

Yr9 (KS4)	Topic Area	Key knowledge/skills (what <u>has</u> to be learnt)	Examples of key compulsory practicals for students	Resources/support at home
1 Cells and organisation	B1 Cell structure and transport	<p>What can be seen under a light and an electron microscope and how to calculate magnification.</p> <p>The similarities and differences between prokaryotic and eukaryotic cells and orders of magnitude.</p> <p>How cells differentiate to form specialised cells.</p> <p>How the structure of different types of animal and plant cells relates to their function.</p> <p>The roles of osmosis and active transport in the movement of materials in and between cells.</p> <p>How the surface area to volume ratio varies according the size of an organism. How to calculate surface area to volume ratio.</p> <p>Why large multicellular organisms need special systems for exchanging materials with the environment.</p>	<p>Required practical: Looking at cells</p> <p>Required practical: Investigating osmosis in plant cells</p>	<p>Kerboodle</p> <p>Google classroom</p> <p>BBC Bitesize</p> <p>My GCSE Science</p>
	B2 Cell division	<p>The role of chromosomes in cells and the importance of the cell cycle.</p>		<p>Kerboodle</p> <p>Google classroom</p>

		<p>The type of cell division that forms the gametes and the way normal body cells grow and divide.</p> <p>How cell differentiation varies in animals and plants.</p> <p>The production and use of plant clones.</p> <p>What stem cells are and how treatment with them may be used to treat people with different medical conditions. Potential benefits, risks, social and ethical issues in the use of stem cells in medical research and treatments.</p>		<p>BBC Bitesize My GCSE Science</p>
	B3 Organisation and the digestive system	<p>How specialised cells are organised into tissues and how several tissues work together to form an organ.</p> <p>The importance of the digestive system and the position of the main organs.</p> <p>The basic structure of carbohydrates, proteins and lipids.</p> <p>How enzymes work as biological catalysts. The way the structure of enzymes is related to their function. The factors that affect enzyme action. The roles played by different digestive enzymes in the body. How digestion is made more efficient.</p>	<p>Required practical: Food tests</p> <p>Required practical: The effect of pH on the rate of reaction of amylase</p>	<p>Kerboodle Google classroom BBC Bitesize My GCSE Science</p>
Yr10 (KS4)	Topic Area	Key knowledge/skills (what <u>has</u> to be	Examples of key compulsory	Resources/support at home

		learnt)	practicals for students	
1 Cells and organisation (continued)	B4 Organising animals and plants	<p>The structure and function of the human circulatory system. The role and components of blood. The structure and function of the different blood vessels and the heart. The way of solving problems with heart and blood supply to the heart.</p> <p>The structure and function of the human gas exchange system. The adaptations of the alveoli of the lungs for effective gas exchange. The mechanisms of breathing. The importance of ventilating the lungs to maintain steep concentration gradients.</p> <p>The tissues and organs in plants. The role of the leaf stomata in gas exchange in a plant. How evaporation and transpiration are controlled in plants.</p>		Kerboodle Google classroom BBC Bitesize My GCSE Science
2 Disease and bioenergetics	B5 Communicable disease	<p>The role of bacteria, viruses, protists and bacteria in diseases.</p> <p>How bacteria multiply by cell division. How to grow an uncontaminated culture of bacteria in the lab.</p> <p>How to calculate the number of bacteria in a population.</p> <p>How to calculate the effect of antibacterial chemicals by measuring the areas of zones of inhibition.</p> <p>How the human defense responses work. How your white blood cells protect you from</p>	<p>Required practical: Investigating the effect of antiseptics and antibiotics.</p> <p>Required practical: Light intensity and the rate of photosynthesis</p>	Kerboodle Google classroom BBC Bitesize My GCSE Science

		disease. How mineral deficiencies can cause diseases in plants. How plant diseases can be detected How plants defend themselves against pathogens and herbivores.		
	B6 Preventing and treating disease	How the immune system works and how vaccination protects people against disease. How antibiotics and painkillers work. How some drugs were discovered and how scientists look for new drugs. The stages involved in testing and trialling new drugs. How monoclonal antibodies are produced and used.		Kerboodle Google classroom BBC Bitesize My GCSE Science
	B7 Non-communicable diseases	What is meant by a non-communicable disease. How cancer spreads. The difference between malignant and benign tumours. Smoking and the risk of disease. The effect of diet and exercise on the risk of developing different diseases. How alcohol affects the body.		Kerboodle Google classroom BBC Bitesize My GCSE Science
	B8 Photosynthesis	The process of photosynthesis in plants and the factors that limit the rate. How plants use the glucose they make.	Practical: Light intensity and rate of photosynthesis Practical: testing for starch	Kerboodle Google classroom BBC Bitesize My GCSE Science
	B9 Respiration	The importance of aerobic and anaerobic respiration. How the body responds to exercise. The metabolic reactions that take place in the body and the role of the liver.		Kerboodle Google classroom BBC Bitesize My GCSE Science
3 Biological	B10 The human	The principles of homeostasis and why it is	Required practical: measuring reaction	Kerboodle

responses	nervous system	<p>important for internal body conditions to be controlled.</p> <p>The differences between sensory and motor neurones and their role in coordination and control.</p> <p>What the main areas of the brain do and how scientists find out about the structure and function of the brain. How the tissues in the human eye are related to their function.</p>	times.	<p>Google classroom</p> <p>BBC Bitesize</p> <p>My GCSE Science</p>
	B11 Hormonal coordination	<p>The principle of hormonal control. The role of the pancreas in monitoring and controlling blood glucose concentration. How diabetes is treated.</p> <p>How reproduction is controlled by hormones and how hormones can be used in the artificial control of fertility.</p> <p>How plants respond to light and gravity to ensure they capture as much light as possible.</p>	Required practical: The effect of light and gravity on the growth of newly germinated seedlings.	<p>Kerboodle</p> <p>Google classroom</p> <p>BBC Bitesize</p> <p>My GCSE Science</p>
Yr11 (KS4)	Topic Area	Key knowledge/skills (what <u>has</u> to be learnt)	Examples of key compulsory practicals for students	Resources/support at home
3 Biological responses	B12 Homeostasis in action	How the body monitors its temperature. How the body removes waste products. The role of the kidney and how water balance is controlled. How dialysis works and what is involved in a kidney transplant.		<p>Kerboodle</p> <p>Google classroom</p> <p>BBC Bitesize</p> <p>My GCSE Science</p>

<p>4 Genetics and evolution</p>	<p>B13 Reproduction</p>	<p>How the DNA of an organism can be analysed. Know about the variants of genes known as alleles. How meiosis in cell division forms gametes.</p> <p>The difference between sexual and asexual reproduction. The structure of DNA and how protein synthesis is controlled.</p> <p>How information is passed from one generation to another. How to use genetic diagrams, direct proportion, simple ratios and probability to predict outcomes of a genetic cross. What happens in gene mutations.</p>		<p>Kerboodle Google classroom BBC Bitesize My GCSE Science</p>
	<p>B14 Variation and evolution</p>	<p>The importance of selective breeding in the development of plants and animals and the increasing use of genetic engineering to introduce desirable characteristics.</p> <p>How clones are created. How adult cell cloning is carried out.</p>		<p>Kerboodle Google classroom BBC Bitesize My GCSE Science</p>
	<p>B15 Genetics and evolution</p>	<p>The history of genetics and the work of Gregor Mendel.</p> <p>How Charles Darwin built up the evidence for his theory of evolution by natural selection and some of the barriers to the acceptance of his ideas, as well as some of the modern evidence we have for evolution.</p> <p>How fossils are formed and how they can reveal how organisms have changed over time.</p>		<p>Kerboodle Google classroom BBC Bitesize My GCSE Science</p>

		How the DNA based systems for classifying organisms work.		
5 Ecology (current year 11 already completed)	B16 Adaptations, interdependence and competition	How to investigate and measure the distribution and abundance of species in a system. Know about the competition between organisms for resources and about the adaptations of organisms that result from natural selection and enable them to compete successfully in specific environments.	Practical: Investigate the population size of a common species in a habitat.	Kerboodle Google classroom BBC Bitesize My GCSE Science
	B17 Organising an ecosystem	The importance of material cycles in nature that return chemicals from the bodies of organisms to the soil, water and air. The importance of decomposition and the factors that affect the rate of decay and of compost formation.	Practical: Investigating the effect of temperature on the rate of decay of fresh milk by measuring pH change.	Kerboodle Google classroom BBC Bitesize My GCSE Science
	B18 Biodiversity and ecosystems	The reasons for the growth in the human population and its impact in terms of pollution of the land, water and air. How to construct accurate pyramids of biomass using data. The meaning of food security and the measures that can be taken to make food production both more efficient and sustainable.		Kerboodle Google classroom BBC Bitesize My GCSE Science