | Links to Practical Activity Groups (PAGs)  * N/A |

# Overview of P6.1 Radioactive emissions

| **Lesson** | **Statements** | **Teaching activities** | **Notes** |
| --- | --- | --- | --- |
| 1 (1hr for separate and combined) | P6.1a recall that atomic nuclei are composed of both protons and neutrons, that the nucleus of each element has a characteristic positive charge  P6.1b recall that atoms of the same elements can differ in nuclear mass by having different numbers of neutrons  P6.1c Use the conventional representation for nuclei to relate the differences between isotopes | **Starter:**The scale of the universe 2  This popular interactive allows users to scroll through orders of magnitude of scale with examples of objects of relevant sizes, from the observable universe down to the Planck length.  [View full activity in P5.1 What is radioactivity? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-physics-b-j259-from-2016/delivery-guide/topic-gpbt05-p5-radioactive-materials/delivery-guide-gpbdg018-p51-what-is-radioactivity?activity=291337#291337)  **Main options**: Atoms and nuclei  A series of experiments, which help to develop ideas of the atom.  <https://spark.iop.org/collections/model-atom>  Build an atom: An interactive app allowing users to build an atom  [View full activity in P5.1 What is radioactivity? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-physics-b-j259-from-2016/delivery-guide/topic-gpbt05-p5-radioactive-materials/delivery-guide-gpbdg018-p51-what-is-radioactivity?activity=291323#291323)  **Plenary options:** Get pupils to write their own definitions of isotopes giving examples. Swap and improve.  What are atoms and isotopes?  A short (3 minutes), simple video about the structure of atoms and the nature of isotopes.  [View full activity in P5.1 What is radioactivity? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-physics-b-j259-from-2016/delivery-guide/topic-gpbt05-p5-radioactive-materials/delivery-guide-gpbdg018-p51-what-is-radioactivity?activity=291331#291331) | Link to delivery guide: Radioactive decay – Waves and Particles  <https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/> |
| 2 (1hr for separate and combined) | P6.1d recall that some nuclei are unstable and may emit alpha particles, beta particles, or neutrons, and electromagnetic radiation as gamma rays  P6.1e relate these emissions to possible changes in the mass or the charge of the nucleus, or both | **Starter options:** Misconceptions about radioactivity  A number of simulations, which focus on misconceptions learners may encounter.  [View full activity in 6.1 Radioactive emissions – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/delivery-guide-gpadg014-p61-radioactive-emissions?activity=287945#287945)  types of radioactive emissions  <https://www.youtube.com/watch?v=5oUagoF_viQ>  **Main:** Teaching radioactivity  Videos, animations and resources, which are useful when teaching radioactivity.  [View full activity in 6.1 Radioactive emissions – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/delivery-guide-gpadg014-p61-radioactive-emissions?activity=287938#287938)  **Plenary:** card sort for alpha, beta and gamma emissions. Relating the change in mass/ charge etc. to the emission produced. | Link to delivery guide: [Radioactive decay – Waves and Particles](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/) |
| 3 (1hr for separate and combined) | P6.1f use names and symbols of common nuclei and particles to write balanced equations that represent radioactive decay  P6.1g balance equations representing the emission of alpha-, beta- or gamma-radiations in terms of the masses, and charges of the atoms involved (M1b, M1c, M3c) | **Starter:** Elements, atomic radii and the periodic radii  A web page featuring a version of the periodic table in which elements are represented as circles of sizes proportional to their atomic radii.  [View full activity in P5.1 What is radioactivity? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-physics-b-j259-from-2016/delivery-guide/topic-gpbt05-p5-radioactive-materials/delivery-guide-gpbdg018-p51-what-is-radioactivity?activity=291320#291320)  **Main:** Go through an example of how to write balanced equations for the different types of emission, get pupils to work through a couple of examples together as a class. Pupils should be given plenty of practice in writing decay equations  **Plenary:** Decay equations worksheet  A good worksheet for learners to fill in the correct numbers to balance nuclear decay equations.  [View full activity in 6.1 Radioactive emissions – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/delivery-guide-gpadg014-p61-radioactive-emissions?activity=287949#287949) | Link to delivery guide: [Radioactive decay – Waves and Particles](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/) |
| 4 (1hr for separate and combined) | P6.1h recall that in each atom its electrons are arranged at different distances from the nucleus, that such arrangements may change with absorption or emission of electromagnetic radiation and that atoms can become ions by loss of outer electrons  P6.1i recall that changes in atoms and nuclei can also generate and absorb radiations over a wide frequency range | **Starter:** The discovery of the electron and the discovery of the atomic nucleus  Two short (around three minutes each) videos, featuring Professor Brian Cox, about some of the experiments leading to the discovery of atomic structure.  [View full activity in P5.1 What is radioactivity? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-physics-b-j259-from-2016/delivery-guide/topic-gpbt05-p5-radioactive-materials/delivery-guide-gpbdg018-p51-what-is-radioactivity?activity=291313#291313)  They may have already covered this in Chemistry to use questioning to assess pupils prior knowledge and understanding.  **Main:** Definition and structures  <https://www.tes.com/teaching-resource/isotopes-6177149>  **Plenary:** SAM question J259-04 Question 9  <http://www.ocr.org.uk/Images/234636-unit-j259-04-depth-in-physics-higher-tier-sample-assessment-material.pdf> | Link to delivery guide: [Radioactive decay – Waves and Particles](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/) |
| 5 (1hr for separate and combined) | P6.1j explain the concept of half-life and how this is related to the random nature of radioactive decay  **P6.1k calculate the net decline, expressed as a ratio, during radioactive emission after a given (integral) number of half-lives (M1c, M3d)** | **Starter options:** Teaching radioactivity  Videos, animations and resources, which are useful when teaching radioactivity.  [View full activity in 6.1 Radioactive emissions – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/delivery-guide-gpadg014-p61-radioactive-emissions?activity=287938#287938)  half-life <https://www.youtube.com/watch?v=0vFHPfnW0Rc>  **Main options:** Skittlarium  A practical to illustrate half-life and half-life graphs using skittles or smarties. Good introduction to half-lives.  [View full activity in 6.1 Radioactive emissions – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/delivery-guide-gpadg014-p61-radioactive-emissions?activity=287943#287943)  Simple model of exponential decay  A simple experiment involving the tossing of coins which provides an analogy for radioactive decay in order to help users understand the concept of a half-life.  <https://spark.iop.org/simple-model-exponential-decay>  **Plenary options:** Nuclear physics  An interactive game which shows half-life of different isotopes. A graph is produced from the results. The graph can be annotated and changed/paused.  [View full activity in 6.1 Radioactive emissions – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/delivery-guide-gpadg014-p61-radioactive-emissions?activity=287965#287965)  Give pupils examples of graphs and get then to calculate the half-life in each instance | Link to delivery guide: [Radioactive decay – Waves and Particles](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/) |
| 6 (1hr for separate and combined) | P6.1l recall the differences in the penetration properties of alpha-particles, beta-particles and gamma-rays | **Starter:** Radioactivity and radiation revision  The video is a good revision source, which covers most aspects of the topic.  [View full activity in 6.1 Radioactive emissions – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/delivery-guide-gpadg014-p61-radioactive-emissions?activity=287940#287940)  **Main options:** Demo penetrating powers of different sources using Geiger tube, sources, paper, thin aluminium and lead.  Nature of ionising radiations  A web page containing a succinct digest of the ranges, penetration power and identity.  <https://spark.iop.org/nature-ionising-radiations>  **Plenary options:** Radioactivity PowerPoint  A PowerPoint, which clearly goes through radioactivity along with a quiz at the end.  [View full activity in 6.1 Radioactive emissions – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/delivery-guide-gpadg014-p61-radioactive-emissions?activity=287951#287951)  Plenary: SAM question J249-02 Question 17  <http://www.ocr.org.uk/Images/234626-unit-j249-02-physics-foundation-tier-paper-2-sample-assessment-material.pdf> | Link to delivery guide: [Radioactive decay – Waves and Particles](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/)  Link to [SAM](https://www.ocr.org.uk/Images/234626-unit-j249-02-physics-foundation-tier-paper-2-sample-assessment-material.pdf) |

|  |  |  |
| --- | --- | --- |
| Additional online learning opportunities As a response to the Covid-19 outbreak, additional online learning opportunities were identified for each topic in June 2020. | | |
| Lesson | Statement | Teaching activities |
| 1 | P6.1a, b, c | Activity 1 in this [IOP newsletter](https://spark.iop.org/sites/default/files/media/documents/Classroom%20Physics%20September%202019%20edition.pdf) offers a novel practical activity for students to make conclusions from scattering observations. |
| 3 | P6.1g | [Video](https://www.youtube.com/watch?v=CaYoDxWxww8) explaining how to write decay equations, can be used as flipped learning. |
| 5 | P6.1j.k | Cambridge International [Video](https://ocr.org.uk/rpgphys16) on half-life which can be used as flipped learning. |
| 5 | P6.1j.k | Question 10, paper 4 of this Cambridge International [exemplar resource](https://ocr.org.uk/rpgphys17) can be used as a homework on half-life. |
| 5 | P6.1j.k | Footprints Science Half-life [quiz](https://www.footprints-science.co.uk/index.php?quiz=Half_life) can be used as homework |

# Outline Scheme of Work: P6 – Radioactivity

## Total suggested teaching time – 11 / 7 hours

### P6.2 Uses and Hazards (5 / 1 hours)

|  |  |
| --- | --- |
| Links to KS3 Subject content  * fuels and energy resources | |
| Links to Mathematical Skills  * N/A | Links to Practical Activity Groups (PAGs)  * N/A |

# Overview of 6.2 Uses and Hazards

| Lesson | Statements | Teaching activities | Notes |
| --- | --- | --- | --- |
| 1 (1hr for separate and combined) | P6.2a recall the differences between contamination and irradiation effects and compare the hazards associated with these two  P6.2b explain why the hazards associated with radioactive material differ according to the half-life involved 🗹 | **Starter:** Radiation principles  This video explains the effects of contamination and irradiation.  [View full activity in 6.2 Uses and hazards – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/delivery-guide-gpadg015-p62-uses-and-hazards?activity=288002#288002)  **Main:** Hazards from radioactive materials  A good revision resource which explains the difference between contamination and irradiation.  [View full activity in 6.2 Uses and hazards – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/delivery-guide-gpadg015-p62-uses-and-hazards?activity=288000#288000)  Radioactivity  A clear explanation of why hazards are associated to the half-life time. Good website for research task.  [View full activity in 6.2 Uses and hazards – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/delivery-guide-gpadg015-p62-uses-and-hazards?activity=288004#288004)  **Plenary:** Pupils write definitions of contamination and irradiation. Swap and improve | Link to delivery guide: [Radioactive decay – Waves and Particles](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/) |
| 2 (1hr separate science only) | P6.2c describe the different uses of nuclear radiations for exploration of internal organs, and for control or destruction of unwanted tissue 🗹 | **Starter:** Cancer treatment what happens during radiotherapy?  A short (<5 minutes) video about the use of radiotherapy to treat cancer.  <https://www.youtube.com/watch?v=gDrR_dVmqZk>  **Main:** Uses of radioisotopes  A research activity, which requires learners to work independently, to identify, uses of radioisotopes in medicine. Learner resource 1 is a learner sheet to support this activity.  [View full activity in 6.2 Uses and hazards – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/delivery-guide-gpadg015-p62-uses-and-hazards?activity=288006#288006)  **Plenary:** Isotopes: What are medical isotopes?  A medium-length (<6 minutes) video about the use of radioactive isotopes in PET scanners.  [View full activity in P5.2 How can radioactive materials be used safely? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-physics-b-j259-from-2016/delivery-guide/topic-gpbt05-p5-radioactive-materials/delivery-guide-gpbdg019-p52-how-can-radioactive-materials-be-used-safely?activity=291385#291385)  [SAM](https://www.ocr.org.uk/Images/234630-unit-j249-04-physics-higher-tier-paper-4-sample-assessment-material.pdf) Question J249-04 Question 24 | Link to delivery guide: [Radioactive decay – Waves and Particles](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/)  Link to [SAM](https://www.ocr.org.uk/Images/234630-unit-j249-04-physics-higher-tier-paper-4-sample-assessment-material.pdf) |
| 3 (1hr separate science only) | P6.2d recall that some nuclei are unstable and may split, and relate such effects to radiation which might emerge, to transfer of energy to other particles and to the possibility of chain reactions 🗹 | **Starter options:** What is nuclear fission?  The video can be used as a good way to introduce nuclear fission.  [View full activity in 6.2 Uses and hazards – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/delivery-guide-gpadg015-p62-uses-and-hazards?activity=287994#287994)  chain reactions with lolly sticks <https://www.youtube.com/watch?v=F0jQgGz7GfY>  **Main options:** Nuclear radiation  Simulations, which explain nuclear fission with and without annotation. Can pause, to play at your own pace.  [View full activity in 6.2 Uses and hazards – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/delivery-guide-gpadg015-p62-uses-and-hazards?activity=287998#287998)  Discussion surrounding dangers involved in Nuclear power, learners may have some knowledge of the Chernobyl and the Fukushima disasters.  **Plenary:** Nuclear fusion vs. fission quiz  A quiz which compares nuclear fission with fusion.  [View full activity in 6.2 Uses and hazards – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/delivery-guide-gpadg015-p62-uses-and-hazards?activity=288010#288010)  Nuclear debate. | Link to delivery guide: [Radioactive decay – Waves and Particles](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/) |
| 4 (1hr separate science only) | P6.2e describe the process of nuclear fusion 🗹 | **Starter:** A short (<2 minutes) video about the levels of radioactivity and the potential harm thereof around the site of the Chernobyl disaster.  [View full activity in P5.3 How can radioactive materials be used to provide energy? – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-twenty-first-century-science-suite-physics-b-j259-from-2016/delivery-guide/topic-gpbt05-p5-radioactive-materials/delivery-guide-gpbdg020-p53-how-can-radioactive-materials-be-used-to-provide-energy?activity=291451#291451)  **Main options:** Nuclear fusion  A PowerPoint, which explains nuclear fusion.  [View full activity in 6.2 Uses and hazards – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/delivery-guide-gpadg015-p62-uses-and-hazards?activity=288008#288008)  Use diagrams to explain the process of nuclear fusion and fission and the chain reaction involved  **Plenary:** Nuclear fusion vs fission quiz  A quiz which compares nuclear fission with fusion.  [View full activity in 6.2 Uses and hazards – Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/delivery-guide-gpadg015-p62-uses-and-hazards?activity=288010#288010) | Link to delivery guide: [Radioactive decay – Waves and Particles](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-physics-a-j249-from-2016/delivery-guide/topic-gpat006-p6-radioactive-decay-waves-and-particles/) |
| 5 |  | Pupils to complete the end of chapter quiz P6. After completion pupils to swap and mark quizzes.  Pupils use their quizzes to create a revision list from Chapter 6 | [End of chapter quiz P6](https://interchange.ocr.org.uk/Downloads/Gateway-Physics-Quizzes.zip) is available on OCR interchange: |

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| --- | --- | --- |
| Additional online learning opportunities ***As a response to the Covid-19 outbreak, additional online learning opportunities were identified for each topic in June 2020.*** | | |
| Lesson | Statement | Teaching activities |
| 2 | P6.2c | This BBC Bitesize [guide](https://www.bbc.co.uk/bitesize/guides/z6k6cqt/revision/5)  can be used alongside the learner sheet in the main activity as flipped learning or homework. |



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