

## Curriculum Summary – Biology (Year 10)

### Autumn

#### **B1: Cells and organisation**

In this chapter students will:

- Learn about microscopy and cells, including how to differentiate between animal and plant cells, differentiate between eukaryotic and prokaryotic cells, and identify adaptations of specialised animal and plant cells. They will also be able to use the formula  $M=I/A$ .
- Learn about the transport of material into and out of cells by diffusion, osmosis, and active transport and how to explain adaptations of exchange surfaces.

#### **B2: Cell division**

In this chapter students will:

- Learn about the process of cell division, how to describe the three overall stages of the cell cycle, and develop an understanding of mitosis as a stage within the cell cycle.
- Make connections between cell differentiation and the specialised cells and adaptations they studied in *Chapter B1 Cell structure and transport*.
- Learn that stem cells are undifferentiated cells that have the potential to become a specialised cell within an organism and will be able to describe some of the uses of stem cells.

#### **B3: Organisation and the digestive system**

In this chapter students will:

- Learn about the principles of organisation. They will be able to define a tissue, an organ, and an organ system.
- Study the human digestive system and understand the hierarchical organisation of the digestive system.
- Recognise carbohydrates, proteins, and lipids, name the molecules they are broken down into and name the enzymes that do this.
- Learn about enzyme action, the lock and key model and be able to define enzymes as biological catalysts.

### Spring

#### **B4: Organising animals and plants**

In this chapter students will:

- Learn about the organisation of animals and plants and will be able to recognise the components of blood and describe their functions.
- Recognise the three main types of blood vessel, link their structures with their functions, and understand the importance of a double circulatory system.
- Student will study the main structures of the heart and related heart problems and treatments.
- Study gas exchange in the lungs and how alveoli are adapted to maximise gas exchange.
- Study the major organs in plants, their functions and how they relate to transpiration.

#### **B5: Communicable disease**

In this chapter students will:

- Learn how health is affected by communicable, different pathogens that cause disease and how the spread of disease can be prevented.
- Describe the different pathogens, the symptoms and treatments of a range of different animal and plant diseases, and the different defence mechanisms of the human body and plants.

#### **B6: Preventing and treating disease**

In this chapter students will:

- Learn how vaccinations and the immune system works.
- Study the treatment of disease by drugs including painkillers and antibiotics.
- Study the discovery of drugs in plants and microbes, including the discovery of penicillin. They will also learn about how drugs are made today to be effective and safe and be able to outline the processes of clinical trials including double blind trials and using placebos.

## **Summer**

### **B7: Non communicable diseases**

In this chapter students will:

- Study non-communicable diseases and should understand what is meant by risk factors for a disease. They will analyse the impact of disease at several different levels and be able to read graphs and quote data to support correlations and causations.
- Study cancer and the different types of tumour, along with the general causes and treatment of cancer.
- Learn about the risks of diseases from smoking and obesity and the effects of diet and exercise on health.
- Study the link between alcohol and health and should understand the effect of alcohol on the brain and liver, and of drinking alcohol during pregnancy.

### **B8: Photosynthesis**

In this chapter students will:

- Study photosynthesis in both plants and algae and be familiar with the word and symbol equation for photosynthesis.
- Study the adaptations of leaves to achieve maximum efficiency in photosynthesis and factors that affect the rate of photosynthesis
- Analyse two or three factors displayed on a graph, deciding which factor is limiting and be confident describing the inverse square law as applied to light intensity.
- Learn about how glucose is stored, how it can be used to make lipids and also how nitrate ions are needed to produce protein.
- Evaluate the use of greenhouses and study how the conditions can be monitored and manipulated to achieve the highest rate of photosynthesis.

### **B9: Respiration**

In this chapter students will:

- Describe the process of respiration and write the word and balanced symbol equation.
- Learn about mitochondria as the site of respiration and will be able to list examples of living processes that need the energy released from respiration.
- Study the response of humans to exercise, including changes in heart rate, breathing rate, and breakdown of glycogen, all to increase the rate of respiration in muscle cells.
- Study anaerobic respiration in animal and plant cells, including fermentation and the balanced symbol equation for fermentation.