BEACONSFIELD HIGH SCHOOL

Y9 Biology Grade Descriptors

In Science (Biology, Chemistry and Physics), students begin their GCSE courses at the start of Year 9. As a result, the attainment descriptors used within Science (Developing, Proficient, Confident and Mastery) are directly aligned to GCSE grading standards for Year 9. These descriptors will reflect how much progress they are making this year and will be the students' current working level in relation to GCSE expectations in science only. They should be interpreted alongside the corresponding GCSE grade ranges shown below.

- Developing GCSE grade 3-4
- Proficient GCSE grade 4-5
- Confident GCSE grade 5-6
- Mastery GCSE grade 6-7

Topic	**Developing**	**Proficient**	**Confident**	**Mastery**
Cell Structure	• Identify plant, animal, and prokaryotic cells from diagrams. • Name main parts of cells and state basic functions. • Know some names of specialsed cells • Use a light microscope and prepare a simple slide. • State why microscopes are useful in cell biology. • Define magnification and calculate total magnification.	• Compare plant and animal cells and describe adaptations. • Explain differences between eukaryotic and prokaryotic cells. • Describe some features of specialsed cells • Use a microscope to study cells and draw scientific diagrams. • Describe advantages and disadvantages of light vs electron microscopes. • Calculate magnification and use field of view	• Explain how cell structures relate to their functions. • Justify the use of electron microscopes. • Describe and explain features of specialised cells • Use magnification formula and rearrange it to calculate real sizes. • Describe how use a microscope to observe cells and the need for staining cells • Know how to draw and label a cell scientifically	• Design a specialised cell, tissue, or organ for a specific function. • Perform calculations using standard form • Know how to convert units for magnification calculations • Understand orders of magnitude • Evaluate the method used to set up a microscope to observe cells • Use field of view equation to calculate magnification
Cell Division	• State that mitosis is a stage in cell division.	• Describe situations where mitosis occurs and why chromosomes are paired.	• Explain why genetic material doubles during mitosis.	• Explain stages of the cell cycle in detail.

	• Recall that body cells have 46 chromosomes and gametes have 23. • Define growth and differentiation. • State meaning of keywords (mitosis, chromosomes, gene, gametes). • State that stem cells are undifferentiated cells. • List simple arguments for and against stem cell use.	• Explain the importance of cell differentiation in multicellular organisms. • Compare embryonic and adult stem cells. • Explain how tissue culture creates plant clones. • Describe the uses of stem cells in medicine. • Explain reasons for ethical objections to stem cells.	• Compare differentiation in plants and animals. • Explain why plant cloning is easier than animal cloning. • Write structured articles on stem cell applications. • Describe therapeutic cloning and its uses. • Communicates well-constructed arguments in discussions.	• Evaluate stem cell use with strong, well-researched arguments. • Carry out practical cloning accurately and safely. • Write persuasive articles using precise vocabulary and real-life examples. • Explain and evaluate therapeutic cloning processes. • Suggest improvements to cloning and stem cell techniques.
Transport in Cells	• Define diffusion and list factors affecting its rate. • Describe osmosis and its effect on cells. • State that active transport moves substances against a concentration gradient using energy. • Identify where active transport occurs. • State that single-celled organisms have a large surface area to volume ratio. • Calculate surface area to volume ratio for simple shapes.	• Predict substance movement across membranes. • Explain why active transport is important. • Compare diffusion, osmosis, and active transport. • Write hypotheses using scientific knowledge. • Explain why multicellular organisms need exchange surfaces. • Describe adaptations that increase effectiveness of exchange surfaces.	• Explain how temperature and concentration gradient affect diffusion. • Use terms isotonic, hypotonic, hypertonic to explain osmosis. • Suggest how cells adapt for active transport. • Plan investigations into osmosis and diffusion. • Calculate percentage change and plot graphs with best-fit lines. • Explain how surface area relates to leaf shape and gas exchange.	• Design and evaluate models for active transport. • Write detailed investigation plans independently. • Use graphs to estimate internal concentrations in plant cells. • Link diffusion principles to adaptations of exchange surfaces. • Calculate surface area to volume ratios for complex shapes. • Evaluate limitations of models and suggest improvements.

Enzymes & Digestion	• State examples of cells, tissues, organs, and organ systems. • Identify organs of the digestive system and their basic functions. • Recall food molecules: carbohydrates, lipids, proteins. • State that enzymes are biological catalysts. • State that temperature and pH affect enzyme activity. • Recall that bile is produced by the liver.	• · Define tissue, organ, and organ system. • Summarise the process of digestion and enzyme roles. • Describe structure of simple sugars, starch, lipids, and proteins. • Use lock-and-key theory to explain enzyme function. • Plan and carry out simple investigations on enzyme activity. • Describe functions of bile and its role in digestion.	• Explain why cells are organised into tissues and organs. • Explain adaptations of the small intestine for absorption. • Carry out multiple food tests and design clear results tables. • Explain how temperature and pH affect enzyme activity. • Plot graphs and draw conclusions from enzyme investigations. • Explain how bile increases efficiency of fat digestion.	• Relate levels of organisation to organ systems with examples. • Explain enzyme control of metabolism and digestion efficiency. • Analyse and evaluate methods and conclusions from experiments. • Apply knowledge of food molecules to give diet advice. • Calculate mean rates of enzyme-catalysed reactions. • Evaluate models of digestion and suggest improvements.
Respiration	• State the word equation for aerobic respiration. • List ways organisms use energy (movement, synthesis, temperature control). • Identify a control in a simple investigation. • Describe how heart rate, breathing rate, and breath volume change with exercise. • State the word equation for anaerobic respiration in animals and plants. • Define metabolism as the sum of all chemical	• Write the balanced symbol equation for aerobic respiration. • Explain why respiration is an exothermic reaction. • Plan an investigation that includes an appropriate control. • Explain why heart rate and breathing rate increase during exercise. • Compare aerobic and anaerobic respiration and their energy yields. • Describe the liver's role in repaying oxygen debt.	• Apply understanding of respiration in unfamiliar contexts. • Explain why glycogen stores change with exercise. • Justify the choice of a control in an investigation. • Explain oxygen debt and its clearance after exercise. • Interpret data on fermentation and respiration rates. • Explain links between diet and urea concentration in urine.	• Evaluate alternative methods for measuring respiration. • Analyse exercise data to draw valid conclusions. • Design and justify an investigation comparing aerobic and anaerobic conditions. • Critically assess claims about metabolism and energy use. • Explain coordinated responses across systems during prolonged exercise. • Integrate knowledge of respiration and metabolism to predict

	reactions in a cell or organism.			impacts of lifestyle changes.
Photosynthesis	• Describe how plants obtain basic materials needed for growth (water, minerals, carbon dioxide). • State the word equation for photosynthesis. • Describe why plants need light for photosynthesis. • List the factors that affect the rate of photosynthesis. • State simple relationships between limiting factors and the rate of photosynthesis. • Plot a basic line graph and writes a simple conclusion.	• Describe how the leaf is adapted for photosynthesis. • Write the balanced symbol equation for photosynthesis. • Describe an experiment showing that plants photosynthesise in light. • Explain why low temperature, low CO_2, low light, or low chlorophyll limit the rate of photosynthesis. • Suggest which factor is limiting the rate in a given situation and can identify the limiting factor from a graph • Describe how to carry out a controlled photosynthesis investigation and can plot a line graph	• Explain how leaf adaptations make photosynthesis efficient. • Apply knowledge of enzymes to explain why temperature affects rate of photosynthesis • Predict how the rate will change when multiple limiting factors interact. • Describe all the ways plants use glucose, including protein synthesis. • Describe the benefits of greenhouses and hydroponics. • Evaluate the method of a photosynthesis rate investigation and plot a graph with line of best fit.	• Give detailed explanations of how leaf adaptations maximise photosynthetic efficiency. • Use the inverse square law to calculate and interpret light intensity in photosynthesis contexts. • Explain how carnivorous plants are adapted to low nutrient environments. • Explain how and why plants convert glucose to starch for storage. • Analyse how greenhouses control limiting factors to maximise yield, using data to comment on cost effectiveness. • Evaluate the method and conclusion of a photosynthesis investigation and accurately interpret graphical data.