OCR GCSE (9-1) Biology A (Gateway Science)

# Overview of Biology GCSE Scheme of work

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| Week | Statements | Teaching activities | Notes |
| 1 | BM1.1i demonstrate an understanding of number, size and scale and the quantitative relationship between units M2a, M2h | Virtual reality microscopy Learners can engage in a skill development programme to enhance their use of microscopes when using them in real life situations.  [View full activity in B1.1 Cell Structures - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg001-b11-cell-structures?activity=301584#301584)  THINKING CONCEPTUALLY |  |
|  | BM1.1ii use estimations and explain when they should be used M1d | Calculating magnification of an image under a light microscope The first website provides a worksheet with examples of how to use the equation to work out the actual size of an image when you know the magnification and actual size. The second link is a video which outlines the relationship between units used to measure microscopic images.  [View full activity in B1.1 Cell Structures - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg001-b11-cell-structures?activity=301592#301592)  THINKING CONCEPTUALLY |  |
|  | **BM1.1iii calculate with numbers written in standard form** **M1b** | Understanding the structure and function of plant and animal cells Students need to be able to describe how to prepare microscope slides and also how to set up and use a microscope. This activity describes how to develop these skills.  [View full activity in B1.1 Cell Structures - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg001-b11-cell-structures?activity=301610#301610)  THINKING CONCEPTUALLY |  |
|  | B1.1a describe how light microscopes and staining can be used to view cells to include lenses, stage, lamp, use of slides and cover slips, and the use of stains to view colourless specimens or to highlight different structures/ tissues and calculation of magnification WS1.2c, WS1.4c, WS1.4d, WS1.4e, WS2a, WS2b, WS2c, WS2d | Looking at pictures, of light micrographs and diagrams of a range of cells Students can observe images and complete a table that identifies the structure, size and type of magnification device required to see the structure.  [View full activity in B1.1 Cell Structures - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg001-b11-cell-structures?activity=301616#301616)  THINKING CONTEXTUALLY |  |
|  | B1.1b explain how the main sub-cellular structures of eukaryotic cells (plants and animals) and prokaryotic cells are related to their functions to include nucleus, genetic material, chromosomes, plasmids, mitochondria (contain enzymes for cellular respiration), chloroplasts (contain chlorophyll) and cell membranes (contain receptor molecules, provides a selective barrier to molecules) WS1.4a, WS2a, WS2b, WS2c, WS2d | Specialised cells in amazing african violets African Violets (*Saintpaulia Spp.*) are excellent plants for investigating specialised cells. Students investigate a variety of specialised cells using light microscopy and see cytoplasmic streaming in trichomes.  [View full activity in B1.1 Cell Structures - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg001-b11-cell-structures?activity=301622#301622)  THINKING CONTEXTUALLY |  |
|  | B1.1c explain how electron microscopy has increased our understanding of sub-cellular structures increased resolution in a transmission electron microscope to include increased resolution in a transmission electron microscope WS1.1a, WS1.4c, WS1.4d | Microscopy In this practical activity, learners will prepare a microscope slide of their own cheek cells and examining them using a light microscope.  [View full activity in B1.1 Cell Structures - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg001-b11-cell-structures?activity=373831#373831)  THINKING CONTEXTUALLY |  |
|  | BM1.2i carry out rate calculations for chemical reactions M1a, M1c | Making 3D models of cells A brief description of how to make 3D models of cells using jelly and various types of sweets plus two alternative methods.  [View full activity in B1.1 Cell Structures - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg001-b11-cell-structures?activity=301620#301620)  THINKING CONTEXTUALLY |  |
|  | BM1.2ii understand and use simple compound measures such as the rate of a reaction M1a, M1c | Cell size and scale This interactive webpage allows students to move a slider from images that can be seen by the naked eye to those that require an electron microscope.  [View full activity in B1.1 Cell Structures - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg001-b11-cell-structures?activity=301618#301618)  THINKING CONTEXTUALLY |  |
|  | B1.2a describe DNA as a polymer WS1.4a | Reviewing DNA structure As a starter activity use mini-whiteboards to review the structure of DNA.  [View full activity in B1.2 What Happens in Cells? - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg002-b12-what-happens-in-cells?activity=301822#301822)  THINKING CONCEPTUALLY |  |
|  | B1.2b describe DNA as being made up of two strands forming a double helix | Revising terminology related to DNA structure Learners complete a crossword to review all the relevant terminology and meanings related to DNA structure.  [View full activity in B1.2 What Happens in Cells? - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg002-b12-what-happens-in-cells?activity=301824#301824)  THINKING CONCEPTUALLY |  |
|  | B1.2c describe that DNA is made from four different nucleotides; each nucleotide consisting of a common sugar and phosphate group with one of four different bases attached to the sugar to include the pairs of complementary bases (A-T and G-C) WS1.4a, WS2a, WS2b, WS2c, WS2d | Making 3D models of the structure of DNA Provide learners with materials to build a model of DNA. Learners follow instructions and apply the principles previously learnt of the structure of DNA to complete the model.  [View full activity in B1.2 What Happens in Cells? - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg002-b12-what-happens-in-cells?activity=301827#301827)  THINKING CONCEPTUALLY |  |
|  | **B1.2d recall a simple description of protein synthesis to include the unzipping of the DNA molecule around the gene, copying to mRNA in nucleus (transcription), (translation) of the nucleotide sequence, in the cytoplasm (separate science only)** | Extraction of DNA from a living organism (e.g. kiwi, leek, onion, peas, wheat germ) A good worksheet to guide learners through the process of extracting DNA. Plus further details on methods on DNA extraction.  [View full activity in B1.2 What Happens in Cells? - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg002-b12-what-happens-in-cells?activity=301886#301886)  THINKING CONTEXTUALLY |  |
|  | **B1.2e explain simply how the structure of DNA affects the proteins made in protein synthesis to include triplet code and its use to determine amino acid order in a protein (separate science only)** | Inside a cell This interactive software allows learners to track across a 3D diagram of an animal cell and focus in and click on the sub-cellular structures which then magnifies and animates the chosen structure providing information on its function.  [View full activity in B1.1 Cell Structures - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg001-b11-cell-structures?activity=301604#301604)  THINKING CONCEPTUALLY |  |
|  | B1.2f describe experiments that can be used to investigate enzymatic reactions WS1.1h, WS1.2b, WS1.2c, WS1.2e, WS1.3a, WS1.3b, WS1.3c, WS1.3d, WS1.3e, WS1.3f, WS1.3g, WS2a, WS2b, WS2c, WS2d | Cell structure: Rap/poem memory aid This is a Rap/Poem covering the main sub-structures of animal and plant cells. It could be used as a starter to recap prior learning or to provide a memory aid.  [View full activity in B1.1 Cell Structures - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg001-b11-cell-structures?activity=301606#301606)  THINKING CONCEPTUALLY |  |
|  | B1.2g explain the mechanism of enzyme action to include the role of enzymes in metabolism, the role of the active site, enzyme specificity (lock and key hypothesis) and factors affecting the rate of enzyme controlled reactions (pH, temperature, substrate and enzyme concentration) WS2a, WS2b, WS2c, WS2d | Plant and animal cells This PowerPoint provides a suggested approach to delivering activities that encourage learning of the components and functions of plant and animal cells.  [View full activity in B1.1 Cell Structures - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg001-b11-cell-structures?activity=301608#301608)  THINKING CONCEPTUALLY |  |
|  | B1.3a describe cellular respiration as a universal chemical process, continuously occurring that supplies ATP in all living cells WS1.2a | Testing for Biological Molecules An experiment to introduce learners to food tests by practical experience on simple foods [tests for starch (using iodine solution), for fat/lipid (using the emulsion test and paper test/grease spot test), for reducing sugar (using Benedict’s reagent) and for protein (using biuret reagent)].  [View full activity in B1.2 What Happens in Cells? - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg002-b12-what-happens-in-cells?activity=373849#373849)  THINKING CONTEXTUALLY |  |
|  | B1.3b describe cellular respiration as an exothermic reaction WS1.2b | Transcription of DNA and translation of mRNA Describe how sequences of 3 bases code for individual amino acids and that these 3 base sequences are called codons.  [View full activity in B1.2 What Happens in Cells? - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg002-b12-what-happens-in-cells?activity=301830#301830)  THINKING CONCEPTUALLY |  |
|  | B1.3c compare the processes of aerobic respiration and anaerobic respiration to include in plants/fungi and animals the different conditions, substrates, products and relative yields of ATP WS2a, WS2b, WS2c, WS2d | Micro scale investigations of catalase activity in plant extracts This activity investigates the action of catalase, a widespread enzyme, found in nearly all aerobic cells (animals, plants and microbes).  [View full activity in B1.2 What Happens in Cells? - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg002-b12-what-happens-in-cells?activity=301888#301888)  THINKING CONTEXTUALLY |  |
|  | B1.3d explain the importance of sugars in the synthesis and breakdown of carbohydrates to include use of the terms monomer and polymer | Rates of enzyme-controlled reactions An experiment to determine the rate of an enzyme-controlled reaction by measuring the production of gas.  [View full activity in B1.2 What Happens in Cells? - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg002-b12-what-happens-in-cells?activity=373842#373842)  THINKING CONTEXTUALLY |  |
|  | B1.3e explain the importance of amino acids in the synthesis and breakdown of proteins to include use of the terms monomer and polymer | Enzyme starter activity This is a very quick and interactive PowerPoint that provides a ‘snappy’ visual assessment for learning opportunity.  [View full activity in B1.2 What Happens in Cells? - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg002-b12-what-happens-in-cells?activity=301833#301833)  THINKING CONCEPTUALLY |  |
|  | B1.3f explain the importance of fatty acids and glycerol in the synthesis and breakdown of lipids | Physiology An experiment to investigate and monitor changes in pulse, ventilation rate and recovery following exercise.  [View full activity in B1.3 Respiration - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg003-b13-respiration?activity=373862#373862)  THINKING CONTEXTUALLY |  |
|  | BM1.4i understand and use simple compound measures such as the rate of a reaction M1a, M1c | Demonstrating an exothermic reaction Commercial heat packs can be used to a show exothermic reaction.  [View full activity in B1.3 Respiration - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg003-b13-respiration?activity=301901#301901)  THINKING CONTEXTUALLY |  |
|  | BM1.4ii translate information between graphical and numerical form M4a | Testing for Biological Molecules An experiment to introduce learners to food tests by practical experience on simple foods [tests for starch (using iodine solution), for fat/lipid (using the emulsion test and paper test/grease spot test), for reducing sugar (using Benedict’s reagent) and for protein (using biuret reagent)].  [View full activity in B1.3 Respiration - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg003-b13-respiration?activity=373869#373869)  THINKING CONTEXTUALLY |  |
|  | BM1.4iii plot and draw appropriate graphs, selecting appropriate scales and axes M4a, M4c | Where does the wood come from? The idea of this activity is to get learners to examine their misconceptions about photosynthesis.  [View full activity in B1.4 Photosynthesis - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg004-b14-photosynthesis?activity=301966#301966)  THINKING CONTEXTUALLY |  |
|  | BM1.4iv extract and interpret information from graphs, charts and tables M2c, M4a | Demonstrating an endothermic reaction A very quick, easy method to demostrate an endothermic reaction.  [View full activity in B1.4 Photosynthesis - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg004-b14-photosynthesis?activity=301959#301959)  THINKING CONCEPTUALLY |  |
|  | **BM1.4v understand and use inverse proportion – the inverse square law and light intensity in the context of factors affecting photosynthesis** **M1c** | Photosynthesis An experiment to measure the rate of photosynthesis by the production of oxygen in aquatic plants.  [View full activity in B1.4 Photosynthesis - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg004-b14-photosynthesis?activity=373880#373880)  THINKING CONTEXTUALLY |  |
|  | B1.4a describe photosynthetic organisms as the main producers of food and therefore biomass for life on Earth | ‘Algal balls’: Photosynthesis using algae wrapped in jelly balls In this practical, learners use algae to look at the rate of photosynthesis.  [View full activity in B1.4 Photosynthesis - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg004-b14-photosynthesis?activity=301968#301968)  THINKING CONTEXTUALLY |  |
|  | B1.4b describe the process of photosynthesis to include reactants and products, twostage process, location of the reaction (in the chloroplasts) WS2a, WS2b, WS2c, WS2d | Pupil-led photosynthesis investigation The ‘algal balls’ learners made earlier, details found above, can be used to promote investigative skills in providing reliable and easily managed photosynthetic material. Alternatively, *Cabomba* species of pondweed can be used.  [View full activity in B1.4 Photosynthesis - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba001-b1-cell-level-systems/delivery-guide-gbadg004-b14-photosynthesis?activity=301970#301970)  THINKING CONTEXTUALLY |  |
|  | B1.4c describe photosynthesis as an endothermic reaction WS1.3b, WS1.3c, WS1.3e | Activities for teaching biology Provides lots of idea on how to teach many harder concepts of biology using models and making it more engaging.  [View full activity in B2.1 Supplying the cell - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg005-b21-supplying-the-cell?activity=298839#298839)  THINKING CONCEPTUALLY |  |
|  | B1.4d describe experiments to investigate photosynthesis WS2a, WS2b, WS2c, WS2d | Diffusion, osmosis and active transport A good video, which starts by looking at each process separately and then, compares them together and shows how they differ.  [View full activity in B2.1 Supplying the cell - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg005-b21-supplying-the-cell?activity=298844#298844)  THINKING CONCEPTUALLY |  |
|  | B1.4e explain the effect of temperature, light intensity and carbon dioxide concentration on the rate of photosynthesis  WS2a, WS2b, WS2c, WS2d | Transport in and out of cells An experiment for investigating the effect of different solute concentrations on osmosis in potato chips.  [View full activity in B2.1 Supplying the cell - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg005-b21-supplying-the-cell?activity=373890#373890)  THINKING CONTEXTUALLY |  |
|  | **B1.4f explain the interaction of these factors in limiting the rate of photosynthesis** WS1.2b, WS1.2c, WS1.2e WS1.3a, WS1.3b, WS1.3c, WS1.3d, WS1.3f, WS1.3g, WS1.4e, WS2c, WS2d | Animal cell mitosis A clear animation on mitosis in detail. Includes a pause and play button.  [View full activity in B2.1 Supplying the cell - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg005-b21-supplying-the-cell?activity=298821#298821)  CURRICULUM CONTENT |  |
|  | BM2.1i use percentiles and calculate percentage gain and loss of mass M1c | What happens during DNA replication? The animation looks at DNA replication and the part enzymes play and complimentary base pairing. It is a PowerPoint and can be used as part of the lesson.  [View full activity in B2.1 Supplying the cell - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg005-b21-supplying-the-cell?activity=298825#298825)  CURRICULUM CONTENT |  |
|  | B2.1a explain how substances are transported into and out of cells through diffusion, osmosis and active transport to include examples of substances moved, direction of movement, concentration gradients and use of the term water potential (no mathematical use of water potential required) WS2a, WS2b, WS2c, WS2d | Mitosis modelling grid Learners use the activity grid to draw the stages of mitosis.  [View full activity in B2.1 Supplying the cell - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg005-b21-supplying-the-cell?activity=298829#298829)  CURRICULUM CONTENT |  |
|  | B2.1b describe the process of mitosis in growth, including the cell cycle the stages of the cell cycle as DNA replication, movement of chromosomes, followed by the growth of the cell WS2a, WS2b, WS2c, WS2d | Mitosis with shoes Teaching mitosis in a practical way making it visual and engaging at the same time.  [View full activity in B2.1 Supplying the cell - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg005-b21-supplying-the-cell?activity=298831#298831)  CURRICULUM CONTENT |  |
|  | B2.1c explain the importance of cell differentiation to include the production of specialised cells allowing organisms to become more efficient and examples of specialised cells WS2a, WS2b, WS2c, WS2d | Investigating mitosis in allium A variety of class practicals and demonstrations that can be undertaken within the classroom. Method and worksheet questions are provided.  [View full activity in B2.1 Supplying the cell - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg005-b21-supplying-the-cell?activity=298841#298841)  THINKING CONCEPTUALLY |  |
|  | B2.1f describe the difference between embryonic and adult stem cells in animals | What is a stem cell? An excellent activity, which focuses on stem cells. It has many visual posters as part of the activity.  [View full activity in B2.1 Supplying the cell - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg005-b21-supplying-the-cell?activity=298819#298819)  CURRICULUM CONTENT |  |
|  | B2.1e describe the functions of stem cells to include division to produce a range of different cell types for development, growth and repair WS1.1e, WS1.1f, WS1.1h | Specialised cells Learners are provided with 4 specialised cells. They are to look at the descriptions provided and match them with the correct cells.  [View full activity in B2.1 Supplying the cell - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg005-b21-supplying-the-cell?activity=298823#298823)  CURRICULUM CONTENT |  |
|  | B2.1d recall that stem cells are present in embryonic and adult animals and meristems in plants | Stem cells Learners to produce an information leaflet for patients explaining how stem cells can be used in their treatment.  [View full activity in B2.1 Supplying the cell - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg005-b21-supplying-the-cell?activity=298827#298827)  CURRICULUM CONTENT |  |
|  | BM2.2i calculate surface area : volume ratios M1c | The heart and circulatory system A very good teaching PowerPoint that can be used in the classroom. It has animations on the circulatory system.  [View full activity in B2.2 The challenges of size - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg006-b22-the-challenges-of-size?activity=298882#298882)  CURRICULUM CONTENT |  |
|  | BM2.2ii use simple compound measures such as rate M1a, M1c | Exploring the heart A video, which shows the function of the heart and blood vessels. It is simplified for learners.  [View full activity in B2.2 The challenges of size - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg006-b22-the-challenges-of-size?activity=298884#298884)  CURRICULUM CONTENT |  |
|  | BM2.2iii carry out rate calculations M1a, M1c | Heart labelling Learners complete the diagram of the heart filling in the blanks.  [View full activity in B2.2 The challenges of size - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg006-b22-the-challenges-of-size?activity=298888#298888)  CURRICULUM CONTENT |  |
|  | BM2.2iv plot, draw and interpret appropriate graphs M4a, M4b, M4c, M4d | Heart information leaflet Learners to produce an informative leaflet for patients on behalf of the British heart foundation, explaining how the heart works and the blood vessels.  [View full activity in B2.2 The challenges of size - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg006-b22-the-challenges-of-size?activity=298890#298890)  CURRICULUM CONTENT |  |
|  | B2.2a explain the need for exchange surfaces and a transport system in multicellular organisms in terms of surface area:volume ratio to include surface area, volume and diffusion distances WS1.4d, WS1.4e, WS1.4f, WS2a, WS2b, WS2c, WS2d | Surface area to volume ratio Learners can be given the opportunity to investigate how surface area to volume ratio affect rate of diffusion.  [View full activity in B2.2 The challenges of size - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg006-b22-the-challenges-of-size?activity=298892#298892)  CURRICULUM CONTENT |  |
|  | B2.2b describe some of the substances transported into and out of a range of organisms in terms of the requirements of those organisms to include oxygen, carbon dioxide, water, dissolved food molecules, mineral ions and urea | All topics A good website that allows you to make quizzes and puzzles for any topic. Very good for starters and testing knowledge of learners.  [View full activity in B2.2 The challenges of size - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg006-b22-the-challenges-of-size?activity=298898#298898)  THINKING CONCEPTUALLY |  |
|  | B2.2c describe the human circulatory system to include the relationship with the gaseous exchange system, the need for a double circulatory system in mammals and the arrangement of vessels | Transport in and out of cells An experiment for investigating the effect of different solute concentrations on osmosis in potato chips.  [View full activity in B2.2 The challenges of size - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg006-b22-the-challenges-of-size?activity=373902#373902)  THINKING CONTEXTUALLY |  |
|  | B2.2d explain how the structure of the heart and the blood vessels are adapted to their functions to include the structure of the mammalian heart with reference to valves, chambers, cardiac muscle and the structure of blood vessels with reference to thickness of walls, diameter of lumen, presence of valves WS2a, WS2b, WS2c, WS2d | Transpiration 1 A task, which focuses on learners independently learning the plant and transpiration.  [View full activity in B2.2 The challenges of size - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg006-b22-the-challenges-of-size?activity=298894#298894)  THINKING CONCEPTUALLY |  |
|  | B2.2e explain how red blood cells and plasma are adapted to their transport functions in the blood WS2a, WS2b, WS2c, WS2d | Transpiration 2 A very good animation, which allows learners to stop and start the animation. It allows learners to gain a close up to features of the plant.  [View full activity in B2.2 The challenges of size - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg006-b22-the-challenges-of-size?activity=298896#298896)  THINKING CONCEPTUALLY |  |
|  | B2.2f explain how water and mineral ions are taken up by plants, relating the structure of the root hair cells to their function WS2a, WS2b, WS2c, WS2d | Translocation A tutorial, which contains an animation about translocation and a step-by-step guide along with a quiz.  [View full activity in B2.2 The challenges of size - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg006-b22-the-challenges-of-size?activity=298886#298886)  CURRICULUM CONTENT |  |
|  | B2.2g describe the processes of transpiration and translocation to include the structure and function of the stomata WS2a, WS2b, WS2c, WS2d | Plant transpiration A virtual lab, which allows learners to look at different plants and their rate of transpiration over time. It uses a photometer to carryout the test.  [View full activity in B2.2 The challenges of size - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba002-b2-scaling-up/delivery-guide-gbadg006-b22-the-challenges-of-size?activity=298900#298900)  THINKING CONCEPTUALLY |  |
|  | B2.2h explain how the structure of the xylem and phloem are adapted to their functions in the plant | All An exciting and new way of teaching many topics. Contains many quizzes, which makes the learning more fun at the same time. Interactive and very engaging.  [View full activity in B3.1 Coordination and control – the nervous system - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg007-b31-coordination-and-control-the-nervous-system?activity=310964#310964)  CURRICULUM CONTENT |  |
|  | B2.2i explain the effect of a variety of environmental factors on the rate of water uptake by a plant to include light intensity, air movement, and temperature WS2a, WS2b, WS2c, WS2d | Synapse Provides learners with a description of the nervous system along with animations. At the end there is a quiz for learners to attempt.  [View full activity in B3.1 Coordination and control – the nervous system - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg007-b31-coordination-and-control-the-nervous-system?activity=310968#310968)  CURRICULUM CONTENT |  |
|  | B2.2j describe how a simple potometer can be used to investigate factors that affect the rate of water uptake WS1.2b, WS1.2c, WS1.2e WS1.3a, WS1.3b, WS1.3c, WS1.3d, WS1.3e, WS1.3f, WS1.3g, WS2a, WS2b, WS2c, WS2d | Skin sensitivity A variety of class practicals and demonstrations that can be undertaken within the classroom. Method and worksheet questions are provided.  [View full activity in B3.1 Coordination and control – the nervous system - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg007-b31-coordination-and-control-the-nervous-system?activity=310974#310974)  THINKING CONCEPTUALLY |  |
|  | BM3.1i extract and interpret data from graphs, charts and tables M2c | GP care The task allows learners to apply what they have learned from the topic and apply it to a context of patient care. Each patient report requires analysis of a specific organ.  [View full activity in B3.1 Coordination and control – the nervous system - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg007-b31-coordination-and-control-the-nervous-system?activity=310982#310982)  THINKING CONTEXTUALLY |  |
|  | B3.1a describe the structure of the nervous system to include Central Nervous System, sensory and motor neurones and sensory receptors | Accommodation A clear video, which explains how the suspensory ligaments and ciliary muscles work together.  [View full activity in B3.1 Coordination and control – the nervous system - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg007-b31-coordination-and-control-the-nervous-system?activity=310972#310972)  THINKING CONCEPTUALLY |  |
|  | B3.1b explain how the components of the nervous system can produce a coordinated response to include it goes to all parts of the body, has many links, has different sensory receptors and is able to coordinate responses | The eye An excellent animation that allows learners to take control when observing how the light enters the eye. They can focus on certain parts of the eye and pause and reply as they wish.  [View full activity in B3.1 Coordination and control – the nervous system - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg007-b31-coordination-and-control-the-nervous-system?activity=310976#310976)  THINKING CONCEPTUALLY |  |
|  | B3.1c explain how the structure of a reflex arc is related to its function WS2a, WS2b, WS2c, WS2d | Areas of the brain The video looks at the function of the brain and the different areas of the brain.  [View full activity in B3.1 Coordination and control – the nervous system - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg007-b31-coordination-and-control-the-nervous-system?activity=310966#310966)  CURRICULUM CONTENT |  |
|  | B3.1d explain how the main structures of the eye are related to their functions to include cornea, iris, pupil, lens, retina, optic nerve, ciliary body, suspensory ligaments (separate science only) | The endocrine system quiz The quiz focuses on the menstrual cycle and the glands. It has a time limit and is a good revision tool or starting point to see what they already know.  [View full activity in B3.2 Coordination and control – the endocrine system - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg008-b32-coordination-and-control-the-endocrine-system?activity=311024#311024)  CURRICULUM CONTENT |  |
|  | B3.1e describe common defects of the eye and explain how some of these problems may be overcome to include colour blindness, short-sightedness and long-sightedness (separate science only) WS2a, WS2b, WS2c, WS2d | Menstrual cycle A good teaching PowerPoint, which covers endocrine system fertility and menstrual cycle.  [View full activity in B3.2 Coordination and control – the endocrine system - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg008-b32-coordination-and-control-the-endocrine-system?activity=311030#311030)  CURRICULUM CONTENT |  |
|  | B3.1f describe the structure and function of the brain to include cerebrum, cerebellum, medulla, hypothalamus, pituitary (separate science only) | The endocrine system A clear video, which explains the endocrine system and its function. It focuses on the main glands and the hormones they release. A good starting point.  [View full activity in B3.2 Coordination and control – the endocrine system - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg008-b32-coordination-and-control-the-endocrine-system?activity=311034#311034)  THINKING CONCEPTUALLY |  |
|  | **B3.1g explain some of the difficulties of investigating brain function to include the difficulty in obtaining and interpreting case studies and the consideration of ethical issues (separate science only)** | Adrenaline A teaching animation, which shows the effects of adrenaline on the body. The modes can be changed from normal to fight or flight.  [View full activity in B3.2 Coordination and control – the endocrine system - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg008-b32-coordination-and-control-the-endocrine-system?activity=311026#311026)  CURRICULUM CONTENT |  |
|  | **B3.1h explain some of the limitations in treating damage and disease in the brain and other parts of the nervous system to include limited ability to repair nervous tissue, irreversible damage to the surrounding tissues, difficulties with accessing parts of the nervous system (separate science only)** WS1.1e, WS1.1f, WS1.1h | The menstrual cycle Learners to move around the classroom and get information about each stage of the menstrual cycle. After completing each stage the learners then draw a diagram of the whole menstrual cycle.  [View full activity in B3.2 Coordination and control – the endocrine system - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg008-b32-coordination-and-control-the-endocrine-system?activity=311037#311037)  THINKING CONCEPTUALLY |  |
|  | BM3.2i extract and interpret data from graphs, charts and tables M2c | Plant hormones auxin A good worksheet on auxin, which will identify if learners understand plant hormones.  [View full activity in B3.2 Coordination and control – the endocrine system - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg008-b32-coordination-and-control-the-endocrine-system?activity=311028#311028)  CURRICULUM CONTENT |  |
|  | BM3.2ii translate information between numerical and graphical forms M4a | Auxins A very good animation on plant growth. The animations focus on response to environment and hormones. There is a section to test learners.  [View full activity in B3.2 Coordination and control – the endocrine system - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg008-b32-coordination-and-control-the-endocrine-system?activity=311039#311039)  THINKING CONCEPTUALLY |  |
|  | B3.2a describe the principles of hormonal coordination and control by the human endocrine system to include use of chemical messengers, transport in blood, endocrine glands and receptors | Homeostasis A very clear video, which explains how homeostasis works and focuses on temperature, water and sugar levels.  [View full activity in B3.3 Maintaining internal environments - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg009-b33-maintaining-internal-environments?activity=311129#311129)  CURRICULUM CONTENT |  |
|  | **B3.2b explain the roles of thyroxine and adrenaline in the body as examples of negative feedback systems to include thyroxine as an example of a negative feedback system** | ADH and control of water balance A teaching animation, which shows the effects of too much or too little water and the role of ADH. The modes can be changed from normal, too much water and too little water.  [View full activity in B3.3 Maintaining internal environments - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg009-b33-maintaining-internal-environments?activity=311131#311131)  CURRICULUM CONTENT |  |
|  | B3.2c describe the role of hormones in human reproduction including the control of the menstrual cycle to include oestrogen, progesterone, FSH and testosterone WS1.3b, WS1.3e | The kidney Learners are to take the role of a nephrologist who has been invited to deliver a speech about the kidney. Learners to pair up and produce a 2 minute speech.  [View full activity in B3.3 Maintaining internal environments - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg009-b33-maintaining-internal-environments?activity=311136#311136)  CURRICULUM CONTENT |  |
|  | **B3.2d explain the interactions of FSH, LH, oestrogen and progesterone in the control of the menstrual cycle** | Sweating and temperature A resource, which provides learners with data, they are to interpret about sweating and temperature.  [View full activity in B3.3 Maintaining internal environments - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg009-b33-maintaining-internal-environments?activity=311125#311125)  CURRICULUM CONTENT |  |
|  | B3.2e explain the use of hormones in contraception and evaluate hormonal and non-hormonal methods of contraception to include relative effectiveness of different forms of contraception WS1.1d, WS1.1e, WS1.1f | Thermoregulation A quiz which learners can use a revision tool or a quick classroom activity. Focuses on temperature control.  [View full activity in B3.3 Maintaining internal environments - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg009-b33-maintaining-internal-environments?activity=311134#311134)  CURRICULUM CONTENT |  |
|  | **B3.2f explain the use of hormones in modern reproductive technologies to treat infertility** WS1.1d, WS1.1e, WS1.1f, WS1.1h | Controlling blood sugar levels A good resource, which promotes independent learning and enables group work whereby learners learn how glucose levels are controlled by interpreting a storyboard.  [View full activity in B3.3 Maintaining internal environments - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg009-b33-maintaining-internal-environments?activity=311123#311123)  CURRICULUM CONTENT |  |
|  | B3.2g explain how plant hormones are important in the control and coordination of plant growth and development, with reference to the role of auxins in phototropisms and gravitropisms to include unequal distribution of auxin (separate science only) WS2a, WS2b, WS2c, WS2d | Blood sugar regulation in diabetes A clear animation, which looks at sugar levels and treatments of type 1 and 2 diabetes. It uses a graph, which is good practice for exam questions. A quiz at the end.  [View full activity in B3.3 Maintaining internal environments - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg009-b33-maintaining-internal-environments?activity=311127#311127)  CURRICULUM CONTENT |  |
|  | B3.2h describe some of the variety of effects of plant hormones, relating to auxins, **gibberellins and ethene** to include controlling growth, controlling germination, fruit ripening, flower opening and shedding of leaves (separate science only) WS2a, WS2b, WS2c, WS2d | Diabetic awareness leaflet Learners could produce a diabetic awareness leaflet for both type 1 and 2.  [View full activity in B3.3 Maintaining internal environments - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg009-b33-maintaining-internal-environments?activity=311139#311139)  CURRICULUM CONTENT |  |
|  | **B3.2i describe some of the different ways in which people use plant hormones to control plant growth to include selective herbicides, root cuttings, seedless fruit (parthenocarpic fruit development), altering dormancy (separate science only)** | Transport in and out of cells An experiment for investigating the effect of different solute concentrations on osmosis in potato chips.  [View full activity in B3.3 Maintaining internal environments - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg009-b33-maintaining-internal-environments?activity=373919#373919)  THINKING CONTEXTUALLY |  |
|  | BM3.3i extract and interpret data from graphs, charts and tables M2c | Structure of kidney Group activity where each member is to go to one of the three stations and find information about nephrons. After 5 minutes they will return and share the information.  [View full activity in B3.3 Maintaining internal environments - Online delivery guide](http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba003-b3-organism-level-systems/delivery-guide-gbadg009-b33-maintaining-internal-environments?activity=311141#311141)  THINKING CONTEXTUALLY |  |
|  | B3.3a explain the importance of maintaining a constant internal environment in response to internal and external change to include allowing metabolic reactions to proceed at appropriate rates WS1.4a | Activity 1: The Circle of Life The video clip for the 'Circle of Life' song at the start of the Disney film 'The Lion King'. This can be played as learners arrive at the classroom and settle at their desks.  [View full activity in B4.1a - B4.1d Cycling of materials through an ecosystem - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010-b41a-b41d-cycling-of-materials-through-an-ecosystem?activity=321952#321952)  THINKING CONTEXTUALLY |  |
|  | B3.3b describe the function of the skin in the control of body temperature to include detection of external temperature, sweating, shivering, change to blood flow (separate science only) WS2a, WS2b, WS2c, WS2d | Activity 2: Dinosaur breath Lesson plan including background information about the cycling of carbon and a practical activity releasing carbon dioxide that could potentially have been breathed out by a dinosaur from chalk (instruction and learners worksheet included).  [View full activity in B4.1a - B4.1d Cycling of materials through an ecosystem - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010-b41a-b41d-cycling-of-materials-through-an-ecosystem?activity=321954#321954)  THINKING CONTEXTUALLY |  |
|  | B3.3c explain how insulin controls blood sugar levels in the body | Activity 3: Nitrogen cycle stations Lesson plan covering the stages of the nitrogen cycle. Learners role play being atoms of nitrogen gas moving around the nitrogen cycle dependent on the roll of a die.  [View full activity in B4.1a - B4.1d Cycling of materials through an ecosystem - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010-b41a-b41d-cycling-of-materials-through-an-ecosystem?activity=321957#321957)  THINKING CONTEXTUALLY |  |
|  | **B3.3d explain how glucagon interacts with insulin to control blood sugar levels in the body** WS2a, WS2b, WS2c, WS2d | Activity 4: Microbes in the soil Learners culture a free-living nitrogen-fixing bacterium from the soil on nitrogen rich and nitrogen free agar. Technician and teacher information included in addition to a learner worksheet containing instructions and questions.  [View full activity in B4.1a - B4.1d Cycling of materials through an ecosystem - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010-b41a-b41d-cycling-of-materials-through-an-ecosystem?activity=321959#321959)  THINKING CONTEXTUALLY |  |
|  | B3.3e compare type 1 and type 2 diabetes and explain how they can be treated | Activity 5: The Nitrogen cycle - a summary A very clear animation showing the different stages of the nitrogen cycle.  [View full activity in B4.1a - B4.1d Cycling of materials through an ecosystem - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010-b41a-b41d-cycling-of-materials-through-an-ecosystem?activity=321961#321961)  THINKING CONTEXTUALLY |  |
|  | B3.3f explain the effect on cells of osmotic changes in body fluids to include higher, lower or equal water potentials leading to lysis or shrinking (no mathematical use of water potentials required) (separate science only) WS2a, WS2b, WS2c, WS2d | Activity 7: Factors affecting decomposition Lesson plan giving instruction on how learners can plan and carry out a practical to find the effect different factors such as temperature, light and water content have on the decomposition of a piece of carrot.  [View full activity in B4.1a - B4.1d Cycling of materials through an ecosystem - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010-b41a-b41d-cycling-of-materials-through-an-ecosystem?activity=321965#321965)  THINKING CONTEXTUALLY |  |
|  | B3.3h describe the gross structure of the kidney and the structure of the kidney tubule | Activity 6: The water cycle This webpage gives a link to a simple animation of the water cycle and to instructions on how to make a very quick and simple mini water cycle with just a bowl, cup, elastic band, cling film and water. Very good for lower ability learners.  [View full activity in B4.1a - B4.1d Cycling of materials through an ecosystem - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010-b41a-b41d-cycling-of-materials-through-an-ecosystem?activity=321963#321963)  THINKING CONTEXTUALLY |  |
|  | B3.3g describe the function of the kidneys in maintaining the water balance of the body to include varying the amount and concentration of urine and hence water excreted (separate science only) WS1.3b, WS2a, WS2b, WS2c, WS2d | Activity 1: Ecosystems A graphic organiser for learners to complete with definitions and images for the key vocabulary describing different levels of organisation in an ecosystem such as species, population, community etc.  [View full activity in B4.1e - B4.1g Factors affecting ecosystems - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010a-b41e-b41g-factors-affecting-ecosystems?activity=322024#322024)  THINKING CONTEXTUALLY |  |
|  | **B3.3i describe the effect of ADH on the permeability of the kidney tubules to include amount of water reabsorbed and negative feedback (separate science only)** WS2a, WS2b, WS2c, WS2d | Activity 3: Abiotic and biotic factors activity An interactive animation requiring learners to select abiotic factors in and ecosystem and biotic factors in an ecosystem. Great for lower ability learners.  [View full activity in B4.1e - B4.1g Factors affecting ecosystems - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010a-b41e-b41g-factors-affecting-ecosystems?activity=322028#322028)  THINKING CONTEXTUALLY |  |
|  | **B3.3j explain the response of the body to different temperature and osmotic challenges to include challenges to include high sweating and dehydration, excess water intake, high salt intake responses to include mechanism of kidney function, thirst (separate science only)** | Activity 2: Abiotic and biotic factors video An animated video to introduce ecosystems and abiotic and biotic factors that affect them.  [View full activity in B4.1e - B4.1g Factors affecting ecosystems - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010a-b41e-b41g-factors-affecting-ecosystems?activity=322026#322026)  THINKING CONTEXTUALLY |  |
|  | BM4.1i calculate rate changes in the decay of biological material (separate science only) M1c | Activity 4: Abiotic and biotic factors PowerPoint A PowerPoint presentation about how abiotic and biotic factors affect communities including information, short activities and questions for learners.  [View full activity in B4.1e - B4.1g Factors affecting ecosystems - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010a-b41e-b41g-factors-affecting-ecosystems?activity=322030#322030)  THINKING CONTEXTUALLY |  |
|  | BM4.1ii calculate the percentage of mass M1c | Activity 5: Sampling an ecosystem Lesson plan, instructions and learner worksheet explaining how to sample biodiversity on the school field.  [View full activity in B4.1e - B4.1g Factors affecting ecosystems - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010a-b41e-b41g-factors-affecting-ecosystems?activity=322032#322032)  THINKING CONTEXTUALLY |  |
|  | BM4.1iii use fractions and percentages M1c | Activity 9: Sampling techniques 2 An experiment to become familiar with the methods of sampling biotic and abiotic factors in a habitat.  [View full activity in B4.1e - B4.1g Factors affecting ecosystems - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010a-b41e-b41g-factors-affecting-ecosystems?activity=373937#373937)  THINKING CONTEXTUALLY |  |
|  | BM4.1iv plot and draw appropriate graphs selecting appropriate scales for the axes M4a, M4c | Activity 6: Ecological interactions A 60 minute lesson that can be used to deliver the interactions between different species within a community.  [View full activity in B4.1e - B4.1g Factors affecting ecosystems - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010a-b41e-b41g-factors-affecting-ecosystems?activity=322034#322034)  THINKING CONTEXTUALLY |  |
|  | BM4.1v extract and interpret information from charts, graphs and tables M2c, M4a | Activity 7: Predators and prey Two video clips from David Attenborough's 'The Hunt' that are great to show the class as an introduction to the relationship between predators and prey.  [View full activity in B4.1e - B4.1g Factors affecting ecosystems - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010a-b41e-b41g-factors-affecting-ecosystems?activity=322036#322036)  THINKING CONTEXTUALLY |  |
|  | B4.1a recall that many different materials cycle through the abiotic and biotic components of an ecosystem to include examples of cycled materials e.g. nitrogen and carbon | Activity 8: Predator prey relationships A fox and rabbit predator prey game where learners drop 'fox' cards onto a table 'meadow' to catch 'rabbits'. Results are recorded over numerous 'years' and the population sizes are plotted on a graph.  [View full activity in B4.1e - B4.1g Factors affecting ecosystems - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010a-b41e-b41g-factors-affecting-ecosystems?activity=322038#322038)  THINKING CONTEXTUALLY |  |
|  | B4.1b explain the role of microorganisms in the cycling of materials through an ecosystem to include the role of microorganisms in decomposition | Activity 1: Food chains A simple drag and drop activity forming food chains from different habitats. A nice introduction to check what learners can remember about food chains from KS3. Particularly good for lower ability learners.  [View full activity in B4.1h - 4.1j Energy transfers in an ecosystem - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010b-b41h-41j-energy-transfers-in-an-ecosystem?activity=322078#322078)  THINKING CONTEXTUALLY |  |
|  | B4.1c explain the importance of the carbon cycle and the water cycle to living organisms to include maintaining habitats, fresh water flow of nutrients | Activity 3: Pyramids of numbers Write 3 food chains on the classroom whiteboard. Ask learners to use their knowledge from KS3 to draw a pyramid of numbers for each food chain. Discuss as a class once complete.  [View full activity in B4.1h - 4.1j Energy transfers in an ecosystem - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010b-b41h-41j-energy-transfers-in-an-ecosystem?activity=322082#322082)  THINKING CONTEXTUALLY |  |
|  | B4.1d explain the effect of factors such as temperature, water content, and oxygen availability on rate of decomposition to include the terms aerobic and anaerobic WS1.1b, WS1.1h, WS1.2b, WS1.2c, WS1.2e, WS1.3a, WS1.3b, WS1.3c, WS1.3d, WS1.3e, WS1.3f, WS1.3g, WS2a, WS2b, WS2c, WS2d | Activity 2: Food webs Animal and plant cards for learners to cut out and arrange in to a food web. Learners draw the links between organisms and label them producer, primary consumer, decomposer etc. Learner instructions included.  [View full activity in B4.1h - 4.1j Energy transfers in an ecosystem - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010b-b41h-41j-energy-transfers-in-an-ecosystem?activity=322080#322080)  THINKING CONTEXTUALLY |  |
|  | B4.1e describe different levels of organisation in an ecosystem from individual organisms to the whole ecosystem | Activity 4: Pyramids of biomass Ask learners to draw pyramids of biomass for the same 3 food chains as activity 3. What do learners notice about the shape of each pyramid? How is this different from the equivalent pyramid of numbers? Why might this be?  [View full activity in B4.1h - 4.1j Energy transfers in an ecosystem - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010b-b41h-41j-energy-transfers-in-an-ecosystem?activity=322084#322084)  THINKING CONTEXTUALLY |  |
|  | B4.1f explain how abiotic and biotic factors can affect communities to include temperature, light intensity, moisture level, pH of soil, predators, food WS1.3a, WS1.3b, WS1.3e WS1.3h, WS2a, WS2b, WS2c, WS2d | Activity 6: Food chains Teachers write 2 food chains on the classroom whiteboard. Discuss with learners which one is most efficient. Further the discussion by asking what chicken (or pig/cattle) farmers might do to increase the efficiency of the food chain e.g keep indoors in confined space, antibiotics etc.  [View full activity in B4.1h - 4.1j Energy transfers in an ecosystem - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010b-b41h-41j-energy-transfers-in-an-ecosystem?activity=322088#322088)  THINKING CONTEXTUALLY |  |
|  | B4.1g describe the importance of interdependence and competition in a community to include interdependence relating to predation, mutualism and parasitism WS1.4a, WS2a, WS2b, WS2c, WS2d | Activity 5: Energy transfer A PowerPoint presentation giving information and short activities/questions for learners to complete. Content covered includes energy transfer, how energy is lost at each trophic level, how to calculate efficiency of energy transfers. Teachers may want to adapt the slides for lower ability learners.  [View full activity in B4.1h - 4.1j Energy transfers in an ecosystem - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010b-b41h-41j-energy-transfers-in-an-ecosystem?activity=322086#322086)  THINKING CONTEXTUALLY |  |
|  | B4.1h describe the differences between the trophic levels of organisms within an ecosystem to include use of the terms producer and consumer (separate science only) | Activity 7: Calculating energy efficiency of biomass transfer This web page has links to a set of exam-style questions and mark schemes on the topic of energy transfer in a food chain for higher, middle and lower ability learners.  [View full activity in B4.1h - 4.1j Energy transfers in an ecosystem - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba004-b4-community-level-systems/delivery-guide-gbadg010b-b41h-41j-energy-transfers-in-an-ecosystem?activity=322090#322090)  THINKING CONTEXTUALLY |  |
|  | B4.1i describe pyramids of biomass and explain, with examples, how biomass is lost between the different trophic levels to include loss of biomass related to egestion, excretion, respiration (separate science only) WS1.3c, WS1.3e | Inheritance activity Learners work through a series of problems to solve simple inheritance puzzles.  [View full activity in B5.1 Inheritance - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg011-b51-inheritance?activity=357553#357553)  THINKING CONTEXTUALLY |  |
|  | B4.1j calculate the efficiency of biomass transfers between trophic levels and explain how this affects the number of trophic levels in a food chain (separate science only) | Genetics terminology worksheet Card sort activity to match key genetics terms to their meaning and examples.  [View full activity in B5.1 Inheritance - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg011-b51-inheritance?activity=330114#330114)  THINKING CONCEPTUALLY |  |
|  | BM5.1i understand and use direct proportions and simple ratios in genetic crosses M1c | Nucleus to gene Learners should label the activity to show the connection between DNA and the nucleus of cells.  [View full activity in B5.1 Inheritance - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg011-b51-inheritance?activity=330116#330116)  THINKING CONCEPTUALLY |  |
|  | BM5.1ii understand and use the concept of probability in predicting the outcome of genetic crosses M2e | DNA: Chromosomes card sort activity Learners should match the name with its description and picture.  [View full activity in B5.1 Inheritance - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg011-b51-inheritance?activity=330118#330118)  THINKING CONCEPTUALLY |  |
|  | BM5.1iii extract and interpret information from charts, graphs and tables M2c, M4a | DNA extraction Learners use a range of food items such as onions or peas and extract the DNA from them.  [View full activity in B5.1 Inheritance - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg011-b51-inheritance?activity=330138#330138)  THINKING CONTEXTUALLY |  |
|  | B5.1a explain the following terms: gamete, chromosome, gene, allele/ variant, dominant, recessive, homozygous, heterozygous, genotype and phenotype | Discontinuous or continuous data Learners should collect continuous and discontinuous data from their classmates for analysis.  [View full activity in B5.1 Inheritance - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg011-b51-inheritance?activity=330120#330120)  THINKING CONCEPTUALLY |  |
|  | B5.1b describe the genome as the entire genetic material of an organism | Genes or environment venn diagram Learners should decide upon whether features are controlled by genes, environment or a combination of both.  [View full activity in B5.1 Inheritance - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg011-b51-inheritance?activity=330122#330122)  THINKING CONCEPTUALLY |  |
|  | B5.1c describe that the genome, and its interaction with the environment, influence the development of the phenotype of an organism to include use of examples of discontinuous and continuous variation e.g. eye colour, weight and height | Genes or environment worksheet Learners should use the worksheet to answer questions on genes and the environment in humans and plants.  [View full activity in B5.1 Inheritance - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg011-b51-inheritance?activity=330124#330124)  THINKING CONCEPTUALLY |  |
|  | B5.1d Recall that all variants arise from mutations, and that most have no effect on the phenotype, some influence phenotype and a very few determine phenotype | Decoding DNA Learners can familiarise themselves with the DNA code sending messages using base pairing rules.  [View full activity in B5.1 Inheritance - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg011-b51-inheritance?activity=330126#330126)  THINKING CONCEPTUALLY |  |
|  | **B5.1e describe how genetic variants may influence phenotype:**   1. **in coding DNA by altering the activity of a protein** 2. **in non-coding DNA by altering how genes are expressed**   **to include:**   1. **in coding: DNA related to mutations affecting protein structure, including active sites of enzymes** 2. **in non-coding: DNA related to stopping transcription of mRNA (use of terms promoter, transcription factor not required)**   **(separate science only)** | Monstrous Mutations game Learners are assigned mutations with respect to their ability to collect peanuts (their food source) when mutations have occurred to their hands.  [View full activity in B5.1 Inheritance - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg011-b51-inheritance?activity=330140#330140)  THINKING CONTEXTUALLY |  |
|  | B5.1f explain some of the advantages and disadvantages of asexual and sexual reproduction in a range of organisms to include the number of live offspring per birth, how quickly the organisms can reproduce verses the need for the introduction of variation in a population caused by environmental pressures (separate science only) | Which type of reproduction is best card sort Learners sort the statements into advantages and disadvantages of sexual and asexual reproduction.  [View full activity in B5.1 Inheritance - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg011-b51-inheritance?activity=330128#330128)  THINKING CONCEPTUALLY |  |
|  | B5.1g explain the terms haploid and diploid | Stages of meiosis flowchart Learners sort the pictures into a flowchard showing the stages of meiosis.  [View full activity in B5.1 Inheritance - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg011-b51-inheritance?activity=330130#330130)  THINKING CONCEPTUALLY |  |
|  | B5.1h explain the role of meiotic cell division in halving the chromosome number to form gametes to include that this maintains diploid cells when gametes combine and is a source of genetic variation | Mitosis and meiosis summary Learners complete the boxes to compare and summarise mitosis and meiosis.  [View full activity in B5.1 Inheritance - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg011-b51-inheritance?activity=330132#330132)  THINKING CONCEPTUALLY |  |
|  | B5.1i explain single gene inheritance to include the context of homozygous and heterozygous crosses involving dominant and recessive genes | Mendel’s social media page Learners compose an online profile page.  [View full activity in B5.1 Inheritance - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg011-b51-inheritance?activity=330142#330142)  THINKING CONTEXTUALLY |  |
|  | B5.1j predict the results of single gene crosses | Exploring classroom variation Learners work with their classmates to identify variation and to decide how best to record and present it for analysis.  [View full activity in B5.2 Natural selection and evolution - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg012-b52-natural-selection-and-evolution?activity=330158#330158)  THINKING CONTEXTUALLY |  |
|  | B5.1k describe sex determination in humans using a genetic cross | Survival of the fittest game Learners work in pairs to explore the effect of background and camouflage on their ability to spot ‘prey’.  [View full activity in B5.2 Natural selection and evolution - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg012-b52-natural-selection-and-evolution?activity=330160#330160)  THINKING CONTEXTUALLY |  |
|  | B5.1l recall that most phenotypic features are the result of multiple genes rather than single gene inheritance | The work of Charles Darwin Video clip to introduce the work of Charles Darwin.  [View full activity in B5.2 Natural selection and evolution - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg012-b52-natural-selection-and-evolution?activity=330154#330154)  THINKING CONCEPTUALLY |  |
|  | B5.1m describe the development of our understanding of genetics to include the work of Mendel (separate science only) WS1.1a, WS1.1d, WS1.1f, WS1.1i | Evolutionary tree activity Learners should try to complete an evolutionary tree for a range of items such as screws and tacks and try to identify the common ancestor.  [View full activity in B5.2 Natural selection and evolution - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg012-b52-natural-selection-and-evolution?activity=330156#330156)  THINKING CONCEPTUALLY |  |
|  | B5.2a state that there is usually extensive genetic variation within a population of a species | Charles Darwin cartoon strip Learners use the information provided to create a cartoon strip showing the work of Darwin.  [View full activity in B5.2 Natural selection and evolution - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg012-b52-natural-selection-and-evolution?activity=330164#330164)  THINKING CONTEXTUALLY |  |
|  | B5.2b describe the impact of developments in biology on classification systems to include natural and artificial classification systems and use of molecular phylogenetics based on DNA sequencing WS1.1b | Evidence for evolution Learners should watch the attached video clip, making notes.  [View full activity in B5.2 Natural selection and evolution - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg012-b52-natural-selection-and-evolution?activity=330148#330148)  THINKING CONCEPTUALLY |  |
|  | B5.2c explain how evolution occurs through the natural selection of variants that have given rise to phenotypes best suited to their environment to include the concept of mutation | Making fossils Learners should use the instructions mat to make their own fossils using plasticine and plaster of Paris.  [View full activity in B5.2 Natural selection and evolution - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg012-b52-natural-selection-and-evolution?activity=330150#330150)  THINKING CONCEPTUALLY |  |
|  | B5.2f describe the work of Darwin and Wallace in the development of the theory of evolution by natural selection and explain the impact of these ideas on modern biology to include seedbanks being used as a store of biodiversity (separate science only) WS1.1a, WS1.1d, WS1.1g, WS1.1h, WS1.3i | Formation of fossils statement sort Learners should sort the statements to show how fossils form.  [View full activity in B5.2 Natural selection and evolution - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg012-b52-natural-selection-and-evolution?activity=330152#330152)  THINKING CONCEPTUALLY |  |
|  | B5.2e describe the evidence for evolution to include fossils and antibiotic resistance in bacteria WS1.1c, WS1.1d, WS1.1g | Evolution and natural selection game Learners are introduced to a scenario where their parents were mutated by UV radiation resulting in mutation of their DNA.  [View full activity in B5.2 Natural selection and evolution - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba005-b5-genes-inheritance-andselection/delivery-guide-gbadg012-b52-natural-selection-and-evolution?activity=330162#330162)  THINKING CONTEXTUALLY |  |
|  | B5.2d describe evolution as a change in the inherited characteristics of a population over time, through a process of natural selection, which may result in the formation of new species | Task 7 - Sampling techniques 1 An experiment to become familiar with the methods of sampling biotic and abiotic factors using capture-recapture techniques in a habitat.  [View full activity in B6.1 Global Challenges Part 1 - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba006-b6-global-challenges/delivery-guide-gbadg013-b61-global-challenges-part-1?activity=373954#373954)  LEARNER ACTIVITIES |  |
|  | BM6.1i construct and interpret frequency tables and diagrams, bar charts and histograms M2c | Task 8 - Sampling techniques 2 An experiment to become familiar with the methods of sampling biotic and abiotic factors in a habitat.  [View full activity in B6.1 Global Challenges Part 1 - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba006-b6-global-challenges/delivery-guide-gbadg013-b61-global-challenges-part-1?activity=373956#373956)  LEARNER ACTIVITIES |  |
|  | BM6.1ii understand the principles of sampling as applied to scientific data M2d | Task 8 - Microbiological techniques An experiment to investigate the effectiveness of naturally occurring antimicrobial substances.  [View full activity in B6.3 Global Challenges Part 3 - Online delivery guide](https://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/delivery-guide/topic-gba006-b6-global-challenges/delivery-guide-gbadg015-b63-global-challenges-part-3?activity=373973#373973)  LEARNER ACTIVITIES |  |
|  | B6.1a explain how to carry out a field investigation into the distribution and abundance of organisms in a habitat and how to determine their numbers in a given area to include sampling techniques (random and transects, capture-recapture), use of quadrats, pooters, nets, keys and scaling up methods WS1.2d, WS1.2b, WS1.2c, WS1.2e, WS1.3h, WS2a, WS2b, WS2c, WS2d |  |  |
|  | B6.1b describe both positive and negative human interactions within ecosystems and explain their impact on biodiversity to include the conservation of individual species and selected habitats and threats from land use and hunting WS2a, WS2b, WS2c, WS2d |  |  |
|  | B6.1c explain some of the benefits and challenges of maintaining local and global biodiversity to include the difficulty in gaining agreements for and the monitoring of conservation schemes along with the benefits of ecotourism |  |  |
|  | **B6.1d evaluate the evidence for the impact of environmental changes on the distribution of organisms, with reference to water and atmospheric gases (separate science only)** |  |  |
|  | BM6.2i use percentiles and calculate percentage gain and loss of mass M1c |  |  |
|  | BM6.2ii calculate arithmetic means M2b |  |  |
|  | BM6.2iii use fractions and percentages M1c |  |  |
|  | BM6.2iv extract and interpret information from charts, graphs and tables M2c, M4a |  |  |
|  | B6.2a describe some of the biological factors affecting levels of food security to include increasing human population, changing diets in wealthier populations, new pests and pathogens, environmental change, sustainability and cost of agricultural inputs (separate science only) |  |  |
|  | B6.2b describe and explain some possible agricultural solutions to the demands of the growing human population to include increased use of hydroponics, biological control, gene technology, fertilisers and pesticides (separate science only) WS1.1c |  |  |
|  | B6.2c explain the impact of the selective breeding of food plants and domesticated animals WS1.1c |  |  |
|  | B6.2d describe genetic engineering as a process which involves modifying the genome of an organism to introduce desirable characteristics |  |  |
|  | **B6.2e describe the main steps in the process of genetic engineering to include restriction enzymes, sticky ends, vectors e.g. plasmids, ligase, host bacteria and selection using antibiotic resistance markers** |  |  |
|  | B6.2f explain some of the possible benefits and risks of using gene technology in modern agriculture to include practical and ethical considerations (separate science only) WS1.1c, WS1.1d, WS1.1e, WS1.1f, WS1.1g, WS1.1h, WS1.3i |  |  |
|  | B6.2g describe and explain some possible biotechnological solutions to the demands of the growing human population to include genetic modification WS1.1c, WS1.1g |  |  |
|  | BM6.3i translate information between graphical and numerical forms M4a |  |  |
|  | BM6.3ii construct and interpret frequency tables and diagrams, bar charts and histograms M2c |  |  |
|  | BM6.3iii understand the principles of sampling as applied to scientific data M2d |  |  |
|  | BM6.3iv use a scatter diagram to identify a correlation between two variables M2g |  |  |
|  | BM6.3v calculate cross-sectional areas of bacterial cultures and clear agar jelly using pr2 (separate science only) M5c |  |  |
|  | B6.3a describe the relationship between health and disease |  |  |
|  | B6.3b describe different types of diseases to include communicable and non-communicable diseases |  |  |
|  | B6.3c describe the interactions between different types of disease to include HIV and tuberculosis; HPV and cervical cancer M |  |  |
|  | B6.3d explain how communicable diseases (caused by viruses, bacteria, protists and fungi) are spread in animals and plants to include scientific quantities, number of pathogens, number of infected cases, estimating number of cases WS1.4b |  |  |
|  | B6.3e explain how the spread of communicable diseases may be reduced or prevented in animals and plants to include detection of the antigen, DNA testing, visual identification of the disease WS1.4b |  |  |
|  | B6.3f describe a minimum of one common human infection, one plant disease and sexually transmitted infections in humans including HIV/AIDS to include plant diseases: virus tobacco mosaic virus TMV, fungal *Erysiphe graminis* barley powdery mildew, bacterial *Agrobacterium tumafaciens* crown gall disease |  |  |
|  | B6.3g describe physical plant defence responses to disease to include leaf cuticle, cell wall (separate science only) |  |  |
|  | B6.3h describe chemical plant defence responses to include antimicrobial substances (separate science only) |  |  |
|  | **B6.3i describe different ways plant diseases can be detected and identified, in the lab and in the field to include the laboratory detection of the DNA or antigen from the disease causing organism. The field diagnosis by observation and microscopy (separate science only)** |  |  |
|  | B6.3j explain how white blood cells and platelets are adapted to their defence functions in the blood |  |  |
|  | B6.3k describe the non-specific defence systems of the human body against pathogens |  |  |
|  | B6.3l explain the role of the immune system of the human body in defence against disease |  |  |
|  | **B6.3m describe how monoclonal antibodies are produced (separate science only)** WS1.1d |  |  |
|  | **B6.3n describe some of the ways in which monoclonal antibodies can be used to include their role in detecting antigens in pregnancy testing, detection of diseases (prostate cancer) and potentially treating disease (targeting cancer cells) (separate science only)** |  |  |
|  | B6.3o explain the use of vaccines and medicines in the prevention and treatment of disease to include antibiotics, antivirals and antiseptics WS1.1g, WS1.1h |  |  |
|  | B6.3p explain the aseptic techniques used in culturing organisms to include use of alcohol, flaming, autoclaving of glassware and growth media, and measures used to stop contaminants falling onto/into the growth media (e.g. working around a Bunsen burner) (separate science only) WS1.1h, WS1.2c, WS2a, WS2b, WS2c, WS2d |  |  |
|  | B6.3q describe the processes of discovery and development of potential new medicines to include preclinical and clinical testing WS1.1d, WS2a, WS2b, WS2c, WS2d |  |  |
|  | B6.3r recall that many non-communicable human diseases are caused by the interaction of a number of factors to include cardiovascular diseases, many forms of cancer, some lung (bronchitis) and liver (cirrhosis) diseases and diseases influenced by nutrition, including type 2 diabetes |  |  |
|  | B6.3s evaluate some different treatments for cardiovascular disease to include lifestyle, medical and surgical |  |  |
|  | B6.3t analyse the effect of lifestyle factors on the incidence of non-communicable diseases at local, national and global levels to include lifestyle factors to include exercise, diet, alcohol and smoking |  |  |
|  | B6.3u describe cancer as the result of changes in cells that lead to uncontrolled growth and division |  |  |
|  | B6.3v discuss potential benefits and risks associated with the use of stem cells in medicine to include tissue transplantation and rejection WS1.1c, WS1.1d, WS1.1e, WS1.1f, WS1.1g, WS1.1h, WS1.1j |  |  |
|  | B6.3w explain some of the possible benefits and risks of using gene technology in medicine to include practical and ethical considerations WS1.1c, WS1.1d, WS1.1e, WS1.1j |  |  |
|  | B6.3x discuss the potential importance for medicine of our increasing understanding of the human genome to include the ideas of predicting the likelihood of diseases occurring and their treatment by drugs which are targeted to genomes WS1.1c, WS1.1d, WS1.1j |  |  |
|  | PAG B1 Microscopy |  |  |
|  | PAG B2 Testing for biological molecules |  |  |
|  | PAG B3 Sampling techniques |  |  |
|  | PAG B4 Rates of enzyme-controlled reactions |  |  |
|  | PAG B5 Photosynthesis |  |  |
|  | PAG B6 Physiology, responses respiration |  |  |
|  | PAG B7 Microbiological techniques |  |  |
|  | PAG B8 Transport in and out of cells |  |  |