

Y9 Biology Curriculum 2023-2024

(v)

Sept/Oct Half Term 1

B1 Cell Biology

B1.1 Cell Structure

Name the main organelles of plant and animal cells (eukaryotic cells).

Recall the relative size of bacterial cells (prokaryotic cells).

Describe the difference in how the genetic material is found within eukaryotic and prokaryotic cells.

Explain how the main sub-cellular structures, including the nucleus, cell membranes, mitochondria, cell wall and chloroplasts in plant cells and plasmids in bacterial cells are related to their functions.

Explain how the structure of different types of cell relates to their function in a tissue, an organ or organ system, or the whole organism. Including sperm cells, nerve cells and muscle cells in animals, and root hair cells, xylem and phloem cells in plants.

Describe cell differentiation.

Describe the differences in magnification and resolution between electron and light microscopes.

Define binary fission .

Required Practical Activity 1: Use a light microscope to observe, draw and label a selection of plant and animal cells. A magnification scale must be included.

B1.2 Cell Division

Recall that the nucleus of a cell contains chromosomes made of DNA molecules. Each chromosome carries a large number of genes. In body cells, the chromosomes are normally found in pairs.

Give an overview of mitosis.

Understand that cell division by mitosis is important in the growth and development of multicellular organisms.

Recognise and describe situations where mitosis is occurring.

HALF TERM

Nov/Dec Half Term 2

Define a stem cell.

Recall that stem cells from human embryos and adult bone marrow can be cloned and made to differentiate into many different types of human cells.

Name some conditions which may be helped by treatment with stem cells.

Discuss the ethical or religious objections and potential risk of stem cell use.

Recall that stem cells from meristems in plants can be used to produce clones of plants quickly and economically, and describe possible uses.

B1.3 Transport in Cells

Explain how substances may move into and out of cells across the cell membranes via diffusion.

Describe diffusion.

Recall that some of the substances transported in and out of cells by diffusion are oxygen and carbon dioxide in gas exchange, and the waste product urea from cells into the blood plasma for excretion in the kidney.

Describe factors that affect the rate of diffusion.

Recall that a single-celled organism has a relatively large surface area to volume ratio to allow sufficient transport of molecules into and out of the cell.

Explain how the small intestine and lungs in mammals, gills in fish, and roots and leaves in plants are adapted for exchanging materials.

List factors that increase the effectiveness of an exchange surface.

Describe osmosis.

Required Practical Activity 3: Investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue.

Recall that active transport moves substances from a more dilute solution to a more concentrated solution (against a concentration gradient). This requires energy from respiration.

Link the structure of a root hair cell to its function.

Describe a use for active transport in both plants and animals.

Explain the difference between diffusion, osmosis and active transport.

CHRISTMAS HOLIDAY

		CHRISTMAS HOLIDAY	(v)
Jan/Feb Half Term 3	B2 Organisation		
	2.1 Principles of Organisation		
	Explain organisational hierarchy.		
	Define a cell, tissue, organ and organism.		
	2.3 Plant Tissues, Organs and Systems		
	Know the function of epidermal tissues, palisade mesophyll, spongy mesophyll, xylem and phloem, and meristem tissue.		
	Describe the structures of tissues in the leaf and relate to their functions.		
	Explain how root hair cells are adapted for the efficient uptake of water and mineral ions.		
	Know the structure and function of xylem tissue.		
	Define factors which affect the rate of transpiration.		
	Explain the role of stomata and guard cells.		
Explain the role of phloem tissue and name this process.			
		HALF TERM	
March/April Half Term 4	B4 Bioenergetics		
	4.1 Photosynthesis		
	State the word equation for photosynthesis.		
	Write a balanced symbol equation for photosynthesis.		
	Explain where the energy for photosynthesis comes from.		
	State the factors that affect the rate of photosynthesis.		
	Explain limiting factors.		
	Explain graphs of photosynthesis rate involving two or three factors and decide which is the limiting factor.		
	Understand and use inverse proportion – the inverse square law and light intensity in the context of photosynthesis.		
	Explain how limiting factors are important in the economics of enhancing the conditions in greenhouses to gain the maximum rate of photosynthesis while still maintaining profit .		
	Required Practical Activity 6: Investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed.		
State the six uses of glucose by plants.			
Know how plants use nitrate ions that are absorbed from the soil.			
		EASTER HOLIDAY	
April/May Half Term 5	2.2 Animal Tissues, Organs and Organ Systems		
	Know that the digestive system is an example of an organ system in which several organs work together to digest and absorb food.		
	Relate knowledge of enzymes to metabolism.		
	Describe the structure, function and optimum conditions for enzymes.		
	Define denaturation.		
	Recall the sites of production and the action of amylase, proteases and lipases.		
	Know that digestive enzymes convert food into small soluble molecules that can be absorbed into the bloodstream.		
	State that the products of digestion are used to build new carbohydrates, lipids and proteins. Some glucose is used in respiration.		
	Recall where bile is made and stored, and its pH and function.		
	State conditions that increase the rate of fat breakdown by lipase.		
	Required Practical Activity 4: Use qualitative reagents to test for a range of carbohydrates, lipids and proteins.		
Required Practical Activity 5: Investigate the effect of pH on the rate of reaction of amylase enzyme.			
		HALF TERM	
Key Skills This Year	Using a microscope and calculating size of specimens from drawings and photographs		
	Calculations of percentage change/median/mode		
	Plotting graphs and bar charts		
	Safe use of laboratory apparatus, following instructions, and collecting and analysing results		