**OCR Gateway Science Biology**

**Biology Unit 1 Cell Level Systems**

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| LESSON | 1 | 2 | 3 | 4 |
| **Lesson 1 Cell Structures**  Plant and animal cells  ***Spec ref: B1.1b*** | State the difference between eukaryotic and prokaryotic cells | Describe the function of eukaryotic cells |  |  |
| **Lesson 2 Cell Structures**  Bacterial Cells  ***Spec ref: B1.1b*** | Name examples of prokaryotes | State the features of prokaryotes | Describe the function of prokaryotic subcellular structures |  |
| **Lesson 3 Cell Structures**  Light Microscopy  ***Spec ref: B1.1a*** | Identify the components of a light microscope | Describe how to use a light microscope to observe cells | Explain how staining highlights cell features |  |
| **Lesson 4 Cell Structures**  Electron Microscopy  **Spec ref: B1.1c** | Describe how transmission electron microscape (TEM) works | State the advantages of using an electron microscope | Explain how electron microscopy has increased understanding of subcellular structure. |  |
| **Lesson 5 Cell Structures**  Electron Microscopy | Trip to university |  |  |  |
| **Lesson 6 Cell Structures**  Revision Lesson and questions |  |  |  |  |
| **Lesson 7 In Cells**  DNA  **Spec ref: B1.1a, B1.2b, B1.2c** | State the role of DNA in the body | Describe the structure of DNA | Explain what is meant by compelmentary base pairing. |  |
| **Lesson 8 In Cells**  Transcription and Translation  **Spec ref: B1.2d, B1.2e** | State the difference between mRNA and DNA | Describe the process of transcription | Describe the process of translation |  |
| **Lesson 9 In Cells**  Enzymes  ***Spec ref: B1.2f, B1.2g*** | State what an enzyme is | Describe the structure of an enzyme | Explain what is meant by enzyme specification. |  |
| **Lesson 10 In Cells**  Enzyme Reactions  **Spec ref: B1.2f, B1.2g** | State the factors that effect enzyme-controlled reactions | Describe what happenes when an enzyme is denatured | Explain how different factors affect the rate of an enzyme-controlled reaction |  |
| **Lesson 11 In Cells**  What happens in cells revision |  |  |  |  |
| **Lesson 12 Respiration**  Carbohydrates, proteins and lipids  ***Spec ref: B1.3d, B1.3e, B1.3f*** | State what is meant by metabolic rate | Decribe the components of carbohydrates, protiens and lipids | Explain how carbohydrates, proteins and lipids are synthe sised and broken down |  |
| **Lesson 13 Respiration**  Aerobic respiration  ***Spec ref: B1.3a, B1.3b*** | State the word equation for aerobic repiration | State the chemical equation for aerobic repiration | Decribe the process od aerobic respiration |  |
| **Lesson 14 Respiration**  Anaerobic respiration  ***Spec ref: B1.3c*** | State the word equation for aerobic repiration | State the chemical equation for aerobic repiration | Describe the differences in anaerobic repiration in different organisms |  |
| **Lesson 15 Respiration**  Respiration revision questions |  |  |  |  |
| **Lesson 16 Photosynthesis**  Photosynthesis  ***Spec ref: B1.4a, B1.4b, B1.4c7*** | State the word equation for photsynthesis | Stae a chemical equation for photosynthesis | Descibe the rpocess of photosynthesis |  |
| **Lesson 17Photosynthesis**  Experimental Photosynthesis  ***Spec ref: B1.4d*** | Describe how to test a leaf for the presence of starch | Descibe how to test for the factors that a plant requires for photosynthesis | Describe hoe to test for the products of photosynthesis |  |
| **Lesson 18 Photosynthesis**  Factors affecting photosynthesis  ***Spec ref: B1.4e*** | State the factors that affect photosynthesis | Describe the effect of light intensity and carbon dioxide on the rate of photosynthesis | Explai the effact of temperature on photosynthesis |  |
| **Lesson 19 Photosynthesis**  Interaction of limiting factors  ***Spec ref: B1.4d, B1.4f*** | Describe how to measure the rate of photosynthesis | Describe experiments to investigate photosynthesis | Calculate relative light intensity using the inverse square law | Explain how factors interact to limit the rate of photosynthesis |
| **Lesson 20 Photosynthesis**  Photosynthesis revision and questions |  |  |  |  |
| **Lesson 21 Cell-level systems**  Unit B1 revision and questions |  |  |  |  |

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| ***Lesson 1***  Diffusion  ***Spec ref: B2.1a*** | State some examples of diffusion | Describe the process of diffusion | State which factors affect the rate of diffusion, and explain why |  |
| ***Lesson 2***  Osmosis  ***Spec ref: B2.1a, B3.3g*** | Describe the process of osmosis | Explain why osmosis occurs | Describe examples of osmosis in plant and animals cells |  |
| ***Lesson 3***  Active Transport  ***Spec ref: B2.1a*** | State the difference between active transport and diffusion | Describe how molecules move by active transport | Describe some examples of active transport |  |
| ***Lesson 4***  Mitosis  ***Spec ref: B2.1b*** | State the purpose of mitosis | Describe the process of DNA replication | Describe the process of mitosis |  |
| ***Lesson 5***  Cell differentiation  ***Spec ref: B2.1c*** | State what cell differentiation is | State some examples of specialised cells | Describe the adaptations of a range of specialised cells |  |
| ***Lesson 6***  Stem cells  ***Spec ref: B2.1d, B2. 1e, B2.1f*** | State where stem cells are found | Describe the function of stem cells | Describe the difference between embryonic and adult stem cells |  |
| ***Lesson 7***  Summary questions  ***Spec ref: B2.1a*** |  |  |  |  |
| ***Lesson 8***  Revision Questions  ***Spec ref: B2.1a*** |  |  |  |  |
| ***Lesson 9***  Exchange and transport  ***Spec ref: B2.2a, B2.2b*** | Calculate surface area: Volume ratio | Give examples of exchange surfaces an transport systems | Explain why multicellular organisms require adapted exchange surfaces |  |
| ***Lesson 10***  Circulatory system  ***Spec ref: B2.2c, B2.2d*** | State the function of the circulatory system | Describe the structure of the double circulatory system | Explain the structure and function of blood vessels |  |
| ***Lesson 11***  Heart and blood  ***Spec ref: B2.2c, B2.2d ,B2.2e*** | Identify the main structures in the heart | Describe the flow of the blood through the heart | state the functions of blood components |  |
| ***Lesson 12***  Plant transport system  ***Spec ref: B2.2g, B2.2h*** | State the functions of Xylem and Phloem tissue | Describe the structure of Xylem tissue | Describe the structure of Phloem tissue |  |
| ***Lesson 13***  Transpirartion system  ***Spec ref: B2.2f, B2.2g*** | State what is meant by transpiration | Describe the transpiration stream | Explain how stomata control water loss form leaves |  |
| ***Lesson 14***  Factors affecting transpiration  ***Spec ref: B2.2i, B2.2j*** | State the factors which affect transpiration | Describe how to use potometer | Explain how environmental factors affect the rate of transpiration |  |
| ***Lesson 15***  Summary questions  ***Spec ref: B2.1a*** |  |  |  |  |
| ***Lesson 16***  Revison questions  ***Spec ref: B2.1a*** |  |  |  |  |
| ***Lesson 17***  Topic summary  ***Spec ref: B2.1a*** |  |  |  |  |
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| ***Lesson 1***  Nervous system  ***Spec ref: B3.1a, B3.1b*** | State the function of the nervous system | Describe the difference in function of sensory and motor neurones | Explain how the nervous system produces a coordinated response |  |
| ***Lesson 2***  Reflexes  ***Spec ref: B3.1c*** | State what is meant by a reflex action | Give examples of reflex actions | Explain the difference between a reflex and voluntary action |  |
| ***Lesson 3***  The eye  ***Spec ref: B3.1d, B3.1e*** | Identify the main structures in the eye | Describe the functions of the main structures in the eye | Describe some defects od vision |  |
| ***Lesson 4***  The brain  ***Spec ref: B3.1f, B3.1g*** | State the function of the brain | Describe the functions of the main structures in the brain | Explain why it is difficult to investigate brain functions |  |
| ***Lesson 5***  Nervous system damage  ***Spec ref: B3.1h*** | Describe examples of damage to nervous tissue | Give examples of nervous system diseases | Explain why it is difficult in treating the nervous system |  |
| ***Lesson 6***  Summary questions  ***Spec ref: B3*** |  |  |  |  |
| ***Lesson 7***  Revision questions  ***Spec ref: B2.1a*** |  |  |  |  |
| ***Lesson 8***  Hormones  ***Spec ref: B3.3.2a, B3.2c*** | State the functions of hormones | Name some examples of endocrine glands and the hormones they release | Describe the specific roles of some hormones in the body |  |
| ***Lesson 9***  Negative feedback  ***Spec ref: B2..2b*** | Describe the role of thyroxine in the body | Describe the role of adrenaline in the body | Describe the purpose of negative feedback |  |
| ***Lesson 10***  The menstrual cycle  ***Spec ref: B3.2b*** | State the hormone involved in reproduction | Describe the main stages in the menstrual cycle. | Explain how hormone interact to control the menstrual cycle |  |
| ***Lesson 11***  Controlling reproduction  ***Spec ref: B3. 2e*** | State some examples of contraception | Explain how hormones are used in contraception | Evaluate different methods of contraception |  |
| ***Lesson 12***  Using hormones to treat infertility  ***Spec ref: B3.2f*** | Give examples of reasons for infertility | Explain how hormones can be used to treat infertility | Discuss the issues surrounding fertile treatments |  |
| ***Lesson 13***  Plant hormones  ***Spec ref: B3.2g*** | Sate examples of tropisms | Explain the role of auxin in phototropism | Explain the role of auxin in gravitropism |  |
| ***Lesson 14***  Uses of plant hormones  ***Spec ref: B3.2h, B3.2i*** | Give examples of plant hormone | Describe commercial uses of the plant hormones |  |  |
| ***Lesson 15***  Summary questions  ***Spec ref: B3*** |  |  |  |  |
| ***Lesson 16***  Revision questions  ***Spec ref: B3*** |  |  |  |  |
| ***Lesson 17***  Controlling body temperature  ***Spec ref: B3.3a, B3.3b*** | Explain the importance of maintaining a constant internal environment | Describe hoe overheating or cooling can affect the body | Describe the function of the skin in controlling body temperature | Explain how the body responds to temperature change |
| ***Lesson 18***  Controlling blood sugar  ***Spec ref: B3.3c, B3.3d , B3.3e*** | Explain how the blood sugar levels change throughout the day | Describe the ole in insulin in maintaining blood glucose levels | Explain the main difference in type 1 and type 2 diabetes |  |
| ***Lesson 19***  Maintaining water balance  ***Spec ref: B3.3f, B3.3g*** | Describe why water levels in the body must remain constant | Describe simply how the body produces urine | Explain who the body maintains water balance by varying urine concentration |  |
| ***Lesson 20***  Inside the kidney  ***Spec ref: B3.3h, B3.3i*** | Identify the structure present in the kidney | Describe the function of the different regions of a nephron | Explain how ADH determines the amount of water that is produced |  |
| ***Lesson 21***  Responding to osmotic challenges  ***Spec ref: B3.3j*** | Explain how the body responds to dehydration | Describe the effects of over-hydration | Evaluate the effectiveness of sports drinks |  |
| ***Lesson 22***  Summary questions  ***Spec ref: B3*** |  |  |  |  |
| ***Lesson 23***  Revision questions  ***Spec ref: B3*** |  |  |  |  |
| ***Lesson 24***  Topic summary  ***Spec ref: B3*** |  |  |  |  |

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| ***Lesson 1***  ***Ecosystems***  ***Spec ref: B4.1e, B4.1h*** | Describe the levels of organisation within an ecosystem | Describe the differences between a producer and consumer | Explain how organisms are organised into food chains |  |
| ***Lesson 2***  ***Abiotic and biotic factors***  ***Spec ref:B4.1F*** | State the difference between a biotic and an abiotic factor | Explain how biotic and abiotic factors can effect communities |  |  |
| ***Lesson 3***  ***Competition and interdependence***  ***Spec ref:B4.1G*** | State the factors that plants and animals need to survive | Explain how predator and prey populations fluctuate in a predation relationship | Describe the difference between mutualism and parasitism |  |
| ***Lesson 4***  ***Pyramids and biomass***  ***Spec ref:B4.1h,B4.1i*** | Explain what pyramids of biomass show | Describe how biomass data is collected | Construct a pyramid of biomass |  |
| ***Lesson 5***  ***Efficiency of biomass transfer***  ***Spec ref:B4.1i,B4.1j*** | Describe how biomass is lost between trophic levels | Calculate the efficiency of biomass transfer | Explain why the number of trophic levels is limited |  |
| ***Lesson 6***  ***Nutrient cycling***  ***Spec ref:B4.1ia,B4.1b,B4.1c*** | Describe what is meant by nutrient cycling | Describe how nitrogen is cycled through the ecosystem | Describe how water is cycled through the ecosystem |  |
| ***Lesson 7***  ***The carbon cycle***  ***Spec ref:B4.1c*** | Describe how carbon is removed from the atmosphere | Describe how carbon is added to the atmosphere | Explain why atmospheric carbon dioxide levels are increasing |  |
| ***Lesson 8***  ***Decomposers***  ***Spec ref:B4.1b,B4.1d*** | State what is meant by decomposition | State some examples of decomposers | Explain how environmental factors affect the rate of decomposition |  |
| ***Lesson 9***  **Revision Lesson summary questions** |  |  |  |  |

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| LESSON | 1 | 2 | 3 | 4 |
| ***Lesson 1***  ***Genes, inheritance, and selection***  ***Spec ref:B5.1a,B5.1b,B5.1c,B5.1l*** | State what is meant by variation | Describe and explain the differences between genetic and environmental variation | Describe the differences between discontinuous and continuous variation |  |
| ***Lesson 2***  ***Sexual asexual reproduction***  ***Spec ref:B5.1a,B5.1f*** | State what is meant by a clone | State the main differences between asexual and sexual reproduction | Explain some of the advantages and disadvantages of asexual and sexual reproduction |  |
| ***Lesson 3***  ***Meiosis***  ***Spec ref:B5.1a,B5.1g,B5.1h*** | State the differences between haploid and diploid cells | Explain the process of meiosis |  |  |
| ***Lesson 4***  ***Dominant and recessive alleles***  ***Spec ref:B5.1a,B5.1c*** | Describe the differences between a dominant and a recessive allele | Describe the differences between homozygous individuals | State some examples of dominant and recessive characteristics |  |
| ***Lesson 5***  ***Genetic crosses 1***  ***Spec ref:B5.1a,B5.1i,B5.1j*** | Explain how to use a Punnett square to show the results of fertilisation | Perform a genetic cross between two homozygous individuals | Use percentages, fractions, and ratio to represent the outcome of a genetic cross |  |
| ***Lesson 6***  ***Genetic cross 2***  ***Spec ref:B5.1i,B5.1J,B5.1k*** | Perform a genetic cross between two heterozygous individuals | State the genotype of male and female organisms | Use a genetic cross to show how gender is inherited |  |
| ***Lesson 7***  ***Mutations***  ***Spec ref:B5.1d,B5.1e,B6.3u*** | State what is meant by a mutation | State some examples of harmful, beneficial, and neutral mutations | Describe how mutations can influence phenotypes |  |
| ***Lesson 8***  ***The history of genetics***  ***Spec ref:B5.1m*** | Name the key scientists who developed our understanding of inheritance | Describe how our understanding of genetics has changed over time |  |  |
| ***Lesson 9***  ***Revision lesson*** |  |  |  |  |
| ***Lesson 10***  ***Natural selection and evolution***  ***Spec ref:B5.2a,B5.2c,B5.2d*** | Describe what is meant by natural selection | Explain how evolution occurs through the process of natural selection | Describe some examples of evolution |  |
| ***Lesson 11***  ***Evidence for evolution***  ***Spec ref:B5.2e*** | Describe how fossil forms | Describe how the fossil record provides evidence for evolution | Describe other examples of evidence for evolution |  |
| ***Lesson 12***  The theory of evolution  Spec ref:B5.2f | Name the key scientists involved in developing the theory of evolution | Describe how the theory of evolution was formed |  |  |
| ***Lesson 13***  ***Classification system***  ***Spec ref:B5.2b*** | State what is meant by classification | Describe the artificial system of classification | Describe how scientific advances have led to the development of the natural classification system |  |
| ***Lesson 14***  ***Revision lesson*** |  |  |  |  |