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# VCE UNITS INFORMATION

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## VCE Physics Units 3 and 4

### CONTENT

#### Unit 3

In this unit, students explore the importance of energy in explaining and describing the physical world. They examine the production of electricity and its delivery to homes. Students consider the field model as a construct that has enabled an understanding of why objects move when they are not apparently in contact with other objects. Applications of concepts related to fields include the transmission of electricity over large distances and the design and operation of particle accelerators. They explore the interactions, effects and applications of gravitational, electric and magnetic fields. Students use Newton's laws to investigate motion in one and two dimensions, and are introduced to Einstein's theories to explain the motion of very fast objects. They consider how developing technologies can challenge existing explanations of the physical world, requiring a review of conceptual models and theories.

#### Unit 4

In this unit, students explore the use of wave and particle theories to model the properties of light and matter. They examine how the concept of the wave is used to explain the nature of light and explore its limitations in describing light behaviour. Students further investigate light by using a particle model to explain its behaviour. A wave model is also used to explain the behaviour of matter which enables students to consider the relationship between light and matter. Students learn to think beyond the concepts experienced in everyday life to study the physical world from a new perspective. Students design and undertake investigations involving at least two continuous independent variables.

### OUTCOMES

#### Unit 3

- Students should be able to analyse gravitational, electric and magnetic fields, and use these to explain the operation of motors and particle accelerators and the orbits of satellites
- Students should be able to analyse and evaluate an electricity generation and distribution system
- Students should be able to investigate motion and related energy transformations experimentally, analyse motion using Newton's laws of motion in one or two dimensions, and explain the motion of objects moving at very large speeds using Einstein's theory of special relativity

#### Unit 4

- Students should be able to apply wave concepts to analyse, interpret and explain the behaviour of light
- Students should be able to provide evidence for the nature of light and matter, and analyse the data from experiments that support this evidence
- Students should be able to design and undertake a practical investigation related to waves or fields or motion, and present methodologies, findings and conclusions in a scientific poster