

## Term 2 Year 10 Physics Curriculum Overview

Welcome to the Year 10 Physics curriculum overview. This term, students will continue their studies following the AQA KS4 Physics curriculum. Below is an outline of the topics your child will study, tailored for both Combined Science and Triple Science students, with clear indications where content is specific to Triple Science.

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### Combined and Triple Science: Units 3 and 4 – The Particle Model and Atomic Structure

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#### Unit 3 – The Particle Model of Matter

##### 1. States of Matter

- Students will learn about the three main states of matter: solid, liquid, and gas. They will explore how the arrangement and movement of particles in each state affect the properties of matter, such as density, volume, and shape.
- The kinetic particle theory will be introduced to explain the behavior of particles in different states and how temperature affects the energy and motion of particles.

##### 2. Changes of State

- Students will study how matter changes from one state to another, such as from solid to liquid (melting), liquid to gas (evaporation), and gas to liquid (condensation), understanding the energy changes that occur during these phase transitions.
- They will investigate how heat energy is involved in these changes and learn about latent heat.

##### 3. Density and its Applications

- The concept of density will be introduced, with students learning how to calculate the density of a substance using the formula  $\text{Density} = \frac{\text{Mass}}{\text{Volume}}$
- Students will apply their understanding of density to real-life situations, such as floating and sinking, and how it relates to the structure of materials.

##### 4. Pressure in Gases

- Students will explore the relationship between pressure, volume, and temperature in gases, using the ideal gas model.
  - They will learn how the pressure of a gas is affected by the volume it occupies and the temperature it is at, and how these principles apply to everyday situations, like inflating tires or using a syringe.
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## Unit 4 – Atomic Structure

### 1. Structure of the Atom

- Students will study the basic structure of an atom, including the nucleus (protons and neutrons) and the electron cloud. They will understand how elements are defined by the number of protons (atomic number) and how isotopes vary based on the number of neutrons.
- Key terms like atomic number, mass number, and isotopes will be explored.

### 2. Development of Atomic Models

- Students will trace the history of atomic models, from Dalton's solid sphere model to Thomson's plum pudding model, Rutherford's nuclear model, and Bohr's model.
- The development of the model of the atom over time and the evidence that supported each theory will be discussed.

### 3. Radioactivity

- An introduction to radioactivity, focusing on the discovery of radioactive decay and the three main types of radiation: alpha, beta, and gamma.
- Students will learn about the properties of each type of radiation, their uses, and how they can be detected.
- The concept of half-life will be introduced, with students learning how to calculate the decay of radioactive substances over time.

### 4. Nuclear Reactions

- **Nuclear Fission and Fusion** (Triple Science only)  
Students will study the processes of nuclear fission and fusion, including the principles behind nuclear power and the difference between these two types of nuclear reactions.
  - They will learn about energy released in nuclear reactions and how nuclear energy is harnessed for power generation.

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## Assessment and Skills Development

Throughout this term, students will develop their understanding of the key concepts in the particle model and atomic structure, building their knowledge of both classical and modern physics. Students will participate in practical activities, such as measuring the density of different materials and investigating the properties of gases under different conditions. Assessment will include quizzes, PMT's and end-of-unit tests to track students' understanding and progress.

We look forward to supporting your child in their continued study of Physics!