

Year 10 Biology Overview - Term 1

Unit 2: Organisation.

Key topics include:

1. Principles of Organisation

- **Cells, Tissues, and Organs:** Students will review how cells are organised into tissues, how tissues form organs, and how organs work together in organ systems.
- **Hierarchy of Biological Organisation:** Understanding how the structure of organisms becomes more complex as cells group together to perform specific functions.

2. The Digestive System

- **Structure and Function:** Exploring the structure of the human digestive system and how it works to break down food into smaller, absorbable molecules.
- **Enzymes and Digestion:** Students will learn about enzymes and their role as biological catalysts in speeding up chemical reactions, such as the breakdown of carbohydrates, proteins, and fats.
- **Enzyme Action:** Investigating the conditions that affect enzyme activity, including temperature and pH, and understanding the "lock and key" model of enzyme function.

Practical work will include experiments to observe the effect of temperature and pH on enzyme activity, such as the breakdown of starch by amylase.

3. The Circulatory System

- **Structure of the Heart:** Learning about the structure and function of the human heart and how it pumps blood around the body through the circulatory system.
- **Blood Vessels and Blood:** Exploring the different types of blood vessels (arteries, veins, and capillaries) and their roles in transporting blood. Students will also learn about the components of blood—red blood cells, white blood cells, platelets, and plasma—and their specific functions.
- **The Double Circulatory System:** Understanding how the heart pumps blood to the lungs for oxygenation and then around the body to supply oxygen and nutrients to tissues.

4. The Respiratory System

- **Gas Exchange:** Investigating how oxygen is absorbed into the blood and carbon dioxide is removed from it through the process of gas exchange in the lungs.

- **Structure of the Lungs:** Understanding how the lungs are adapted to maximise gas exchange, with a focus on alveoli and their large surface area, thin walls, and good blood supply.

Practical investigations may involve modelling the structure of the lungs and conducting experiments to measure lung capacity.

5. Health and Disease

- **Non-Communicable Diseases:** Exploring how lifestyle factors such as smoking, diet, and exercise impact the risk of developing non-communicable diseases, such as cardiovascular disease.
- **Cancer:** Understanding what cancer is, how it develops, and the factors that can increase the risk of cancer.

We are following the AQA KS4 Biology curriculum, which is designed to build students' scientific knowledge and understanding while preparing them for their GCSEs. Below is an outline of the topics we will be covering this half term for both Combined Science and Triple Science Classes.

Combined Science (Biology) – Topics from Unit 2:

Organisation

Our Combined Science students will focus on developing an understanding of how the human body and plants function. This half term, students will study the following areas:

1. The Respiratory System

- Students will learn about the structure and function of the human respiratory system, including the trachea, lungs, and alveoli.
- We will explore how gas exchange takes place in the lungs and the role of the respiratory system in providing oxygen for respiration and removing carbon dioxide from the body.
- Students will examine the effects of exercise on the respiratory system and the impact of various lifestyle factors, such as smoking.

2. The Circulatory System

- This topic focuses on the structure and function of the circulatory system, including the heart, blood vessels, and blood.
- Students will study how blood transports essential nutrients, oxygen, and waste products to and from cells, and how the heart pumps blood through the circulatory system.
- We will also discuss factors affecting heart health and the role of lifestyle in preventing cardiovascular disease.

3. Plant Organisation

- In this section, students will learn about the structure and function of plant tissues, organs, and systems.
- We will cover how plants transport water, minerals, and food through xylem and phloem, and how they are adapted to carry out photosynthesis effectively.
- Students will also explore the process of transpiration and the factors that affect the rate of water loss in plants.

Triple Science (Biology) – Topics from Unit 2 and Introduction to Unit 3: Infection and Response

In addition to studying the same topics covered in Combined Science (listed above), our Triple Science students will begin studying Unit 3: Infection and Response. This section introduces concepts that help students understand how the body protects itself from pathogens and how we can support the immune system.

1. Introduction to Infection and Response (Unit 3)

- Students will learn about different types of pathogens, including bacteria, viruses, fungi, and protists, and how they cause disease.
- We will discuss the human body's primary defenses against infection, such as the skin, mucus, and immune system.
- Students will also study how vaccines work and explore the role of immunization in preventing disease spread.

Assessment and Skills Development

Throughout this half term, students will engage in practical investigations to reinforce their learning and develop essential scientific skills, such as observation, hypothesis formulation, and data analysis. Assessment will include short quizzes, homework tasks, and end-of-topic tests to check understanding and provide feedback.