| **This 3-Year Scheme of Work offers a flexible approach for KS4. The suggested timings are based on three lessons per fortnight (assuming a two-week timetable of two lessons one week and one lesson in the other) but can be tailored to suit the needs of a particular class or group of students. Lessons are assumed to be sessions of 40-60 minutes. The teaching scheme is scheduled to finish in the second term of Year 11 to allow time for revision and GCSE examinations in the summer term. Please note that some of these lessons are shorter than others and therefore sometimes there are more than three lessons in a fortnight. The maths skills spreads are numbered as the last spread in a chapter but can be used at any appropriate point according to the needs of your students.** |
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| **Year** | **Term** | **Week** | **Student Book spread number**  | **Lesson title** | **Lesson objectives** | **AQA specification reference** | **Lesson resources (on CD ROM)** | **Collins Connect resources** |
| **Chapter 1: Cell biology (17 lessons)** |
| Year 9 | Term 1 | 1/2 | 1.1 | Looking at cells | * Describe the structure of eukaryotic cells.
* Recognise the order of magnitude of cells.
* Explain how the main sub-cellular structures are related to their functions.
 | 4.1.1.1; 4.1.1.2 | Worksheets 1.1.1, 1.1.2 and 1.1.3; PowerPoint presentation | Quick starter Homework worksheetHomework quizSlideshow |
| Year 9 | Term 1 | 1/2 | 1.2 | The light microscope | * Describe how to use a microscope.
* Observe plant and animal cells with a light microscope.
* Understand the limitations of light microscopy.
 | 4.1.1.5 | Worksheet 1.2; Practical sheet 1.2; Technician’s notes 1.2; PowerPoint presentation | Quick starter Homework worksheetHomework quizSlideshow |
| Year 9 | Term 1 | 1/2 | 1.3 | Looking at cells in more detail | * Identify the differences in the magnification and resolving power of light and electron microscopes.
* Describe simply how electron microscopes work in comparison to light microscopes.
* Explain how electron microscopy has increased our understanding of sub-cellular structures.
 | 4.1.1.5 | Worksheet 1.3; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 1 | 3/4 | 1.4 | Required practical: Using a light microscope to observe and record animal and plant cells | * Apply knowledge to select techniques, instruments,

apparatus and materials to observe cells.* Make and record observations and measurements.
* Present observations and other data using appropriate

methods. | 4.1.1.2 | Worksheets 1.4.1 and 1.4.2; Practical sheets 1.4.1 and 1.4.2; Technician’s notes 1.4; PowerPoint presentation | Quick starter Homework worksheetHomework quizVideo |
| Year 9 | Term 1 | 3/4 | 1.5 | Primitive cells | * Describe and explain the differences between prokaryotic cells and eukaryotic cells.
* Explain how prokaryotic and eukaryotic cells evolved over time.
 | 4.1.1.1; 4.1.1.2 | Worksheet 1.5; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 1 | 3/4 | 1.6 | Cell division | * Describe the process of mitosis in growth, and mitosis as part of the cell cycle.
* Describe how the process of mitosis produces cells that are identical genetically to the parent cell.
 | 4.1.2.1; 4.1.2.2 | Worksheets 1.6.1 and 1.6.2; Technician’s notes 1.6; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 1 | 5/6 | 1.7 | Cell differentiation | * Explain the importance of cell differentiation.
* Understand size and scale in relation to cells, tissues,

organs and body systems. * Describe how cells, tissues, organs and organ systems are organised to make up an organism.
 | 4.1.1.3; 4.1.1.4 | Worksheet 1.7; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 1 | 5/6 | 1.8 | Cancer | * Describe cancer as a condition resulting from changes in cells that lead to their uncontrolled growth, division and spread.
* Understand some of the risk factors that trigger cells to become cancerous.
* Use data to analyse and evaluate the impact of cancer.
 | 4.2.2.7 | Worksheets 1.8.1, 1.8.2 and 1.8.3; PowerPoint presentation | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 9 | Term 1 | 5/6 | 1.9 | Stem cells | * Identify cells as being differentiated, or as stem cells.
* Describe the function of stem cells in embryonic and adult animals.
* Explain how stem cells can be useful.
 | 4.2.1.3 | Worksheets 1.9.1 and 1.9.2; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 1 | 7/8 | 1.10 | Stem cell banks | * Explore the use of stem cells in medicine.
* Identify the risks in using stem cells.
* Evaluate the benefits and disadvantages of using stem cells.
 | 4.1.2.3 | Worksheet 1.10; PowerPoint presentation | Quick starter Homework worksheetHomework quizVideo |
| Year 9 | Term 1 | 7/8 | 1.11 | Key concept: Cell development | * Revise ideas about cell structure, cell division and stem cells.
* Apply ideas about cells to unfamiliar contexts.
* Describe how plant meristems can be used in cloning.
 | 4.1.2.3 | Worksheets 1.11.1 and 1.11.2; PowerPoint presentation | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 9 | Term 1 | 7/8 | 1.12 | Cells at work | * Recognise that all organisms respire.
* Explain respiration as the process of making energy.
* Describe aerobic respiration as an exothermic reaction.
 | 4.2.2.1 | Worksheet 1.12; Practical sheet 1.12; Technician’s notes 1.12; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 1 | 7/8 | 1.13 | Living without oxygen | * Describe the process of anaerobic respiration.
* Explain when anaerobic processes occur.
* Compare the processes of aerobic and anaerobic respiration.
 | 4.2.2.1 | Worksheet 1.13; PowerPoint presentation | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 9 | Term 1 | 9/10 | 1.14 | Growing microorganisms | * Describe the techniques used to produce uncontaminated cultures of microorganisms.
* Describe how bacteria reproduce by binary fission.
* Calculate the number of bacteria in a population.
 | 4.1.1.6 | Worksheet 1.14; Practical sheet 1.14; Technician’s notes 1.14; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 1 | 9/10 | 1.15 | Testing new antibiotics | * Use appropriate apparatus to investigate the effect of antibiotics on bacterial growth.
* Use microorganisms safely.
* Apply sampling techniques to ensure that samples are representative.
 | 4.3.1.8; 4.3.1.9 | Worksheets 1.15.1, 1.15.2 and 1.15.3 | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 1 | 9/10 | 1.16 | Required practical: Investigating disinfectants | * Carry out experiments with due regard to health and safety.
* Present and process data, identifying anomalous results.
* Evaluate methods and suggest further investigations.
 | 4.1.1.6 | Worksheet 1.16; Practical sheet 1.16; Technician’s notes 1.16 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 9 | Term 1 | 9/10 | 1.17 | Maths skills: Size and number | * To make estimates of the results of simple calculations, without using a calculator.
* To use ratio and proportion to calibrate a microscope.
* To recognise and use numbers in decimal and standard form.
 |  | Worksheets 1.17.1 and 1.17.2 | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 9 | Term 1 | 11/12 | **Assessments** | End of chapter test Student BookEnd of chapter test Collins Connect |
| **Chapter 2: Photosynthesis (12 lessons)** |
| Year 9 | Term 1 | 11/12 | 2.1 | Explaining photosynthesis | * Identify the raw materials and products of photosynthesis.
* Describe photosynthesis by an equation.
* Explain gas exchange in leaves.
 | 4.4.1.1 | Worksheet 2.1; Practical sheet 2.1; Technician’s notes 2.1 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 9 | Term 1 | 11/12 | 2.2 | Looking at photosynthesis | * Explain the importance of photosynthesis.
* Explain how plants use the glucose they produce.
 | 4.4.1.1; 4.2.3.2 | Worksheet 2.2; Technician’s notes 2.2 | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 2 | 13/14 | 2.3 | Investigating leaves | * Identify the internal structures of a leaf.
* Explain how the structure of a leaf is adapted for photosynthesis.
* Recall that chlorophyll pigments in chloroplasts absorb light energy for photosynthesis.
 | 4.2.3.1 | Worksheets 2.3.1, 2.3.2 and Technician’s notes 2.3 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 9 | Term 2 | 13/14 | 2.4 | Required practical: Investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed | * Identify and manage variables.
* Process data and identify outliers.
* Evaluate an experimental process.
 | 4.4.1.2 | Worksheet 2.4; Practical sheets 2.4.1, 2.4.2 and 2.4.3; Technician’s notes 2.4 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 9 | Term 2 | 13/14 | 2.5 | Increasing photosynthesis | * Identify factors that affect the rate of photosynthesis.
* Interpret data about the rate of photosynthesis.
* Explain the interaction of factors in limiting the rate of photosynthesis.
 | 4.4.1.2 | Worksheet 2.5; Technician’s notes 2.5 | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 2 | 15/16 | 2.6 | Increasing food production | * Identify the factors that increase food production.
* Explain how these factors can be controlled.
* Evaluate the benefits of manipulating the environment to increase food production.
 | 4.4.1.2 | Worksheet 2.6; Technician’s notes 2.6 | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 9 | Term 2 | 15/16 | 2.7 | Key concept: Diffusion in living systems | * Use concentration gradients to explain the direction of diffusion.
* Apply the principles of diffusion to movement of different substances in plants.
 | 4.1.3.1 | Worksheets 2.7.1, 2.7.2 and 2.7.3; Practical sheet 2.7; Technician’s notes 2.7 | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 9 | Term 2 | 15/16 | 2.8 | Looking at stomata | * Describe transpiration in plants.
* Explain the structure and function of stomata.
* Explain the relationship between transpiration and leaf structure.
 | 4.2.3.1; 4.2.3.2 | Worksheet 2.8; Practical sheet 2.8; Technician’s notes 2.8 | Quick starter Homework worksheetHomework quizVideo |
| Year 9 | Term 2 | 15/16 | 2.9 | Moving water | * Describe the structure and function of xylem and roots.
* Describe how xylem and roots are adapted to absorb water.
* Explain why plants in flooded or waterlogged soil die.
* Explain how wilting occurs.
 | 4.2.3.1; 4.2.3.2 | Worksheets 2.9.1, 2.9.2 and 2.9.3; Practical sheet 2.9; Technician’s notes 2.9 | Quick starter Homework worksheetHomework quizVideo |
| Year 9 | Term 2 | 17/18 | 2.10 | Investigating transpiration | * Describe how transpiration is affected by different factors.
* Explain the movement of water in the xylem.
 | 4.2.3.2 | Worksheet 2.10; Practical sheet 2.10; Technician’s notes 2.10 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 9 | Term 2 | 17/18 | 2.11 | Moving sugar | * Describe the movement of sugar in a plant as translocation.
* Explain how the structure of phloem is adapted to its function in the plant.
* Explain the movement of sugars around the plant.
 | 4.2.3.2 | Worksheet 2.11; Technician’s notes 2.11 | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 2 | 17/18 | 2.12 | Maths skills: Surface area to volume ratio | * Be able to calculate surface area and volume.
* Be able to calculate surface-area-to-volume ratio.
* Know how to apply ideas about surface area and volume.
 | 4.2.3.2 | Worksheet 2.12 | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 9 | Term 2 | 17/18 | **Assessments** | End of chapter test Student BookEnd of chapter test Collins ConnectEnd of teaching block test Collins Connect |
| **Chapter 3: Moving and changing materials (18 lessons)** |
| Year 9 | Term 2 | 19/20 | 3.1 | Explaining water movement | * Describe how water moves by osmosis in living tissues.
* Identify factors that affect the rate of osmosis.
* Explain what the term ‘partially permeable membrane’ means.
 | 4.1.3.2 | Worksheet 3.1; Practical sheet 3.1; Technician’s notes 3.1 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 9 | Term 2 | 19/20 | 3.2 | Required practical: Investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue | * Use scientific ideas to develop a hypothesis.
* Plan experiments to test a hypothesis.
* Draw conclusions from data and compare these with hypotheses made.
 | 4.1.3.2 | Worksheet 3.2; Practical sheets 3.2.1 and 3.2.2; Technician’s notes 3.2 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 9 | Term 2 | 19/20 | 3.3 | Learning about active transport | * Describe active transport.
* Explain how active transport is different from diffusion and osmosis.
* Explain why active transport is important.
 | 4.1.3.3 | Worksheet 3.3; Technician’s notes 3.3 | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 2 | 19/20 | 3.4 | Key concept: Investigating the need for transport systems | * Describe the need for transport systems. Describe how the effectiveness of an exchange surface can be increased. Explain in terms of surface-area-to-volume ratios the need for transport systems
 | 4.1.3.1 | Worksheet 3.4; Practical sheet 3.4; Technician’s notes 3.4 | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 9 | Term 2 | 21/22 | 3.5 | Explaining enzymes | * Describe what enzymes are and how they work.
* Explain the lock-and-key theory.
* Use the collision theory to explain enzyme action.
 | 4.2.2.1 | Worksheet 3.5; Practical sheet 3.5; Technician’s notes 3.5 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 9 | Term 2 | 21/22 | 3.6 | Required practical: Investigate the effect of pH on the rate of reaction of amylase enzyme | * Describe how safety is managed, apparatus is used and accurate measurements are made.
* Explain how representative samples are taken.
* Make and record accurate observations.
* Draw and interpret a graph from secondary data using knowledge and observations.
 | 4.2.2.1 | Worksheets 3.6.1, 3.6.2 and 3.6.3; Practical sheet 3.6; Technician’s notes 3.6 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 9 | Term 2 | 23/24 | 3.7 | Learning about the digestive system | * Identify and locate the organs in the digestive system, and describe their functions.
* Describe how the products of digestion are absorbed into the body.
* Explain why the small intestine is an efficient exchange surface.
 | 4.2.2.1 | Worksheet 3.7; Practical sheet 3.7 (teacher demonstration); Technician’s notes 3.7 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 9 | Term 2 | 23/24 | 3.8 | Explaining digestion | * Describe how physical digestion helps to increase the rate of chemical digestion.
* Name the sites of production and action of specific enzymes.
* Interpret data about digestive enzymes.
 | 4.2.2.1 | Worksheet 3.8 | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 2 | 23/24 | 3.9 | Required practical: Use qualitative reagents to test for a range of carbohydrates, lipids and proteins | * Suggest appropriate apparatus for the procedures.
* Describe how safety is managed and apparatus is used.
* Describe how accurate measurements are made.
* Interpret observations and make conclusions.
 | 4.2.2.1 | Practical sheets 3.9.1 and 3.9.2; Technician’s notes 3.9 | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 3 | 25/26 | 3.10 | Looking at more exchange surfaces | * Identify the structures responsible for gas exchange in fish, amphibians and insects.
* Describe the adaptations of different gas exchange surfaces.
* Explain the gas exchange surfaces in amphibians.
 | 4.1.3.1 | Worksheets 3.10.1, 3.10.2 and 3.10.3 | Quick starter Homework worksheetHomework quizVideo |
| Year 9 | Term 3 | 25/26 | 3.11 | Learning about plants and minerals | * Describe how mineral ions from the soil help plants to grow.
* Explain how root hair cells are adapted for efficient osmosis.
* Describe the function of different mineral ions in a plant.
 | 4.1.3.3; 4.2.3.2 | Worksheet 3.11 | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 3 | 25/26 | 3.12 | Investigating how plants use minerals | * Describe why plants need different mineral ions.
* Explain the effects of mineral deficiencies on plant growth.
* Explain the importance of fertilisers.
 | 4.1.3.3 | Worksheet 3.12; Practical sheet 3.12; Technician’s notes 3.12 | Quick starter Homework worksheetHomework quizVideo |
| Year 9 | Term 3 | 27/28 | 3.13 | Learning about the circulatory system | * Identify the parts of the circulatory system.
* Describe the functions of the parts of the circulatory system.
* Explain how the structure of each part of the circulatory system relates to its function.
 | 4.2.2.2; 4.2.2.3 | Worksheets 3.13.1, 3.13.2 and 3.13.3; Practical sheets 3.13.1 and 3.13.2; Technician’s notes 3.13 | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 3 | 27/28 | 3.14 | Exploring the heart | * Describe the structure and functions of the heart.
* Identify the functions and adaptations of the parts of the heart.
* Explain the movement of blood around the heart.
 | 4.2.2.2 | Worksheet 3.14; Practical sheet 3.14; Technician’s notes 3.14 | Quick starter Homework worksheetHomework quizSlideshowVideos |
| Year 9 | Term 3 | 27/28 | 3.15 | Studying blood | * Identify the parts of the blood and their functions.
* Explain the adaptations of red blood cells.
* Explain how red blood cells and haemoglobin transport oxygen efficiently.
 | 4.2.2.3 | Worksheets 3.15.1 and 3.15.2 | Quick starter Homework worksheetHomework quizVideo |
| Year 9 | Term 3 | 29/30 | 3.16 | Investigating gas exchange | * Identify the parts of the human gas exchange system and know their functions.
* Explain how gas exchange occurs in humans.
* Explain the adaptations of the gas exchange surfaces.
 | 4.1.3.1; 4.2.2.2 | Worksheet 3.16; Practical sheet 3.16; Technician’s notes 3.16 | Quick starter Homework worksheetHomework quizVideo |
| Year 9 | Term 3 | 29/30 | 3.17 | Learning about coronary heart disease | * Identify the causes and symptoms of coronary heart disease and heart failure.
* Describe possible treatments of coronary heart disease and heart failure.
* Evaluate the possible treatments of coronary heart disease and heart failure.
 | 4.2.2.4 | Worksheets 3.17.1, 3.17.2 and 3.17.3 | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 3 | 29/30 | 3.18 | Maths skills: Extracting and interpreting information | * To extract and interpret information from tables, charts and graphs.
 |  | Worksheets 3.18.1, 3.18.2 and 3.18.3 | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 9 | Term 3 | 29/30 | **Assessments** | End of chapter test Student BookEnd of chapter test Collins Connect |
| **Chapter 4: Health matters (18 lessons)** |
| Year 9 | Term 3 | 31/32 | 4.1 | Learning about health | * Recall the difference between health and disease.
* Explain how some diseases interact.
* Evaluate data about lifestyle and health.
 | 4.2.2.6; 4.2.2.7 | Worksheets 4.1.1, 4.1.2 and 4.1.3; Practical sheet 4.1; Technician’s notes 4.1 | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 3 | 31/32 | 4.2 | Key concept: Looking at risk factors | * Recall the causes of some non-communicable diseases.
* Describe the impact of lifestyle on non-communicable diseases.
* Explain the impact of lifestyle on non-communicable diseases.
 | 4.2.2.6 | Worksheets 4.2.1 and 4.2.2 | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 9 | Term 3 | 31/32 | 4.3 | Exploring non-communicable diseases | * Identify risk factors for cancer.
* Explain the differences between types of tumours.
* Explain the impact of non-communicable diseases
 | 4.2.2.6; 4.2.2.7 | Worksheet 4.3; Practical sheet 4.3; Technician’s notes 4.3 | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 3 | 31/32 | 4.4 | Analysing and evaluating data | * Translate information between graphical and numerical forms.
* Use scatter diagrams to identify correlations.
* Evaluate the strength of evidence.
 | 4.2.2.5; 4.2.2.6 | Worksheets 4.4.1, 4.4.2 and 4.4.3; Practical sheet 4.4; Technician’s notes 4.4 | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 3 | 33/34 | 4.5 | Studying pathogens | * Recall the definition of a pathogen.
* Explain how communicable diseases can be controlled.
* Distinguish between epidemics and pandemics.
 | 4.3.1.1 | Worksheets 4.5.1 and 4.5.2 | Quick starter Homework worksheetHomework quizVideos |
| Year 9 | Term 3 | 33/34 | 4.6 | Learning about viral diseases | * Describe the symptoms of some viral diseases.
* Describe the transmission and control of some viral diseases.
* Explain how some viral diseases are spread.
 | 4.3.1.2 | Worksheets 4.6.1, 4.6.2 and 4.6.3 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 9 | Term 3 | 33/34 | 4.7 | Studying bacterial diseases | * Describe the symptoms of some bacterial diseases.
* Explain how some bacterial diseases can be controlled.
* Compare and contrast bacterial and viral diseases.
 | 4.3.1.3 | Worksheets 4.7.1, 4.7.2 and 4.7.3 | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 3 | 35/36 | 4.8 | Looking at fungal diseases | * Recall the name and symptoms of a fungal disease.
* Describe the transmission and treatment of rose black spot.
* Explain how rose black spot affects the growth of the plant.
 | 4.3.1.4 | Worksheet 4.8 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 9 | Term 3 | 35/36 | 4.9 | Learning about malaria | * Recall that malaria is a protist disease.
* Describe the lifecycle of the malarial vector.
* Evaluate control methods for the spread of malaria.
 | 4.3.1.5 | Worksheets 4.9.1 and 4.9.2 | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 3 | 35/36 | 4.10 | Protecting the body | * Describe how the body protects itself from pathogens.
* Explain how the body protects itself from pathogens.
* Explain how communicable diseases can be spread.
 | 4.3.1.6 | Worksheets 4.10.1, 4.10.2 and 4.10.3 | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 3 | 37/38 | 4.11 | Exploring white blood cells | * Describe phagocytosis.
* Explain how antibody production can lead to immunity.
* Explain the specificity of immune system responses
 | 4.3.1.6 | Worksheet 4.11 | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 3 | 37/38 | 4.12 | Using antibiotics and painkillers | * Describe the uses of antibiotics and painkillers.
* Explain how antibiotics and painkillers can be used to treat diseases.
* Explain the limitations of antibiotics.
 | 4.3.1.8 | Worksheet 4.12; Practical sheet 4.12; Technician’s notes 4.12 | Quick starter Homework worksheetHomework quiz |
| Year 9 | Term 3 | 37/38 | 4.13 | Building immunity | * Recall how vaccinations prevent infection.
* Explain how mass vaccination programmes reduce the spread of a disease.
* Evaluate the global use of vaccination.
 | 4.3.1.7 | Worksheets 4.13.1, 4.13.2 and 4.13.3 | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 10 | Term 1 | 39/40 | 4.14 | Making new drugs | * Recall some traditional drugs and their origins.
* Describe how new drugs are developed.
* Explain why ‘double-blind’ trials are conducted.
 | 4.3.1.9 | Worksheets 4.14.1 and 4.14.2; Practical sheet 4.14; Technician’s notes 4.14 | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 10 | Term 1 | 39/40 | 4.15 | Investigating monoclonal antibodies (high demand only) | * Describe uses of monoclonal antibodies.
* Explain how monoclonal antibodies are produced.
* Evaluate the use of monoclonal antibodies.
 | 4.3.2.1; 4.3.2.2 | Worksheet 4.15 | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 1 | 39/40 | 4.16 | Looking at plant diseases | * Recall the causes of plant diseases.
* Describe the symptoms and identification methods of some plant diseases.
* Explain the use of monoclonal antibodies in identifying plant pathogens.
 | 4.3.3.1 | Worksheets 4.16.1, 4.16.2 and 4.16.3 | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 1 | 41/42 | 4.17 | Learning about plant defences | * Recall some physical plant defence responses.
* Explain how mechanical plant defence systems help them survive.
* Explain how chemical plant defence systems help them survive.
 | 4.3.3.2 | Worksheet 4.17 | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 1 | 41/42 | 4.18 | Maths skills: Sampling and scientific data | * Understand why sampling is used in science.
* Be able to explain different sampling techniques.
 |  | Worksheet 4.18; Practical sheet 4.18; Technician’s notes 4.18 | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 10 | Term 1 | 41/42 | **Assessments** | End of chapter test Student BookEnd of chapter test Collins ConnectEnd of teaching block test Collins ConnectEnd of year test Collins Connect |
| **Chapter 5: Coordination and control (29 lessons)** |
| Year 10 | Term 1 | 41/42 | 5.1 | Homeostasis | * Explain the importance of homeostasis in regulating internal conditions in the body.
* Recall that these control systems involve nervous or chemical responses.
* Describe how control systems involve receptors, coordination centres and effectors.
 | 4.5.1 | Worksheets 5.1.1 and 5.1.2; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 1 | 43/44 | 5.2 | The nervous system | * Describe the structure and function of the nervous system.
* Explain how the nervous system is adapted to its functions.
* Describe the structure of sensory, motor and relay neurones.
 | 4.5.2.1 | Worksheets 5.2.1 and 5.2.2; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 1 | 43/44 | 5.3 | Reflex actions | * Explain the importance of reflex actions.
* Describe the path of a reflex arc.
* Explain how the structures in the reflex arc relate to their function.
 | 4.5.2.1 | Worksheets 5.3.1, 5.3.2 and 5.3.3; Practical sheet 5.3; Technician’s notes 5.3; PowerPoint presentation | Quick starter Homework worksheetHomework quizSlideshow |
| Year 10 | Term 1 | 43/44 | 5.4 | The brain | * Recall that the brain controls complex behaviour using billions of interconnected neurones.
* Identify the three main regions of the brain and describe their functions.
* Describe how the regions of the brain are mapped.
 | 4.5.2.2 | Worksheets 5.4.1 and 5.4.2 | Quick starter Homework worksheetHomework quizVideo |
| Year 10 | Term 1 | 45/46 | 5.5 | Required practical: Investigating reaction time | * Select appropriate apparatus and techniques for the measurement of biological processes.
* Carry out physiological experiments safely.
* Use appropriate techniques in problem-solving contexts.
 | 4.5.2.1 | Worksheets 5.5.1,5.5.2 and 5.5.3; Practical sheet 5.5; Technician’s notes 5.5 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 10 | Term 1 | 45/46 | 5.6 | The eye | * Relate the structures of the eye to their functions.
* Explain how the eye is adapted to seeing in colour and in dim light.
 | 4.5.2.3 | Worksheets 5.6.1, 5.6.2 and 5.6.3; Practical sheet 5.6; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 1 | 45/46 | 5.7 | Seeing in focus | * Relate the structures of the eye to their functions.
* Understand how the eye is able to focus on near or distant objects.
 | 4.5.2.3 | Worksheets 5.7.1, 5.7.2 and 5.7.3; PowerPoint presentation | Quick starter Homework worksheetHomework quizVideo |
| Year 10 | Term 1 | 47/48 | 5.8 | Eye defects | * Describe and understand why short-sightedness (myopia) occurs.
* Describe and understand why long-sightedness (hyperopia) occurs.
* Demonstrate how techniques are used to correct eye defects.
 | 4.5.2.3 | Worksheets 5.8.1, 5.8.2 and 5.8.3; Practical sheet 5.8 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 10 | Term 1 | 47/48 | 5.9 | Controlling body temperature | * Describe the mechanisms by which body temperature is controlled when too hot or cold.
* Explain how body temperature can be controlled in a specific context.
 | 4.5.2.4 | Worksheet 5.9; Practical sheet 5.9; Technician’s notes 5.9; PowerPoint presentation | Quick starter Homework worksheetHomework quizSlideshow |
| Year 10 | Term 1 | 47/48 | 5.10 | The endocrine system | * Recall that the endocrine system is made up of glands that secrete hormones into the blood.
* Know the location of the major endocrine glands.
* Understand why the pituitary gland is the ‘master gland’.
 | 4.5.3.1 | Worksheets 5.10.1 and 5.10.2 | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 1 | 49/50 | 5.11 | Controlling blood glucose | * Recall that blood glucose is monitored and controlled by the pancreas.
* Understand how insulin controls blood glucose levels.
* Understand how insulin works with another hormone – glucagon – to control blood sugar levels.
 | 4.5.3.2; 4.5.3.7 | Worksheets 5.11.1, 5.11.2 and 5.11.3 | Quick starter Homework worksheetHomework quizVideo |
| Year 10 | Term 1 | 49/50 | 5.12 | Diabetes | * Understand the causes of Type 1 and Type 2 diabetes.
* Compare Type 1 and Type 2 diabetes.
* Evaluate information on the relationship between obesity and diabetes, and make appropriate recommendations.
 | 4.5.3.2; 4.5.3.7 | Worksheets 5.12.1 and 5.12.2; PowerPoint presentation | Quick starter Homework worksheetHomework quizVideo |
| Year 10 | Term 1 | 49/50 | 5.13 | Diabetes recommendations | * Understand the causes of Type 1 and Type 2 diabetes.
* Compare Type 1 and Type 2 diabetes.
* Evaluate information on the relationship between obesity and diabetes, and make appropriate recommendations.
 | 4.5.3.2; 4.5.3.7 | Worksheet 5.13 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 10 | Term 2 | 51/52 | 5.14 | Water balance | * Recall the ways in which the body loses water.
* Explain why cells do not function efficiently if they lose or gain too much water.
* Explain how excess protein is converted to urea for excretion.
 | 4.5.3.3; 4.5.3.7 | Worksheets 5.14.1, 5.14.2 and 5.14.3; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 2 | 51/52 | 5.15 | The kidneys | * Recall that excess water, ions and urea are removed from the body by the kidneys in urine.
* Describe how the kidneys produce urine.
* Explain how the hormone ADH regulates the amount of water in the urine, and therefore, in the body.
 | 4.5.3.3 | Worksheets 5.15.1 and 4.15.2; PowerPoint presentation | Quick starter Homework worksheetHomework quizVideo |
| Year 10 | Term 2 | 51/52 | 5.16 | Negative feedback (Higher tier only) | * Explain the role of thyroxine in the body.
* Understand the principles of negative feedback, as applied to thyroxine.
 | 4.5.3.7 | Worksheet 5.16; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 2 | 53/54 | 5.17 | Kidney failure | * Recall that people who suffer from kidney failure can be treated by dialysis or kidney transplant.
* Understand the principles of dialysis.
* Evaluate the advantages and disadvantages of treating organ failure using a mechanical device or transplant.
 | 4.5.3.3 | Worksheet 5.17 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 10 | Term 2 | 53/54 | 5.18 | Dialysis or transplant? | * Describe different forms of dialysis.
* Use data to draw conclusions.
* Use data to evaluate the advantages and disadvantages of dialysis and kidney donation.
 | 4.5.3.3 | Worksheets 5.18.1, 5.18.2 and 5.18.3  | Quick starter Homework worksheetHomework quizVideo |
| Year 10 | Term 2 | 53/54 | 5.19 | Human reproduction | * Describe the roles of hormones in sexual reproduction.
* Explain how hormones interact in the menstrual cycle.
 | 4.5.3.4 | Worksheets 5.19.1 and 5.19.2 | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 2 | 55/56 | 5.20 | IVF (Higher tier only) | * Explain the use of hormones in technologies to treat infertility.
* Describe the technique of in-vitro fertilisation.
* Evaluate the scientific, emotional, social and ethical issues of in-vitro fertilisation.
 | 4.5.3.6 | Worksheet 5.20; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 2 | 55/56 | 5.21 | IVF evaluation (Higher tier only) | * Evaluate data regarding in-vitro fertilisation and use this to draw conclusions.
* Evaluate the scientific, emotional, social and ethical issues of in-vitro fertilisation.
 | 4.5.3.6 | Worksheet 5.21 | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 2 | 55/56 | 5.22 | Systems working together (Higher tier only) | * Describe the effects of adrenaline.
* Understand that automatic control systems may involve nervous responses and chemical responses.
* Understand that combinations of hormones work to produce a response.
 | 4.5.3.7 | Worksheet 5.22 | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 2 | 57/58 | 5.23 | Contraception | * Define the purpose of contraception.
* Describe hormonal methods and non-hormonal methods of contraception.
* Explain how these methods are effective at preventing pregnancy.
 | 4.5.3.5 | Worksheets 5.23.1 and 5.23.2 | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 2 | 57/58 | 5.24 | Which contraceptive? | * Describe the advantages and disadvantages of different contraceptive methods.
* Use data to evaluate the effectiveness of different contraceptive methods.
 | 4.5.3.5 | Worksheet 5.24 | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 2 | 57/58 | 5.25 | Auxins | * Recall that plants produce hormones to coordinate and control growth, and responses to light and gravity.
* Describe how unequal distributions of auxins cause unequal growth rates in plant shoots and roots.
 | 4.5.4.1; 4.5.4.2 | Worksheets 5.25.1, 5.25.2 and 5.25.3; Practical sheet 5.25; Technician’s notes 5.25 | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 2 | 59/60 | 5.26 | Applications of auxins | * Explain how auxins coordinate and control responses to light and gravity.
* Explain that auxins act on ‘stem cells’ in plants called meristems.
* Describe some applications of auxins.
 | 4.5.4.2 | Worksheets 5.26.1, 5.26.2 and 5.26.3; Practical sheet 5.26; Technician’s notes 5.26 | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 2 | 59/60 | 5.27 | Required practical: The effect of light and gravity on the growth of germinating seeds | * Describe how an experiment is planned for a specific purpose.
* Make and record observations and translate data from one form to another.
* Interpret observations and other data, identifying patterns and trends, make inferences and draw conclusions.
 | 4.5.4.1 | Worksheet 5.27; Practical sheet 5.27; Technician’s notes 5.27 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 10 | Term 2 | 59/60 | 5.28 | Other plant hormones (Higher tier only) | * Recall that gibberellins are important in seed germination, and ethene in cell division and ripening of fruit.
* Explain the application of the plant hormones ethane and gibberellins.
 | 4.5.4.2 | Worksheet 5.28 | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 2 | 61/62 | 5.29 | Maths skills: The spread of scientific data | * Be able to use range bars on graphs.
* Understand how box and whisker plots can be used to show the spread of data.
* Understand how to use percentiles.
 |  | Worksheets 5.29.1, 5.29.2 and 5.29.3 | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 10 | Term 2 | 61/62 | **Assessments** | End of chapter test Student BookEnd of chapter test Collins Connect |
| **Chapter 6: Genetics (14 lessons)** |
| Year 10 | Term 2 | 61/62 | 6.1 | DNA and genes | * Describe the structure of DNA.
* Describe a gene as a small section of DNA that codes for a protein.
 | 4.6.1.4; 4.6.1.5 | Worksheet 6.1; Practical sheet 6.1; Technician’s notes 6.1 | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 10 | Term 3 | 61/62 | 6.2 | The human genome | * Describe a gene as a small section of DNA that codes for a protein.
* Explain the importance of understanding the human genome.
 | 4.6.1.4; 4.6.1.5 | Worksheet 6.2 | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 3 | 63/64 | 6.3 | Tracing human migration | * Explain the importance of understanding the human genome.
* Discuss the use of the human genome in understanding human migration patterns.
 | 4.6.1.4; 4.6.1.5 | Worksheets 6.3.1 and 6.3.2 | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 3 | 63/64 | 6.4 | The structure of DNA | * Describe the structure of DNA as repeating nucleotide units.
* Identify the four bases in DNA.
* Explain that the bases A and T, and C and G, are complementary.
 | 4.6.1.5 | Worksheets 6.4.1 and 6.4.2 Practical sheet 6.4; Technician’s notes 6.4 | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 3 | 63/64 | 6.5 | Proteins | * Describe how proteins are synthesised according to the DNA template of a gene.
* Explain that the genetic code of a gene specifies the protein to be made.
 | 4.6.1.5 | Worksheets 6.5.1 and 6.5.2 | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 10 | Term 3 | 65/66 | 6.6 | Mutations | * Model changes to the base sequences of DNA to illustrate mutations.
* Describe the negative and, sometimes, positive effects of mutations.
* Describe how mutations can affect protein function.
 | 4.6.1.5 | Worksheet 6.6 | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 10 | Term 3 | 65/66 | 6.7 | Meiosis | * Explain how meiosis halves the number of chromosomes for gamete production.
* Explain how fertilisation restores the chromosome number.
* Understand that the four gametes produced by meiosis are genetically different.
 | 4.6.1.1; 4.6.1.2; 4.6.1.8 | Worksheets 6.7.1 and 6.7.2 | Quick starter Homework worksheetHomework quizVideo |
| Year 10 | Term 3 | 65/66 | 6.8 | Asexual and sexual reproduction | * Understand that asexual reproduction involves just one parent and produces genetically identical offspring.
* Understand that sexual reproduction leads to variety in the offspring.
 | 4.6.1.1; 4.6.1.3 | Worksheets 6.8.1 and 6.8.2  | Quick starter Homework worksheetHomework quizSlideshow |
| Year 10 | Term 3 | 67/68 | 6.9 | Genetics | * Understand and be able to use genetics terms, such as dominant, recessive, genotype, phenotype, homozygous and heterozygous.
* Know that some human conditions are caused by a recessive allele.
 | 4.6.1.6; 4.6.1.7 | Worksheets 6.9.1, 6.9.2 and 6.9.3  | Quick starter Homework worksheetHomework quizVideo |
| Year 10 | Term 3 | 67/68 | 6.10 | Genetic crosses | * Use the terms dominant, recessive, genotype, phenotype, homozygous and heterozygous.
* Know that some human conditions, such as cystic fibrosis, are caused by a recessive allele.
* Complete or construct a Punnett square to predict the outcome of a genetic cross.
 | 4.6.1.6; 4.6.1.7 | Worksheets 6.10.1, 6.10.2 and 6.10.3 | Quick starter Homework worksheetHomework quizVideo |
| Year 10 | Term 3 | 67/68 | 6.11 | Tracking gene disorders | * Understand the use of a family tree to show the inheritance of a characteristic.
* Explain economic, social and ethical issues concerned with embryo screening.
 | 4.6.1.6; 4.6.1.7 | Worksheets 6.11.1 and 6.11.2 | Quick starter Homework worksheetHomework quizVideo |
| Year 10 | Term 3 | 69/70 | 6.12 | Gregor Mendel | * Plan experiments to explore phenomena and test hypotheses
* Draw conclusions from given observations
* Evaluate data in terms of reproducibility.
 |  | Worksheets 6.12.1, 6.12.2 and 6.12.13 | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 3 | 69/70 | 6.13 | Key concept: Genetics is simple – or is it? | * Explain how certain characteristics are controlled by a single gene.
* Understand that many characteristics are the result of multiple genes which interact.
* Describe the search for genes that are linked to disease.
 | 4.6.1.6; 4.6.1.7 | Worksheet 6.13 | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 10 | Term 3 | 69/70 | 6.14 | Maths skills: Fractions, ratio, proportion and probability | * Understand and use fractions and percentages.
* Understand and use ratio and proportion.
* Understand and use probability when predicting the outcomes of genetic crosses.
 |  | Practical sheet 6.13; Technician’s notes 6.13 | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 10 | Term 3 | 69/70 | **Assessments** | End of chapter test Student BookEnd of chapter test Collins ConnectEnd of teaching block test Collins Connect |
| **Chapter 7: Variation and evolution (21 lessons)** |
| Year 10 | Term 3 | 71/72 | 7.1 | Variation | * Recall that differences in the characteristics of individuals in a population is called variation.
* Understand the genetic and environmental differences leading to variation.
 | 4.6.2.1 | Worksheets 7.1.1, 7.1.2 and 7.1.3; Practical sheet 7.1; Technician’s notes 7.1; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 3 | 71/72 | 7.2 | The theory of evolution | * Recall that all species of living things have evolved from simple life forms.
* Explain how evolution occurs through natural selection,
 | 4.6.2.2 | Worksheets 7.2.1, 7.2.2 and 7.2.3; PowerPoint presentation | Quick starter Homework worksheetHomework quizSlideshow |
| Year 10 | Term 3 | 71/72 | 7.3 | The origin of species by natural selection | * Explain the evidence that led Darwin to propose the theory of evolution by natural selection.
* Describe the process of natural selection.
 | 4.6.3.1 | Worksheets 7.3.1 and 7.3.2; Practical sheet 7.3; Technician’s notes 7.3; PowerPoint presentation | Quick starter Homework worksheetHomework quizVideo |
| Year 10 | Term 3 | 73/74 | 7.4 | Fossil evidence | * Understand how, and the situations in which, fossils are formed.
* Understand how fossils are used as evidence for evolution of species from simpler life forms.
 | 4.3.6.4; 4.3.6.5 | Worksheets 7.4.1 and 7.4.2 ; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 3 | 73/74 | 7.5 | How much have organisms changed? | * Understand why the fossil record is incomplete.
* Use the fossil record to understand how much, or how little, organisms have changed as life developed on Earth.
 | 4.6.3.5 | Worksheets 7.5.1, 7.5.2 and 7.5.3; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 10 | Term 3 | 73/74 | 7.6 | Darwin and Wallace | * Recognise how Darwin and Wallace proposed, independently, the theory of evolution.
* Describe how Alfred Wallace gathered evidence for evolution, including warning coloration and mimicry.
 | 4.6.3.2 | Worksheets 7.6.1, 7.6.2 and 7.6.3; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 11 | Term 1 | 75/76 | 7.7 | A new species | * Understand that when natural selection operates differently on populations, a new species is produced.
* Understand that during evolution, new species are formed when populations become so different that they can no longer interbreed.
 | 4.6.3.2 | Worksheets 7.7.1, 7.7.1 and 7.7.3; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 11 | Term 1 | 75/76 | 7.8 | Evidence of natural selection and evolution? | * Understand how scientific theories develop over time.
* Plan experiments to test hypotheses
 | 4.6.3.4 | Worksheet 7.8; Practical sheets 7.8.1 and 7.8.2 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 11 | Term 1 | 75/76 | 7.9 | Evolution: fitting the pieces of the jigsaw | * Describe the work of Mendel, Darwin and Wallace.
* Explain how they contributed to the theory of evolution.
* Appreciate that many scientists have contributed to the gene theory.
 | 4.6.3.1; 4.6.3.2; 4.6.3.3 | Worksheets 7.9.1, 7.9.2 and 7.9.3  | Quick starter Homework worksheetHomework quiz |
| Year 11 | Term 1 | 75/76 | 7.10 | Antimicrobial resistance | * Recall that bacteria develop that are resistant to antibiotics, which is evidence of evolution.
* Understand the mechanism by which antibiotic resistance develops.
* Understand the effects of the development of antibiotic resistance on the treatment of disease.
 | 4.6.3.7 | Worksheets 7.10.1, 7.10.2 and 7.10.3; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 11 | Term 1 | 77/78 | 7.11 | Combatting antimicrobial resistance | * Describe how to reduce the rate of development of antibiotic resistance.
* Understand the requirement for, and the impact of, new antibiotics.
* Recognise the difficulties associated with developing new antibiotics.
 | 4.6.3.7 | Worksheets 7.11.1 and 7.11.2 | Quick starter Homework worksheetHomework quiz |
| Year 11 | Term 1 | 77/78 | 7.12 | Selective breeding | * Describe the process of selective breeding.
* Recall how selective breeding enables humans to choose desirable characteristics in animals and plants.
* Explain how selective breeding can lead to inbreeding.
 | 4.6.2.3 | Worksheets 7.12.1 and 7.12.2; PowerPoint presentation | Quick starter Homework worksheetHomework quizSlideshow |
| Year 11 | Term 1 | 77/78 | 7.13 | Producing new plant varieties | * Describe the process of selective breeding.
* Recall how selective breeding enables humans to choose desirable characteristics in plants.
* Evaluate the benefits and risks of selective breeding in plants.
 | 4.6.2.3 | Worksheets 7.13.1 and 7.13.2; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 11 | Term 1 | 79/80 | 7.14 | Genetic engineering | * Explain what is meant by the term genetic engineering.
* Give examples of how plant crops have been genetically engineered to improve products.
* Describe how fungus cells are engineered to produce human insulin
 | 4.6.2.4 | Worksheets 7.14.1 and 7.14.2; PowerPoint presentation | Quick starter Homework worksheetHomework quizVideo |
| Year 11 | Term 1 | 79/80 | 7.15 | Genetically modified crops: the science | * Explain the benefits of genetic modification in a range of crops.
* Explain the concerns about genetic modification.
* Explain the ethical concerns about genetic engineering.
 | 4.6.2.4 | Worksheet 7.15 | Quick starter Homework worksheetHomework quiz |
| Year 11 | Term 1 | 79/80 | 7.16 | Is genetic modification safe? | * Explore the benefits of genetic modification in medicine.
* Explain the concerns that people have about genetic modification.
* Explain the possible safety issues of genetic engineering in agriculture and medicine.
 | 4.6.2.4 | Worksheets 7.16.1 and 7.16.2; PowerPoint presentation | Quick starter Homework worksheetHomework quiz |
| Year 11 | Term 1 | 81/82 | 7.17 | Ethically wrong, or essential? | * Explain the benefits of, and concerns about, genetic modification.
* Explain the ethical issues of genetic engineering in agriculture and medicine.
 | 4.6.2.4 | Worksheets 7.17.1, 7.17.2 and 7.17.3; PowerPoint presentation | Quick starter Homework worksheetHomework quizSlideshow |
| Year 11 | Term 1 | 81/82 | 7.18 | Cloning | * Describe how cuttings and tissue culture are used to produce new plants.
* Describe the use of embryo transplants and adult cell cloning in animals.
 | 4.6.2.5 | Worksheets 7.18.1, 7.18.2 and 7.18.3; Practical sheet 7.18; Technician’s notes 7.18; PowerPoint presentation | Quick starter Homework worksheetHomework quizVideo |
| Year 11 | Term 1 | 81/82 | 7.19 | The tree of life | * Describe how living things have been classified into groups using a system devised by Linnaeus.
* Describe how new models of classification have developed.
 | 4.6.4 | Worksheets 7.19.1, 7.19.2 and 7.19.3 | Quick starter Homework worksheetHomework quizVideo |
| Year 11 | Term 1 | 81/82 | 7.20 | Extinction…or survival? | * List the causes of extinction.
* Explain how new predators, competitors and diseases can lead to extinctions.
 | 4.6.3.6 | Worksheets 7.20.1, 7.20.2 and 7.20.3; PowerPoint presentation | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 11 | Term 1 | 83/84 | 7.21 | Maths skills: Using charts and graphs to display data | * Understand when and how to use bar charts.
* Understand how to show sub-groups on bar charts.
* Understand how to plot histograms.
 |  | Worksheets 7.21.1 and 7.21.2 | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 11 | Term 1 | 83/84 | **Assessments** | End of chapter test Student BookEnd of chapter test Collins Connect |
| **Chapter 8: Ecology in action (24 lessons)** |
| Year 11 | Term 1 | 83/84 | 8.1 | Key concept: Learning about ecosystems | * Describe what an ecosystem is.
* Explain the importance of high biodiversity.
* Explain what is meant by a self-supporting ecosystem
 | 4.7.1.1; 4.7.3.1 | Worksheets 8.1.1, 8.1.2 and 8.1.3 | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 11 | Term 1 | 83/84 | 8.2 | Changing abiotic factors | * Identify abiotic factors that affect ecosystems.
* Explain changes in the distribution of species in an ecosystem.
* Describe stable and unstable populations.
 | 4.7.1.2; 4.7.2.4 | Worksheets 8.2.1, 8.2.2 and 8.2.3; Practical sheets 8.2.1 and 8.2.2; Technician’s notes 8.2 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 11 | Term 1 | 83/84 | 8.3 | Investigating predator­–prey relationships | * Describe how changes in one population affect another.
* Explain interdependent relationships.
* Explain how predator–prey population cycles have cyclical changes.
 | 4.7.2.1 | Worksheets 8.3.1 and 8.3.2; Practical sheet 8.3; Technician’s notes 8.3 | Quick starter Homework worksheetHomework quiz |
| Year 11 | Term 1 | 85/86 | 8.4 | Looking at trophic levels | * Explain trophic levels.
* Explain and construct pyramids of biomass.
* Explain the difficulties in constructing pyramids.
 | 4.7.2.1; 4.7.4.1; 4.7.4.2 | Worksheets 8.4.1, 8.4.2 and 8.4.3  | Quick starter Homework worksheetHomework quiz |
| Year 11 | Term 1 | 85/86 | 8.5 | Transferring biomass | * Identify how biomass is lost.
* Calculate the efficiency of biomass transfers.
* Explain the impact of biomass loss on the numbers of organisms.
 | 4.7.4.3 | Worksheets 8.5.1, 8.5.2 and 8.5.3 | Quick starter Homework worksheetHomework quizVideo |
| Year 11 | Term 1 | 87/88 | 8.6 | Competing for resources | * Describe how competition impacts on populations.
* Explain why animals in the same habitat are in competition.
* Explain interspecific and intraspecific competition.
 | 4.7.1.1 | Worksheets 8.6.1, 8.6.2 and 8.6.3 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 11 | Term 2 | 87/88 | 8.7 | Required practical: Measure the population size of a common species in a habitat | * Describe a suitable method to investigate a population.
* Estimate the size of a population.
* Explain the effect of sample size.
 | 4.7.2.1 | Worksheet 8.7; Practical sheet 8.7; Technician’s notes 8.7 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 11 | Term 2 | 87/88 | 8.8 | Adapting for survival in animals | * Recall why animals have adaptations.
* Explain some adaptations.
* Use surface-area-to-volume ratios to explain some adaptations.
 | 4.7.1.4 | Worksheets 8.8.1; 8.8.2 and 8.8.3; Practical sheet 8.8; Technician’s notes 8.8 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 11 | Term 2 | 89/90 | 8.9 | Adapting for survival in plants | * Identify some adaptations of plants and bacteria.
* Explain the importance of plant adaptations.
* Explain a range of plant adaptations.
 | 4.7.1.4 | Worksheets 8.9.1, 8.9.2 and 8.9.3; Practical sheet 8.9; Technician’s notes 8.9 | Quick starter Homework worksheetHomework quiz |
| Year 11 | Term 2 | 89/90 | 8.10 | Cycling materials | * Recall that many materials are recycled in nature.
* Explain the stages in the water and decay cycles.
* Explain the importance of recycling materials.
 | 4.7.2.2; 4.7.4.1 | Worksheets 8.10.1 and 8.10.2; Practical sheet 8.10 (demonstration); Technician’s notes 8.10 | Quick starter Homework worksheetHomework quizVideo |
| Year 11 | Term 2 | 89/90 | 8.11 | Cycling carbon | * Recall that plants take in carbon as carbon dioxide.
* Explain how carbon is recycled.
* Interpret a diagram of the carbon cycle.
 | 4.7.2.2 | Worksheets 8.11.1 and 8.11.2; Practical sheet 8.11; Technician’s notes 8.11 | Quick starter Homework worksheetHomework quizVideo |
| Year 11 | Term 2 | 91/92 | 8.12 | Investigating decay | * Recall the factors needed for decay.
* Describe how different factors affect decay.
* Explain extracellular digestion.
 | 4.7.2.2 | Worksheets 8.12.1, 8.12.2 and 8.12.3; Practical sheet 8.12; Technician’s notes 8.12 | Quick starter Homework worksheetHomework quiz |
| Year 11 | Term 2 | 91/92 | 8.13 | Investigate the effect of temperature on the rate of decay of fresh milk by measuring pH change | * Describe how safety is managed, apparatus is used and accurate measurements are made.
* Make and record observations and make accurate measurements.
* Evaluate methods and suggest possible improvements and further investigations.
 | 4.7.2.3 | Worksheets 8.13.1, 8.13.2 and 8.13.3; Practical sheet 8.13; Technician’s notes 8.13 | Quick starter Homework worksheetHomework quizSlideshow |
| Year 11 | Term 2 | 91/92 | 8.14 | Changing the environment | * Recall causes of environmental change.
* Describe the impact of environmental change.
* Explain the impact of an environmental change.
 | 4.7.2.4; 4.7.3.1; 4.7.3.2 | Worksheet 8.14 | Quick starter Homework worksheetHomework quizVideos |
| Year 11 | Term 2 | 93/94 | 8.15 | Learning about land use | * Identify why land use has changed.
* Describe the effects of changing land use.
* Evaluate a change in land use.
 | 4.7.3.3 | Worksheets 8.15.1 and 8.15.2  | Quick starter Homework worksheetHomework quizVideo |
| Year 11 | Term 2 | 93/94 | 8.16 | Changing the landscape | * Identify the reasons for deforestation.
* Describe the impact of peat bog destruction and deforestation.
* Evaluate the destruction of peat bogs and forests.
 | 4.7.3.3; 4.7.3.4 | Worksheets 8.16.1 and 8.16.2 | Quick starter Homework worksheetHomework quiz |
| Year 11 | Term 2 | 93/94 | 8.17 | Thinking about global warming | * Recall what global warming is.
* Describe the causes of global warming.
* Explain how global warming impacts on biodiversity.
 | 4.7.3.5 | Worksheet 8.17 | Quick starter Homework worksheetHomework quizSlideshowVideos |
| Year 11 | Term 2 | 95/96 | 8.18 | Looking at waste management | * Describe how waste production is linked to human population growth.
* Describe the impact of waste on ecosystems.
* Explain how waste impacts on biodiversity.
 | 4.7.3.2 | Worksheet 8.18 | Quick starter Homework worksheetHomework quizVideo |
| Year 11 | Term 2 | 95/96 | 8.19 | Investigating pollution | * Identify pollution levels using indicator species.
* Explain how indicator species measure pollution.
* Compare different methods of measuring pollution.
 | 4.7.3.2 | Worksheets 8.19.1 and 8.19.2; Practical sheet 8.19; Technician’s notes 8.19 | Quick starter Homework worksheetHomework quiz |
| Year 11 | Term 2 | 95/96 | 8.20 | Maintaining biodiversity | * Describe some conservation measures.
* Describe the impact of breeding programmes.
* Explain how habitats are regenerated.
 | 4.7.3.6 | Worksheets 8.20.1, 8.20.2 and 8.20.3 | Quick starter Homework worksheetHomework quizVideos |
| Year 11 | Term 2 | 97/98 | 8.21 | Learning about food security | * Identify factors affecting food security.
* Describe how different factors affect food security.
* Interpret data to evaluate food security.
 | 4.7.5.1 | Worksheets 8.21.1, 8.21.2 and 8.21.3  | Quick starter Homework worksheetHomework quiz |
| Year 11 | Term 2 | 97/98 | 8.22 | Maintaining food security | * Describe some intensive farming methods.
* Explain ethical issues related to intensive farming.
* Evaluate modern farming techniques.
* Describe methods to maintain sustainable fisheries.
 | 4.7.5.2 | Worksheet 8.22 | Quick starter Homework worksheetHomework quiz |
| Year 11 | Term 2 | 97/98 | 8.23 | Using biotechnology | * Describe some uses of biotechnology.
* Explain the advantages of some uses of biotechnology.
* Evaluate some uses of biotechnology.
 | 4.7.5.4 | Worksheets 8.23.1 and 8.23.2 | Quick starter Homework worksheetHomework quizVideos |
| Year 11 | Term 2 | 99 | 8.24 | Maths skills: Using graphs to show relationships | * To recognise direct proportionality in a graph.
* To calculate reaction rates in linear graphs.
* To use the gradient of a graph to calculate the rate.
 |  | Worksheet 8.24 | Quick starter Homework worksheetHomework quizSlideshowVideo |
| Year 11 | Term 2 | 99 | **Assessments** | End of chapter test Student BookEnd of chapter test Collins ConnectEnd of teaching block test Collins ConnectEnd of course test Collins Connect |