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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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) |