



Science Department Biology Curriculum and Assessment Map

	Half Term 1		Half-Term 2		Half Term 3	Half Term 4	Half Term 5	Half Term 6
Year 10	Transport in Cells	Organisation and the Digestive System	Bioenergetics: Respiration	Blood, blood vessels and the heart	Non-Communicable Disease	Health and Disease	Plants tissues, organs and systems	Bioenergetics: Photosynthesis
Fundamental Knowledge	<ol style="list-style-type: none"> Describe how substances move by diffusion. Identify factors which affect the rate of diffusion and explain why this occurs. Define the term 'osmosis'. Define the term 'active transport'. Describe where active transport occurs in humans and 	<ol style="list-style-type: none"> Define the terms tissue, organ, and organ system and order in terms of their sizes. Suggest the function of glandular, epithelial, and muscular tissue in organs. Name the organs of the digestive system and state the role of the digestive system. Describe the function of the organs in the digestive system. Key Practical Skill: carry out food tests for carbohydrates, lipids and proteins. 	<ol style="list-style-type: none"> State what is meant by 'aerobic respiration' and write a word equation for this reaction. Identify respiration as an exothermic or endothermic reaction and explain why. Describe the uses of the energy transferred by respiration. List the main structures of the gas exchange system. Describe how the lungs are adapted for gaseous exchange. 	<ol style="list-style-type: none"> State the main components of blood and recognise from a photograph or diagram. Describe the function of each part of the blood and describe how the different blood cells are adapted for function. Identify the three main types of blood vessel and recognise them in diagrams. Describe the structure and function of the three main types of blood vessel and explain how the structure relates to function. Estimate heart rate and carry out rate calculations for blood flow. 	<ol style="list-style-type: none"> State what is meant by 'health'. State what a non-communicable disease is and give examples. State what risk factors are and identify examples of what they can be. State what cancer is. Describe the characteristics of a benign tumour. Describe the characteristics of a malignant tumour. State what a carcinogen is and recognise them as risk factors for cancer. 	<ol style="list-style-type: none"> Define the term 'pathogen' and identify examples of pathogens. Describe the ways in which disease can be spread. Describe how bacteria and viruses make us feel ill. Explain how the spread of diseases can be reduced or prevented. For the following viral diseases, describe the symptoms, ways in which they are spread and methods to reduce spread: measles, HIV, TMV. 	<ol style="list-style-type: none"> Describe the structure of plant cells, the function of organelles and explain how specialised cells plant cells are adapted for their function. Define the term 'osmosis'. Osmosis Required Practical: Investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue. Define photosynthesis and state the word equation for the photosynthesis reaction. Recognise the chemical symbols for carbon dioxide, water, oxygen and glucose and construct a balanced symbol equation for photosynthesis. 	<ol style="list-style-type: none"> Define photosynthesis and state the word equation for the photosynthesis reaction. State what is meant by a limiting factor and identify the limiting factors of photosynthesis. Explain the effects of temperature, light intensity, carbon dioxide concentration and the amount of chlorophyll on the rate of photosynthesis and interpret graphs

	<p>plants and what is transported.</p> <p>6. Describe the differences between diffusion, osmosis and active transport.</p> <p>7. Calculate and compare surface area: volume ratios.</p> <p>8. Explain how the small intestine and lungs in mammals, and roots and leaves in plants, are adapted for exchange of substances.</p>	<p>6. Describe the food test and positive result for: sugars, starch, protein and lipids.</p> <p>7. State what enzymes are.</p> <p>8. Use the lock and key theory to describe enzyme action and to explain why enzymes are specific.</p> <p>9. Describe the general role of digestive enzymes.</p> <p>10. Identify the enzymes that break down carbohydrates, starch, proteins and lipases.</p> <p>11. Identify what carbohydrates, proteins and lipids are broken down into during digestion.</p> <p>12. Describe what the products of digestion are used for.</p> <p>13. Identify where amylase, proteases and lipases are produced and where they work.</p> <p>14. Describe and explain the effect of temperature and pH on enzyme activity.</p> <p>15. Calculate rate of chemical reactions controlled by enzymes.</p> <p>16. Key Practical Skill: investigate the effect of pH on the rate of</p>	<p>6. State what 'anaerobic respiration' is and write an equation for this process in muscles.</p> <p>7. Give examples of the situations in which anaerobic respiration takes place in cell.</p> <p>8. State whether anaerobic respiration transfers more or less energy than aerobic and explain why.</p> <p>9. Write a word equation for the anaerobic respiration in yeast and plant cells.</p> <p>10. State what anaerobic respiration in yeast cells is called and explain the importance of this is baking and brewing.</p> <p>11. Describe and explain the changes that occur to the body during exercise.</p> <p>12. Explain what is meant by the oxygen debt and why it occurs.</p> <p>13. Describe the role of the liver in removing lactic acid from the blood.</p> <p>14. State what metabolism is.</p>	<p>6. State the function of the heart.</p> <p>7. Label a diagram to show the structure of the heart, identifying atria, ventricles, aorta, vena cava, pulmonary artery, pulmonary vein and coronary arteries.</p> <p>8. Describe the double circulatory system, include the role of the left and right ventricle and identified blood vessels (see list above).</p> <p>9. Describe what is meant by a natural pacemaker and identify the location of the group of cells that control this in the human heart.</p> <p>10. Describe why a person may need an artificial pacemaker.</p> <p>11. State what coronary heart disease is and describe the problems that this can lead to.</p> <p>12. Describe the use of stents and statins as treatments of coronary heart disease.</p> <p>13. Identify the consequences of faulty heart valves and describe how this could be treated using biological or mechanical valve replacements.</p> <p>14. Describe the use of heart/heart and lung transports or artificial hearts.</p>	<p>8. Describe the effects of diet, smoking and exercise on cardiovascular disease.</p> <p>9. State that obesity is a risk factor for type 2 diabetes.</p> <p>10. Describe the effects of alcohol on the liver and brain function.</p> <p>11. Describe the effects of smoking on lung disease and lung cancer.</p> <p>12. Describe the effect of smoking and alcohol on unborn babies.</p> <p>13. Understand that many diseases are caused by an interaction of a number of factors.</p> <p>14. Describe the human and financial cost of non-communicable diseases to an individual, a local community, a nation or global.</p>	<p>6. For the following bacterial diseases, describe the symptoms, ways in which they are spread and methods to reduce spread: Salmonella food poisoning, gonorrhoea.</p> <p>7. Explain why gonorrhoea is becoming more difficult to treat.</p> <p>8. For the following fungal diseases, describe the symptoms, ways in which they are spread and methods to reduce spread: rose black spot.</p> <p>9. For the following protist diseases, describe the symptoms, ways in which they are spread and methods to reduce spread: malaria.</p> <p>10. Identify and describe the non-specific defence systems of the human body.</p> <p>11. Describe the role of the immune system in defence against disease.</p> <p>12. Describe the three ways in which white blood cells help to defend against pathogens.</p>	<p>6. Identify the photosynthesis reaction as exothermic or endothermic and explain why.</p> <p>7. Identify the plant cell part that is important for photosynthesis and describe its function.</p> <p>8. Describe the structure and function of plant tissues: epidermal tissue, palisade mesophyll tissue, spongy mesophyll tissue, xylem and phloem, meristem tissue</p> <p>9. Describe the organisation of tissues within a plant leaf (an organ) and identify these tissues on a diagram.</p> <p>10. Describe the role of stomata and guard cells in plant leaves.</p> <p>11. Explain how the structure of root hair cells, xylem and phloem help their function.</p> <p>12. Describe the process of transpiration.</p> <p>13. Describe the process of translocation.</p> <p>14. Describe the function of root hair cells and describe how they are adapted for this function.</p> <p>15. Describe the function of xylem tissue and describe how it is structured for this function.</p> <p>16. Describe the function of phloem tissue and identify the structure of phloem vessels.</p> <p>17. Describe factors which affect the rate of transpiration.</p>	<p>showing one of these factors.</p> <p>4. Required practical: investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed.</p> <p>5. Measure and calculate rates of photosynthesis.</p> <p>6. Describe the use of glucose produced in respiration.</p> <p>7. Identify what plants also need to produce proteins.</p> <p>8. HIGHER: Explain graphs of photosynthesis rate involving more than one factor and decide which the limiting factor is.</p> <p>9. HIGHER: Understand what 'inverse proportionality is' and use the inverse square law to link light intensity and distance between plant/light source.</p>
--	---	--	---	---	---	---	---	---

		<p>reaction of amylase enzyme.</p> <p>17. State where bile is made and stored.</p> <p>18. Explain why bile is important in digestion.</p>	<p>15. Describe examples of the reactions that metabolism includes in plants and animals.</p>	<p>15. Evaluate methods of heart treatments.</p>			<p>18. Measure and calculate the rate of transpiration</p>	
Learning Checkpoint Tasks	<p>1. Diffusion and Osmosis</p> <p>2. Active Transport</p>	<p>1. Digestive System</p> <p>2. Enzymes</p>	<p>1. Respiratory system and gas exchange</p> <p>2. Respiration</p>	<p>1. Blood, blood vessels and the heart</p> <p>2. Problems with the heart</p>	<p>1. Cancer and Smoking</p> <p>2. Obesity and alcohol</p>	<p>1. Pathogens and Disease</p> <p>2. Preventing infection and Vaccinations</p>	<p>1. Plants and transport tissues</p> <p>2. Transpiration</p>	<p>1. Photosynthesis and uses of glucose</p> <p>2. Factors affecting rate of photosynthesis</p>
Common Assessment Task	Year 10: Common Assessment 1				Year 10: Common Assessment 2			
Mock Exam (if applicable)								
Interleaved Knowledge	<p>Previously students will have learnt:</p> <ul style="list-style-type: none"> • How substances can move by diffusion • How the digestive system gets glucose and other food molecules into the blood • How the respiratory (breathing) system gets oxygen into the blood • Differences between cells from different organisms • How some cells are specialised and adapted to their functions • How cells, tissues, organs and organ systems are related. 				<p>Previously at KS2/3, pupils will have learnt:</p> <ul style="list-style-type: none"> • The importance for humans of exercise, eating the right amounts of different types of food, and hygiene • Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. • About the structure of bacteria • About the use of microscopes to study cells <p>Students will study cancer and the different types of tumour, along with the general causes and treatment of cancer. They should link this to mitosis and the cell cycle in B2 <i>Cell division</i>.</p>		<p>Previously at KS2/KS3 students will have learnt:</p> <ul style="list-style-type: none"> • How cells, tissues, organs and organ systems are related. • That plants make their own food (glucose) using photosynthesis • How light and chlorophyll are necessary for photosynthesis • About certain plant cells being specialised and adapted to their functions. <p>Students will study the adaptations of leaves to achieve maximum efficiency in photosynthesis. They should link this work with B1.2 <i>Animal and plant cells</i>, B1.5 <i>Specialisation in plant cells</i>, and B4.6 <i>Tissues and organs in plants</i>.</p>	

		<p>Students should be aware of the risks of diseases from smoking, linked to work on the heart and blood vessels in B4 <i>Organising animals and plants</i>. They should know how they work and be aware of the current crisis of antibiotic-resistant strains of bacteria, linking with work in B14.8 <i>Antibiotic resistant bacteria</i>.</p>	<p>All students should be aware of the fate of glucose – its use in respiration, and also how it can be assimilated into starch and cellulose. They should link this with B1.2 <i>Animal and plant cells</i>, B1.7 <i>Osmosis</i>, and B9 <i>Respiration</i>. Students should also consider the need for nitrate ions as well as glucose to make proteins, and how glucose can be used to make lipids. They should link this with B3.3 <i>The chemistry of food</i> where they carried out food tests.</p>
--	--	--	--