

Physics Units 3 & 4

Unit 3: How do fields explain motion and electricity?

In this unit, students apply Newton's laws to study motion in one and two dimensions. They explore the concept of fields as models used to explain motion observations of objects not in direct contact. Three fundamental fields - gravitational, magnetic, and electric - are compared and contrasted, with focus on their interrelation and impact on particle motion. The importance of fields in electricity production, transmission, and applications like particle accelerators is considered. Additionally, students conduct a practical investigation related to fields, motion, or light, presenting their design, analysis, and findings in a scientific poster format.

Area of Study 1: How do physicists explain motion in two dimensions?

- Investigate motion and energy transformations experimentally.
- Analyse motion using Newton's laws of motion.
- Apply Newton's laws in one and two dimensions

Area of Study 2: How do things move without contact?

- analyse gravitational, electric, and magnetic fields, and apply these to explain the operation of motors and particle accelerators and the orbits of satellites.

Area of Study 3: How are fields used in electricity generation?

- analyse and evaluate an electricity generation and distribution system.

Unit 4: How have creative ideas and investigation revolutionised thinking

This unit explores how theory and experiment shape our understanding of natural phenomena, focusing on pivotal shifts in physics. It covers changes in thinking about light, matter, and energy, transitioning from wave to particle models and vice versa. Students also delve into relativistic concepts near the speed of light and their impact on modern technology like GPS. Additionally, they conduct a practical investigation and present their findings in a scientific poster format.

Area of Study 1: How has understanding about the physical world changed?

- Analyse and apply models explaining the nature of light and matter
- Use special relativity to explain observations at near-light speeds

Area of Study 2: How is scientific inquiry used to investigate fields, motion or light?

- design and conduct a scientific investigation related to fields, motion or light, and present an aim, methodology and method, results, discussion and a conclusion in a scientific poster.