# Switching Edexcel GCSE (9-1) Biology to OCR GCSE (9-1) Gateway Biology A

## Introduction

Are you currently teaching the Edexcel GCSE sciences? Are you thinking of switching? We are here to help.

We will provide you with all the support you could need to switch from the Edexcel GCSE Biology qualification to our OCR GCSE Biology A, including:

* Mapping of Edexcel’s specification to OCR’s specification
* An overview of the differences in assessment
* Mapping of the Edexcel textbook to OCR’s specification

## Our offer

* Our GCSE (9-1) Gateway Biology A qualification has been created by our subject specialist team working with a number of stakeholders including: OCR Science Consultative Forum, teachers, assessors, Higher Education Institutions and learned societies. It has been created to be a qualification which engages students so they achieve their full potential.
* Our GCSE team are passionate about both science and education. With industry, teaching and assessment experience, they are fully committed to supporting centres’ delivery of our GCSE qualifications.
* We have produced a wide range of support materials, such as handbooks (including maths skills), delivery guides, practical activities and end of topic quizzes. We have a selection of practice papers which can be used as mock papers in preparation for the exams and we have a free and user-friendly tool - ExamBuilder - that you can use to create customised papers for students.
* Within this document as well as mapping the specifications, we also provide textbook mapping – illustrating how you can use your existing Edexcel textbooks to teach the OCR specification; making it easier for you to use the resources you already have.
* Join our conversations on the OCR Community and @ocr\_science on Twitter to discuss and share good practice.

## Key differences

|  |  |
| --- | --- |
| **OCR GCSE (9-1) Gateway Biology A** | **Edexcel GCSE (9-1) Biology** |
| **8 flexible practical** activities -select from our suggested activities or use your own preferred practical activities. | 8 core practical activities you have to deliver. |
| In each assessment students have 1 hour and 45 minute to complete **90** marks worth of questions | In each assessment learners have 1 hour and 45 minute to complete **100** marks worth of questions. |
| 15 marks of multiple choice questions at the start of each paper. | Some multiple choice questions scattered throughout papers. |
| One 6 mark level of response question per paper. | **Two** 6 mark level of response question on all sample assessment material. |

## Content mapping

The content within the OCR GCSE (9-1) in Biology A (Gateway) covers the key concepts of biology and will be very familiar. We’ve laid it out in a logical progression to support teaching the GCSE in a linear way.

Below is a table to show where Edexcel biology content is covered in the OCR Gateway biology specification.

| **Pearson Edexcel Level 1/Level 2 GCSE (9-1) in Biology (1BIO)** | **OCR Biology A (Gateway Science)** | **Surplus Content In Pearson Edexcel Biology** |
| --- | --- | --- |
| Topic 1 key concepts in biology | 1.1 Cell structures  1.2 What happens in cells (and what do they need)  2.1 Supplying the cell |  |
| Topic 2 cells and control | 2.1 supplying the cell  3.1 Coordination & control – the nervous system  6.3 Monitoring & maintaining health |  |
| Topic 3 genetics | 1.2 What happens in cells (and what do they need)  5.1 Inheritance  5.2 Natural selection & evolution | 3.17B describe the inheritance of ABO blood groups with reference to co-dominance & multiple alleles  3.18B Explain how sex linked genetic disorders are inherited (Higher only) |
| Topic 4 natural selection & genetic modification | 5.2 Natural selection & evolution  6.2 Feeding the human race | 4.5 describe the evidence for human evolution based on stone tools including: the development of tools over time; how these can be dated from their environment  4.9B describe the process of tissue culture & its advantages in medical research & plant breeding programmes |
| Topic 5 health, disease & the development of medicines | 6.3 Monitoring & maintaining health | 5.7B Describe the lifecycle of a virus including lysogenic and lytic pathways |
| Topic 6 plant structures & their functions | 1.4 Photosynthesis  2.2 The challenges of size  3.2 Coordination & control – the endocrine system | 6.14B Explain how plants are adapted to survive in extreme environments including the effect of leaf size and shape, the cuticle and stomata |
| Topic 7 animal coordination, control and homeostasis | 3.2 Coordination & control – the endocrine system  3.3 Maintaining internal environments | 7.17 evaluate the correlation between body mass and type 2 diabetes including waist: hip calculations & BMI, using the BMI equation: BMI=weight/height2 |
| Topic 8 exchange & transport in animals | 1.3 Respiration  2.1 Supplying the cell  2.2 The challenges of size | 8.5B calculate the rate of diffusion using Fick’s Law: rate = (surface area x concentration difference)/thickness of membrane  8.12 Calculate heart rate, stroke volume and cardiac output using the equation: cardiac output= stroke volume x heart rate |
| Topic 9 ecosystems & material cycles | 4.1 Ecosystems  6.1 Monitoring & maintaining the environment  6.2 Feeding the human race | 9.15 Explain how nitrates are made available for plant uptake including the use of fertilisers crop rotation and the role of bacteria in the nitrogen cycle |

## Assessment

A comparison of the differences in assessment models is below:

|  |  |
| --- | --- |
| **OCR GCSE (9-1) Gateway Biology A** | **Edexcel GCSE (9-1) Biology** |
| **Paper 1** (Foundation) or Paper 3 (Higher)  Assessed: Topic 1-3 and 7  Time allowed: 1 hour 45 minutes  Foundation and Higher tier available  Marks: 90 marks  Weighting: 50% of GCSE  Question types:  Section A: 15 x Multiple choice  Section B: structured, closed short answer and 1 x 6 mark level of response | **Paper 1**  Assessed: Topics 1-5  Time allowed: 1 hour 45 minutes  Foundation and Higher tier available  Marks: 100 marks  Weighting: 50% of GCSE  Question types: Multiple choice, , short answer, calculations and open response |
| **Paper 2** (Foundation) or Paper 4 (Higher)  Assessed: Topic 4-6 and 7 (may draw on knowledge from topics 1-3)  Foundation and Higher tier available  Marks 90 marks  Weighting 50% of GCSE  Question types:  Section A: 15 x Multiple choice  Section B: structured, closed short answer and 1 x 6 mark level of response | **Paper 2**  Assessed: Topics 1, 6-9  Time allowed: 1 hour 45 minutes  Foundation and Higher tier available  Marks: 100 marks  Weighting: 50% of GCSE  Question types: Multiple choice, short answer, calculations and open response. |

## Using the Edexcel textbook

Below you will find all the information you need to start teaching OCR GCSE (9-1) Gateway Biology A while still using the new Edexcel textbooks. We have mapped our specification to the Edexcel Pearson textbook to save you having to buy another set of textbooks. We also have endorsed textbooks for use with our specification and details of these textbooks can be found on the qualification page on the OCR website.

## Edexcel Pearson textbook mapping

 indicates content is for separate science biology only

| **Specification statement** | **Chapter covering specification statement** | **Page number** | **Comments** |
| --- | --- | --- | --- |
| **Topic B1 Cell level systems** | | | |
| **B1.1 Cell structures** | | | |
| B1.1a describe how light microscopes and staining can be used to view cells | SB1a plant and animal cells, Sb1b core practical | 2 & 3, 6 & 7 | SB1b core practical using microscopes |
| B1.1b explain how the main sub-cellular structures of eukaryotic cells (plants and animals) and prokaryotic cells are related to their functions | SB1b plant and animal cells, SB1d inside Bacteria | 4 & 5, 10& 11 | eukaryotic cells 4&5, bacteria 10 & 11 |
| B1.1c explain how electron microscopy has increased our understanding of sub-cellular structures | SB1b plant and animal cells | 4 & 5 |  |
| BM1.1i demonstrate an understanding of number, size and scale and the quantitative relationship between units | Sbia microscopes | 2 & 3 |  |
| BM1.1ii use estimations and explain when they should be used | SB1b plant & animal cells | 4 & 5 |  |
| **BM1.1iii calculate with numbers written in standard form** | SB1d inside bacteria | 11 |  |
| **B1.2 What happens in cells (and what do cells need)?** | | | |
| B1.2a describe DNA as a polymer | SB3ci DNA | 54 |  |
| B1.2b describe DNA as being made up of two strands forming a double helix | SB3ci DNA | 54 |  |
| 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 | SB3ci DNA | 54 |  |
| **B1.2d  recall a simple description of protein synthesis** | SB3d protein synthesis | 58 & 59 | transcription on pg 58, translation pg 59 with diagrams, but not very simple |
| **B1.2e  explain simply how the structure of DNA affects the proteins made in protein synthesis** | SB3e genetic variants and phenotypes | 60 |  |
| B1.2f describe experiments that can be used to investigate enzymatic reactions | Sb1h core practical pH and enzymes,  SB1h enzyme activity | 22 & 23, 20 & 21 | p20-21 graphic representations and analysis |
| B1.2g explain the mechanism of enzyme action | SB1g enzyme action SB1h enzyme activity | 18 & 19 20 & 21 | p20-21 factors affecting enzyme action |
| BM1.2i carry out rate calculations for chemical reactions | SB1h enzyme activity | 20, 21 | exam style questions |
| BM1.2ii understand and use simple compound measures such as the rate of a reaction | SB1h enzyme activity | 20, 21 | exam style questions |
| **B1.3 Respiration** | | | |
| B1.3a describe cellular respiration as a universal chemical process, continuously occurring that supplies ATP in all living cells | SB8e cellular respiration | 170 | ATP not mentioned ("releases energy") |
| B1.3b describe cellular respiration as an exothermic reaction | SB8e cellular respiration | 170 |  |
| B1.3c compare the processes of aerobic respiration and anaerobic respiration | SB8e cellular respiration | 170 & 171 | plants not mentioned |
| B1.3d explain the importance of sugars in the synthesis and breakdown of carbohydrates | SB1e enzymes & nutrition | 12 | starch to glucose only |
| B1.3e explain the importance of amino acids in the synthesis and breakdown of proteins | SB1e enzymes & nutrition | 12 |  |
| B1.3f explain the importance of fatty acids and glycerol in the synthesis and breakdown of lipids | SB1e enzymes & nutrition | 12 |  |
| **B1.4 Photosynthesis** | | | |
| B1.4a describe photosynthetic organisms as the main producers of food and therefore biomass for life on Earth | SB6a photosynthesis | 124 |  |
| B1.4b describe the process of photosynthesis | SB6a photosynthesis | 124 | not stated that it is a 2 stage process |
| B1.4c describe photosynthesis as an endothermic reaction | SB6a photosynthesis | 124 |  |
| B1.4d describe experiments to investigate photosynthesis | SB6b core practical - light intensity and photosynthesis | 128 |  |
| B1.4e explain the effect of temperature, light intensity and carbon dioxide concentration on the rate of photosynthesis | SB6b factors that affect photosynthesis and Core practical as above | 126-128 |  |
| **B1.4f explain the interaction of these factors in limiting the rate of photosynthesis** | SB6b factors that affect photosynthesis | 127 |  |
| BM1.4i understand and use simple compound measures such as the rate of a reaction | SB6b factors that affect photosynthesis and Core practical as above | 126, 127 | rate means speed, inverse square law |
| BM1.4ii translate information between graphical and numerical form | SB6b core practical - light intensity and photosynthesis | 129 | plot a graph from given data |
| BM1.4iii plot and draw appropriate graphs, selecting appropriate scales and axes | SB6b core practical - light intensity and photosynthesis | 129 | plot a graph from given data |
| BM1.4iv extract and interpret information from graphs, charts and tables | SB6b core practical - light intensity and photosynthesis | 129 | exam style questions |
| **BM1.4v understand and use inverse proportion – the inverse square law and light intensity in the context of factors affecting photosynthesis** | SB6b factors that affect photosynthesis | 127 |  |
| **Topic B2 Scaling up** | | | |
| **B2.1 Supplying the cell** | | | |
| B2.1a explain how substances are transported into and out of cells through diffusion, osmosis and active transport | SB1i transporting substances, Core practical: Osmosis in Potato slices | 24, 25 |  |
| B2.1b describe the process of mitosis in growth, including the cell cycle | SB2a mitosis | 30, 31 |  |
| B2.1c explain the importance of cell differentiation | SB2b growth in animals | 33 |  |
| B2.1d recall that stem cells are present in embryonic and adult animals and meristems in plants | SB2d stem cells,  SB4f tissue culture | 36, 37, 86, 87 | page 87 description of cauliflower cloning |
| B2.1e describe the functions of stem cells | SB2d stem cells | 36 |  |
| B2.1f describe the difference between embryonic and adult stem cells in animals | SB2d stem cells | 36 | zebra fish |
| BM2.1i use percentiles and calculate percentage gain and loss of mass | SB2b growth in animals SB2c growth in plants | 33, 35 | percentiles percentage gain and loss |
| **B2.2 The challenges of size** | | | |
| B2.2a explain the need for exchange surfaces and a transport system in multicellular organisms in terms of surface area : volume ratio | SB8a efficient transport and exchange SB8b factors affecting diffusion | 162, 163, 164, 165 |  |
| B2.2b describe some of the substances transported into and out of a range of organisms in terms of the requirements of those organisms | SB8a efficient transport and exchange | 162, 163 |  |
| B2.2c describe the human circulatory system | SB8c the circulatory system SB8a efficient transport and exchange | 166, 167, 162, 163 | No mention of double circulatory system |
| B2.2d explain how the structure of the heart and the blood vessels are adapted to their functions | SB8d the heart SB8c the circulatory system | 168, 169, 166, 167 |  |
| B2.2e explain how red blood cells and plasma are adapted to their transport functions in the blood | SB8c the circulatory system | 166, 167 |  |
| B2.2f explain how water and mineral ions are taken up by plants, relating the structure of the root hair cells to their function | SB6c absorbing water and mineral ions | 130, 131 |  |
| B2.2g describe the processes of transpiration and translocation | SB6d transpiration & translocation  SB6a photosynthesis | 132, 133, 125 |  |
| B2.2h explain how the structure of the xylem and phloem are adapted to their functions in the plant | SB6d transpiration & translocation | 133 | also diagram p134 |
| B2.2i explain the effect of a variety of environmental factors on the rate of water uptake by a plant | SB6d transpiration & translocation | 132, 133 |  |
| B2.2j describe how a simple potometer can be used to investigate factors that affect the rate of water uptake | SB6d transpiration & translocation | 132 |  |
| BM2.2i calculate surface area : volume ratios | SB8a efficient transport & exchange | 162, 163 |  |
| BM2.2ii use simple compound measures such as rate | SB6b factors that affect photosynthesis | 126, 127 |  |
| BM2.2iii carry out rate calculations | SB6b core practical - light intensity and photosynthesis | 129 | exam style questions |
| BM2.2iv plot, draw and interpret appropriate graphs |  |  |  |
| **Topic B3 Organism level systems** | | | |
| **B3.1 Coordination and control - the nervous system** | | | |
| B3.1a describe the structure of the nervous system | SB2g the nervous system SB2i neurotransmission speeds | 42, 43, 46 | relay and motor neurone |
| B3.1b explain how the components of the nervous system can produce a coordinated response | SB2g the nervous system | 42, 43 |  |
| B3.1c explain how the structure of a reflex arc is related to its function | SB2i neurotransmission speeds | 47 |  |
| B3.1d  explain how the main structures of the eye are related to their functions | SB2h the eye | 44, 45 |  |
| B3.1e  describe common defects of the eye and explain how some of these problems may be overcome | SB2h the eye | 45 |  |
| B3.1f  describe the structure and function of the brain | SB2e the brain | 38, 39 |  |
| **B3.1g  explain some of the difficulties of investigating brain function** |  |  | not found (p40 41 for investigating brain function, no mention of difficulties) |
| **B3.1h  explain some of the limitations in treating damage and disease in the brain and other parts of the nervous system** |  |  | not found (as above) |
| BM3.1i extract and interpret data from graphs, charts and tables |  |  | not found in this section |
| **B3.2 Coordination and control - the endocrine system** | | | |
| B3.2a describe the principles of hormonal coordination and control by the human endocrine system | SB7a hormones | 142, 143 |  |
| **B3.2b explain the roles of thyroxine and adrenaline in the body** | SB7b hormonal control of metabolic rate | 144, 145 |  |
| B3.2c describe the role of hormones in human reproduction including the control of the menstrual cycle | SB7c the menstrual cycle SB7d hormones & the menstrual cycle | 146, 147, 148, 149 |  |
| **B3.2d explain the interactions of FSH, LH, oestrogen and progesterone in the control of the menstrual cycle** | SB7d hormones & the menstrual cycle | 148 |  |
| B3.2e explain the use of hormones in contraception and evaluate hormonal and non-hormonal methods of contraception | SB7c the menstrual cycle | 147 | Comparison table. No evaluation of different methods |
| **B3.2f explain the use of hormones in modern reproductive technologies to treat infertility** | SB7d hormones & the menstrual cycle | 149 |  |
| 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 | SB6f plant hormones | 136, 137 |  |
| B3.2h  describe some of the variety of effects of plant hormones, relating to auxins, **gibberellins and ethene** | SB6f plant hormones | 137 |  |
| **B3.2i  describe some of the different ways in which people use plant hormones to control plant growth** | SB6g uses of plant hormones | 138, 139 |  |
| BM3.2i extract and interpret data from graphs, charts and tables | SB7c menstrual cycle SB7d hormones & menstrual cycle | 147, 148 |  |
| BM3.2ii translate information between numerical and graphical forms | SB7c the menstrual cycle | 146, 147 |  |
| **B3.3 Maintaining internal environment** | | | |
| B3.3a explain the importance of maintaining a constant internal environment in response to internal and external change | SB7e control of blood glucose SB7g thermoregulation | 151, 154 | definition of homeostasis role of hypothalamus, mention of hypothermia |
| B3.3b  describe the function of the skin in the control of body temperature | SB7g thermoregulation | 155 |  |
| B3.3c explain how insulin controls blood sugar levels in the body | SB7e control of blood glucose | 150 |  |
| **B3.3d explain how glucagon interacts with insulin to control blood sugar levels in the body** | SB7e control of blood glucose | 151 |  |
| B3.3e compare type 1 and type 2 diabetes and explain how they can be treated | SB7e control of blood glucose SB7f type 2 diabetes | 151, 152 |  |
| B3.3f  explain the effect on cells of osmotic changes in body fluids | SB7h osmoregulation | 156 | water potentials, lysis and shrinking not specifically mentioned |
| B3.3g  describe the function of the kidneys in maintaining the water balance of the body | SB7h osmoregulation | 156 | "urinary system removes excess amounts.." not mentioned that kidneys vary amount/ conc of urine (water) |
| B3.3h describe the gross structure of the kidney and the structure of the kidney tubule | SB7i the kidneys | 158, 159 |  |
| **B3.3i  describe the effect of ADH on the permeability of the kidney tubules** | SB7i the kidneys | 159 | controlling water content |
| **B3.3j  explain the response of the body to different temperature and osmotic challenges** | SB7g thermoregulation SB7i the kidneys | 155, 159 | no mention of dehydration, high salt intake, thirst |
| BM3.3i extract and interpret data from graphs, charts and tables | SB7f type 2 diabetes | 152, 153 |  |
| **Topic B4 Community level systems** | | | |
| **B4.1 Ecosystems** | | | |
| B4.1a recall that many different materials cycle through the abiotic and biotic components of an ecosystem | SB9k the carbon cycle SB9l the nitrogen cycle | 198, 199, 200, 201 |  |
| B4.1b explain the role of microorganisms in the cycling of materials through an ecosystem | SB9k the carbon cycle | 198, 199 |  |
| B4.1c explain the importance of the carbon cycle and the water cycle to living organisms | SB8j the water cycle SB9k the carbon cycle | 196, 197, 198, 199 |  |
| B4.1d  explain the effect of factors such as temperature, water content, and oxygen availability on rate of decomposition | SB9m rates of decomposition | 202, 203 | terms aerobic and anaerobic NOT used |
| B4.1e describe different levels of organisation in an ecosystem from individual organisms to the whole ecosystem | SB9a ecosystems | 176, 177 |  |
| B4.1f explain how abiotic and biotic factors can affect communities | SB9c abiotic factors and communities SB9d biotic factors and communities | 180, 181, 184, 185 |  |
| B4.1g describe the importance of interdependence and competition in a community | SB9a ecosystems SB9d biotic factors and communities SB9f Parastism and Mutualism | 176, 184, 185, 188, 189 | (definition of interdependence) |
| B4.1h  describe the differences between the trophic levels of organisms within an ecosystem | SB9b energy transfer | 178 |  |
| B4.1i describe pyramids of biomass and explain, with examples, how biomass is lost between the different trophic levels | SB9b energy transfer | 178, 179 |  |
| 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 | SB9b energy transfer | 179 |  |
| BM4.1i  calculate rate changes in the decay of biological material | SB9m rates of decomposition | 203 | worked example |
| BM4.1ii calculate the percentage of mass | SB9b energy transfer | 179 |  |
| BM4.1iii Use fractions and percentages | SB9b energy transfer | 179 |  |
| BM4.1iv plot and draw appropriate graphs selecting appropriate scales for the axes |  |  | none found in this section |
| BM4.1v extract and interpret information from charts, graphs and tables | SB9d biotic factors & communities | 185 | extend question |
| **Topic B5 Genes, inheritance and selection** | | | |
| **B5.1 Inheritance** | | | |
| B5.1a explain the following terms: gamete, chromosome, gene, allele/variant, dominant, recessive, homozygous, heterozygous, genotype and phenotype | SB3b meiosis SB3g alleles | 52, 64, 65 | Gamete, chromosome gene allele dominant recessive homozygous heterozygous genotype phenotype |
| B5.1b describe the genome as the entire genetic material of an organism | SB3b meiosis | 52 |  |
| B5.1c describe that the genome, and its interaction with the environment, influence the development of the phenotype of an organism | SB3b meiosis SB3k variation | 52, 72 |  |
| 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 | SB3e genetic variants and phenotypes SB3j gene mutation | 60, 61, 70 | eye colour weight and height not given as examples |
| **B5.1e  describe how genetic variants may influence phenotype: • in coding DNA by altering the activity of a protein • in non-coding DNA by altering how genes are expressed** | SB3d protein synthesis SB3e genetic variants an phenotypes | 59, 60, 61 |  |
| B5.1f  explain some of the advantages and disadvantages of asexual and sexual reproduction in a range of organisms | SB3a sexual and asexual reproduction | 50, 51 |  |
| B5.1g explain the terms haploid and diploid | SB1c specialised cells SB2a mitosis SB3b meiosis | 8, 30, 52, |  |
| B5.1h explain the role of meiotic cell division in halving the chromosome number to form gametes | SB3b meiosis | 53 |  |
| B5.1i explain single gene inheritance | SB3h inheritance | 66, 67 |  |
| B5.1j predict the results of single gene crosses | SB3h inheritance | 66, 67 |  |
| B5.1k describe sex determination in humans using a genetic cross | SB3h inheritance | 66 |  |
| B5.1l recall that most phenotypic features are the result of multiple genes rather than single gene inheritance | SB3i multiple and missing alleles | 68, 69 |  |
| B5.1m  describe the development of our understanding of genetics | SB3f Mendel | 62, 63 |  |
| BM5.1i understand and use direct proportions and simple ratios in genetic crosses | SB3h inheritance | 66 |  |
| BM5.1ii understand and use the concept of probability in predicting the outcome of genetic crosses | SB3h inheritance | 66 | worked example |
| BM5.1iii extract and interpret information from charts, graphs and tables | SB3h inheritance | 66, 67 |  |
| **B5.2 Natural selection and evolution** | | | |
| B5.2a state that there is usually extensive genetic variation within a population of a species | SB3g alleles SB4b Darwin’s theory | 64, 78 | although never explicitly stated |
| B5.2b describe the impact of developments in biology on classification systems | SB4d classification | 82, 83 | Artificial and natural classification not mentioned specifically. Impact of developments not actually found |
| B5.2c explain how evolution occurs through the natural selection of variants that have given rise to phenotypes best suited to their environment | SB4b Darwin’s theory | 78, 79 | natural selection due to genetic variation (not mutation) |
| 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 | SB4b Darwin’s theory | 78, 79 |  |
| B5.2e describe the evidence for evolution | SB4a evidence for human evolution SB4b Darwin’s theory | 76, 77, 79 | fossil evidence antibiotic resistance |
| 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 | SB4c development of Darwin’s theory | 80, 81 |  |
| **Topic B6 Global challenges** | | | |
| **B6.1 Monitoring and maintaining the environment** | | | |
| 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 | SB9a ecosystems SB9c core practical Quadrats and transects | 177, 182, 183 | Quadrats, population equation Quadrats and transects only no mention of other sampling/identification techniques |
| B6.1b describe both positive and negative human interactions within ecosystems and explain their impact on biodiversity | SB9g biodiversity and humans SB9h preserving biodiversity | 190, 191, 192, 193 |  |
| B6.1c explain some of the benefits and challenges of maintaining local and global biodiversity |  |  | not found |
| **B6.1d  evaluate the evidence for the impact of environmental changes on the distribution of organisms, with reference to water and atmospheric gases** | SB9e assessing pollution | 186, 187 |  |
| BM6.1i construct and interpret frequency tables and diagrams, bar charts and histograms |  |  | none found |
| BM6.1ii understand the principles of sampling as applied to scientific data | SB9c core practical Quadrats and transects | 183 |  |
| **B6.2 Feeding the human race** | | | |
| B6.2a  describe some of the biological factors affecting levels of food security | SB9i food security | 194, 195 |  |
| B6.2b  describe and explain some possible agricultural solutions to the demands of the growing human population | SB4i fertilisers and biological control | 92, 93 | no mention of hydroponics and not related to the growing global population |
| B6.2c explain the impact of the selective breeding of food plants and domesticated animals | SB4g genes in agriculture and medicine | 88 |  |
| B6.2d describe genetic engineering as a process which involves modifying the genome of an organism to introduce desirable characteristics | SB4e breeds and varieties SB4g genes in agriculture and medicine | 85, 89 | (p89 bacterial modification) |
| **B6.2e describe the main steps in the process of genetic engineering** | SB4g genes in agriculture and medicine | 89 | (no mention of selection using antibiotic resistance markers) |
| B6.2f  explain some of the possible benefits and risks of using gene technology in modern agriculture | SB4g genes in agriculture and medicine SB4h GM and agriculture | 88, 90, 91 |  |
| B6.2g describe and explain some possible biotechnological solutions to the demands of the growing human population | SB4h GM and agriculture | 90, 91 | (not related to population growth) |
| BM6.2i use percentiles and calculate percentage gain and loss of mass | SB2b growth in animals | 32 |  |
| BM6.2ii calculate arithmetic means |  |  | none in this section |
| BM6.2iii use fractions and percentages |  |  | none in this section |
| BM6.2iv extract and interpret information from charts, graphs and tables | SB4h GM & agriculture | 91 |  |
| **B6.3 Monitoring and maintaining health** | | | |
| B6.3a describe the relationship between health and disease | SB5a health & disease | 96, 97 |  |
| B6.3b describe different types of diseases | SB5a health & disease | 97 |  |
| B6.3c describe the interactions between different types of disease | SB5d pathogens | 102, 103 | HIV and TB only |
| B6.3d explain how communicable diseases (caused by viruses, bacteria, protists and fungi) are spread in animals and plants | SB5e spreading pathogens SB5h plant diseases | 104, 105, 110, 111 | no numbers |
| B6.3e explain how the spread of communicable diseases may be reduced or prevented in animals and plants | Sb5e spreading pathogens SB5g plant defences | 104, 105, 108, 109 |  |
| B6.3f describe a minimum of one common human infection, one plant disease and sexually transmitted infections in humans including HIV/AIDS | Sb5d pathogens SB5h plant diseases SB5i physical & chemical barriers | 102, 110, 111, 113 |  |
| B6.3g  describe physical plant defence responses to disease | SB5g plant defences | 108 |  |
| B6.3h  describe chemical plant defence responses | SB5g plant defences | 108, 109 |  |
| **B6.3i  describe different ways plant diseases can be detected and identified, in the lab and in the field** | SB5h plant diseases | 110, 111 |  |
| B6.3j explain how white blood cells and platelets are adapted to their defence functions in the blood | SB8c the circulatory system | 167 |  |
| B6.3k describe the non-specific defence systems of the human body against pathogens | SB5j the immune system | 114, 115 |  |
| B6.3l explain the role of the immune system of the human body in defence against disease | SB5j the immune system | 114, 115 |  |
| **B6.3m  describe how monoclonal antibodies are produced** | SB5l monoclonal antibodies | 120, 121 |  |
| **B6.3n  describe some of the ways in which monoclonal antibodies can be used** | SB5l monoclonal antibodies | 121 |  |
| B6.3o explain the use of vaccines and medicines in the prevention and treatment of disease | SB5j the immune system SB5k antibiotic and core practicals | 115, 116, 117, 118 | no mention of antivirals. (Antiseptics mentioned in core practical) |
| B6.3p  explain the aseptic techniques used in culturing organisms | SB5k core practical antibiotics | 118, 119 |  |
| B6.3q describe the processes of discovery and development of potential new medicines | SB5k antibiotics | 116, 117 |  |
| B6.3r recall that many non-communicable human diseases are caused by the interaction of a number of factors | SB5b non communicable diseases  SB5c cardiovascular disease SB7f type 2 diabetes | 98, 99, 100, 101, 152, 153 |  |
| B6.3s evaluate some different treatments for cardiovascular disease | SB5c cardiovascular disease | 101 |  |
| B6.3t analyse the effect of lifestyle factors on the incidence of non-communicable diseases at local, national and global levels | SB5b non communicable diseases | 99 |  |
| B6.3u describe cancer as the result of changes in cells that lead to uncontrolled growth and division | SB2a mitosis | 31 |  |
| B6.3v discuss potential benefits and risks associated with the use of stem cells in medicine | SB2d stem cells | 37 |  |
| B6.3w explain some of the possible benefits and risks of using gene technology in medicine | SB4g genes in agriculture and medicine | 88, 89 |  |
| B6.3x discuss the potential importance for medicine of our increasing understanding of the human genome | SB3j gene mutation | 71 | Human genome project |
| BM6.3i translate information between graphical and numerical forms | SB5b non communicable diseases | 99 |  |
| BM6.3ii construct and interpret frequency tables and diagrams, bar charts and histograms | SB5b non communicable diseases SB5c cardiovascular disease | 99, 100 |  |
| BM6.3iii understand the principles of sampling as applied to scientific data | SB5h plant diseases | 111 | diagnostic testing, soil sampling |
| BM6.3iv use a scatter diagram to identify a correlation between two variables | SB5a health & disease SB5h plant diseases | 96, 97, 111 |  |
| BM6.3v  calculate cross-sectional areas of bacterial cultures and clear agar jelly using πr2 | SB5f virus life cycles | 107 |  |

## Want to switch to OCR?

If you’re an OCR-approved centre, all you need to do is download the specification and start teaching. Your exams officer can complete an intention to teach form which enables us to provide appropriate support. When you’re ready to enter your students, you just need to speak to your exams officer to:

1. Make estimated entries by 10 October so we can prepare the question papers and ensure we’ve got enough examiners.
2. Make final entries by 21 February. If you are not already an OCR-approved centre please refer your exams officer to the centre approval section of our admin guide.

## Next steps

1. Familiarise yourself with the specification, sample assessment materials and teaching resources on the OCR Biology A qualification page of the OCR website.

<http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/>

1. Browse the online delivery guides for teaching ideas and use the Scheme of Work builder to create your personal scheme of work.   
   <http://www.ocr.org.uk/qualifications/gcse-gateway-science-suite-biology-a-j247-from-2016/planning-and-teaching/>
2. Get a login for our secure extranet, Interchange – this allows you to access the latest past/practice papers and use our results analysis service, Active Results.

<https://interchange.ocr.org.uk>

1. Sign up to receive subject updates by email.   
   <http://www.ocr.org.uk/i-want-to/email-updates>
2. Sign up to attend a training event or take part in webinars on specific topics running throughout the year and our Q&A webinar sessions every half term.   
   <https://www.cpdhub.ocr.org.uk>
3. Attend one of our free teacher network events that are run in each region every term. These are hosted at the end of the school day in a school or college near you, with teachers sharing best practice and subject specialists on hand to lead discussion and answer questions.  
   <http://ocr.org.uk/qualifications/professional-development/teacher-networks/>