VCE Physics

Integrating Unit 2 options as applications across Units 1 and 2 VCE Physics

Content included in the set of eighteen options in VCE Physics Unit 2 Area of Study 2 may be used to support learning across Units 1 and 2 by providing applications that illustrate physics principles and/or providing opportunities for deeper understanding of core concepts. The table below includes examples of how integration may be achieved.

| Unit and area of study | Unit 2 Option | Unit 2 Option: key knowledge that links to another area of study |
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| 1.1 How are light and heat explained? | 2.1 How does physics explain climate change? | ***Unit 2 Option 1 links to Unit 1 Area of Study 1**** Transformation of radiation as it passes through the atmosphere and is absorbed and re-emitted by Earth
* Impact on global warming of the absorption and re-emission of infra-red radiation by greenhouse gases
* Comparison of the total energy across the electromagnetic spectrum emitted by objects at different temperatures
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| 2.8 How can human vision be enhanced? | ***\Unit 2 Option 8 links to Unit 1 Area of Study 1**** Pinhole cameras
* Two-lens telescopes and microscopes
* Correction of short-sightedness and long-sightedness
* Polarised lenses
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| 2.9 How is physics used in photography? | ***Unit 2 Option 9 links to Unit 1 Area of Study 1**** Effect on image formation by polarising lenses, colour filters, aperture size and shutter speed
* Comparison of traditional and digital cameras
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| 2.10 How do instruments make music? | ***Unit 2 Option 10 links to Unit 1 Area of Study 1**** Sound as the transmission of energy via longitudinal pressure waves
* Sound intensity
* Resonance
* Factors that influence natural frequency
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| 2.13 How do astrophysicists investigate stars and black holes? | ***Unit 2 Option 13 links to Unit 1 Area of Study 1**** Methods for investigating light from stars
* Properties of stars
* Hertzsprung-Russell diagram
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| 2.14 How can we detect possible life beyond Earth’s Solar System? | ***Unit 2 Option 14 links to Unit 1 Area of Study 1**** Spectroscopy
* Methods of exoplanet detection
* Targeted and untargeted searches for extra-terrestrial intelligence
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| 2.15 How can physics explain traditional artefacts, knowledge and techniques? | ***Unit 2 Option 15 links to Unit 1 Area of Study 1**** Fishing techniques – refraction
* Weaving patterns in fabrics, baskets: effects on light absorption, transmission and diffraction patterns
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| 2.16 How do particle accelerators work? | ***Unit 2 Option 16 links to Unit 1 Area of Study 1***Use of particle accelerators to produce synchrotron light |
| 2.18 How is contemporary physics research being conducted in our region? | ***Unit 2 Option 18 links to Unit 1 Area of Study 1**** Climate change research
* Research into optical devices
* Space research
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| How is energy from the nucleus utilised? | 2.2 How do fusion and fission compare as viable nuclear energy power sources? | ***Unit 2 Option 2 links to Unit 1 Area of Study 2**** Conversion of nuclear energy into thermal energy for power generation
* Risks and benefits for society of using nuclear energy as a power source
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| 2.6 How is radiation used to maintain human health? | ***Unit 2 Option 6 links to Unit 1 Area of Study 2**** Use of X-rays, medical radioisotopes, CT, MRI, SPECT and PET in medical imaging
* Relationship between properties of α, β, and γ radiation and their uses in medical applications
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| 2.16 How do particle accelerators work? | ***Unit 2 Option 16 links to Unit 1 Area of Study 2**** Use of particle accelerators to collide particles
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| 2.17 How does physics explain the origins of matter?  | ***Unit 2 Option 17 links to Unit 1 Area of Study 2**** Evidence for the Big Bang theory as an explanation of the origins of both time and space
* Discoveries of sub-atomic particles
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| 2.18 How is contemporary physics research being conducted in our region? | ***Unit 2 Option 18 links to Unit 1 Area of Study 2**** Dark matter research
* Research at the Australian Synchrotron
* Nuclear fusion research
* Medical research involving radiation
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| How can electricity be used to transfer energy? | 2.7 How does the human body use electricity | ***Unit 2 Option 7 links to Unit 1 Area of Study 3**** Action potentials
* Heart beat
* Current through, and potential difference across, the human body
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| 2.12 How can AC electricity charge a DC device? | ***Unit 2 Option 12 links to Unit 1 AoS3**** Transformers, diodes, capacitors, voltage regulators, heat and light sensors
* Comparison of light bulbs, LEDs and lasers for their suitability for data transfer
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| How is motion understood? | 2.3 How do heavy things fly? | ***Unit 2 Option 3 links to Unit 2 Area of Study 1**** Modelling the forces acting on an aircraft in flight
* Production of thrust with reference to Newton’s laws of motion
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| 2.4 How do forces act on structures and materials? | ***Unit 2 Option 4 links to Unit 2 Area of Study 1**** Stability of structures, and centre of mass
* Behaviour of materials under load in terms of extension and compression
* Suitability of different materials for use in structures
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| 2.5 How do forces act on the human body? | ***Unit 2 Option 5 links to Unit 2 Area of Study 1**** Application of centre of mass calculations to a body
* Calculation of stress and strain for bone and muscle
* Use of artificial materials in prostheses
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| 2.11 How can performance in ball sports be improved? | ***Unit 2 Option 11 links to Unit 2 Area of Study 1**** Coefficients of static and kinetic friction for sliding and rolling balls
* Spinning sports balls and the Magnus effect
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| 2.15 How can physics explain traditional artefacts, knowledge and techniques? | ***Unit 2 Option 15 links to Unit 2 Area of Study 1**** Motion of indigenous toys, woomeras
* Structures of shelters
* Weaving patterns in fabrics, baskets
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| 2.18 How is contemporary physics research being conducted in our region? | ***Unit 2 Option 18 links to Unit 2 Area of Study 1**** Materials research (improved properties suited for function; e.g. tensile strength)
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