

## Term 1

Welcome to the Year 8 Science overview for this half-term. As part of our commitment to providing a strong foundation in science, this term your child will focus on deepening their understanding of key concepts from the AQA KS3 Science syllabus. This half-term, Year 8 students will be studying two important units: Energy 1 and Reactions 1. Below is an outline of the topics they will cover and the skills they will develop in each unit.

**Unit 1: Energy 1** In this unit, students will continue building on their knowledge of energy from Year 7, learning more about how energy is transferred and how we use energy in everyday life.

Key topics include:

- Energy Transfers and Transformations: Exploring how energy moves from one store to another and how it can be transformed between different forms such as thermal, kinetic, chemical, and potential energy.
- Conservation of Energy: Revisiting the principle that energy cannot be created or destroyed, only transferred between stores.
- Work Done: Introducing the concept of work done and how energy is transferred when forces move objects, using the formula  $\text{work} = \text{force} \times \text{distance}$ .
- Power and Efficiency: Understanding the concept of power as the rate of energy transfer and calculating efficiency in different devices. Students will learn how to assess how much energy is "useful" and how much is "wasted" in everyday situations.
- Energy Resources: Expanding on renewable and non-renewable energy sources, such as fossil fuels, wind power, and solar energy, and understanding their advantages and disadvantages.
- Global Energy Demand: Exploring how our growing energy needs impact the environment and the importance of using energy efficiently.

Practical investigations will include measuring energy transfers in different systems, such as using pendulums or examining how different materials affect energy loss in insulating objects.

**Unit 2: Reactions 1** This unit introduces students to chemical reactions, focusing on the basic principles that govern how substances interact and change into new substances.

Key topics include:

- Types of Chemical Reactions: Identifying different types of reactions, such as combustion, oxidation, and neutralisation, and understanding how they differ from physical changes.

- **Reactants and Products:** Learning how to represent chemical reactions using word and symbol equations and understanding the difference between reactants and Products.
- **The Particle Model in Reactions:** Exploring how the arrangement and movement of particles change during chemical reactions.
- **Exothermic and Endothermic Reactions:** Investigating reactions that release energy (exothermic) and those that absorb energy (endothermic), and how this affects the surroundings.
- **Acids and Alkalis:** An introduction to acids, alkalis, and the pH scale, focusing on how we can measure and identify these substances.
- **Balancing Simple Chemical Equations:** Learning how to balance basic chemical equations to show the conservation of mass in reactions.

Practical activities will involve conducting simple chemical reactions in the lab, such as testing the reactivity of metals or exploring acid-base neutralisation using indicators.

Following the AQA KS3 Science curriculum, students will deepen their understanding of fundamental concepts in biology and physics.

This half term, they will study Inheritance and Evolution and Friction, Moments, and Hooke's Law. Here is an outline of the topics covered in each area and the learning objectives.

## **Inheritance and Evolution**

In the Inheritance and Evolution unit, students will explore how genetic information is passed from one generation to the next and how organisms change over time through evolution. This topic is designed to develop an understanding of biological diversity and the processes that drive adaptation and survival.

### **1. Genetic Inheritance**

- Students will study the basics of genetics, including how traits are passed down from parents to offspring through genes.
- Key concepts such as DNA, chromosomes, and alleles will be introduced, helping students understand why family members share certain characteristics.
- They will explore dominant and recessive traits, and consider how genetic variation contributes to diversity in plants, animals, and humans.

### **2. Evolution and Natural Selection**

- This topic covers the principles of evolution and the role of natural selection in shaping species.
- Students will learn about the work of Charles Darwin and other scientists, discovering how advantageous traits become more common in a population over generations.
- Students will also examine real-life examples of evolution, such as adaptations in animals and plants, and discuss how environmental changes can drive evolutionary shifts.

## **Friction, Moments, and Hooke's Law**

In this physics-focused unit, students will investigate how forces interact with objects, affecting motion, stability, and structural integrity. They will study friction, turning forces (moments), and Hooke's Law to better understand the effects of forces in everyday Life.

### **1. Friction and its Effects**

- Students will explore friction as a force that opposes motion between surfaces in contact, examining its benefits and drawbacks in various contexts.
- Through practical activities, they will investigate factors that affect frictional force, such as surface type, weight, and movement.
- They will apply their knowledge to real-world examples, such as vehicle movement, the grip of footwear, and how friction is reduced or increased for different applications.

### **2. Moments and Turning Forces**

- This section introduces the concept of moments, or turning forces, which occur when a force acts on a pivot or fulcrum.
- Students will learn about balanced and unbalanced moments and how they affect the stability of objects, using examples like seesaws and door hinges.
- Practical experiments will help students understand how to calculate moments and apply this understanding to problems involving levers and other simple machines.

### **3. Hooke's Law and Elasticity**

- In this topic, students will investigate Hooke's Law, which describes the relationship between force and the extension of elastic materials like springs.
- They will conduct experiments to measure how materials stretch under force and understand how elasticity affects objects in daily life.
- Students will examine the practical uses of Hooke's Law, such as in designing elastic materials and calculating safe loads for structures.