

Yr9	Topic Area	Key knowledge/skills (what <u>has</u> to be learnt)	Examples of required practicals for students	Resources/support at home
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>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>Kerboodle</p> <p>Google classroom</p> <p>BBC Bitesize</p> <p>My GCSE Science</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.		
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</p> <p>Google classroom</p> <p>BBC Bitesize</p> <p>My GCSE Science</p>
C1	Atomic Structure	<p>Understanding the key developments in our development of a model for the structure of the atom and how atoms bond to each other to form compounds.</p> <p>Describing and explaining separation techniques.</p>		<p>Kerboodle</p> <p>Google classroom</p> <p>BBC Bitesize</p>
C2	The Periodic Table	<p>Understanding how the Periodic Table was developed based on the trends and patterns of reactions between elements.</p> <p>Understanding how the properties of the different groups are related to their electronic structure with particular focus on groups 1 and 7.</p>	Displacement Reactions	<p>Kerboodle</p> <p>Google classroom</p> <p>BBC Bitesize</p>
C3	Structure and Bonding	Explaining the difference between metals and non-metals in terms of structure and bonding of atoms.	<p>Cooling curves</p> <p>Testing conductivity</p>	<p>Kerboodle</p> <p>Google classroom</p> <p>BBC Bitesize</p>
P1	Conservation and dissipation of energy	<p>How to work out energy stored in a moving object or when it is lifted or stretched</p> <p>How energy is stored and transferred and what happens after it is used</p> <p>How to compare machines and appliances in terms of their efficiency</p>		<p>Kerboodle</p> <p>Google classroom</p> <p>BBC Bitesize</p>
P2	Energy transfer by	How energy is transferred by heating through conduction	Determining the heat capacity	Kerboodle

	heating	How to work out the energy needed to heat an object	of a metal Testing sheets of materials as insulators	Google classroom BBC Bitesize
P3	Energy resources	How to compare different renewable and non renewable energy resources How the environment is affected by the use of different energy resources		Kerboodle Google classroom BBC Bitesize

Yr10	Topic Area	Key knowledge/skills (what <u>has</u> to be learnt)	Examples of key compulsory practicals for students	Resources/support at home
B4	B 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
B5	Communicable disease	<p>The role of bacteria, viruses, protists and bacteria in diseases.</p> <p>How the human defense responses work. How your white blood cells protect you from disease.</p>	Required practical: Light intensity and the rate of photosynthesis	Kerboodle Google classroom BBC Bitesize My GCSE Science
B6	Preventing and treating disease	<p>How the immune system works and how vaccination protects people against disease. How antibiotics and painkillers work.</p> <p>How some drugs were discovered and how scientists look for new</p>		Kerboodle Google classroom BBC Bitesize My GCSE Science

		drugs. The stages involved in testing and trialling new drugs.		
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	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
C4	Chemical Change	How to carry out calculations using balanced symbol equations to predict the amounts of reactants and products in a reaction	RP2 Titration	Kerboodle Google classroom BBC Bitesize My GCSE Science
C5	Chemical calculations	How to represent neutralisation as an ionic equation and calculate the number of hydrogen ions in a solution given its pH number Calculate unknown concentrations from experimental results	RP1 Preparation of salt	Kerboodle Google classroom BBC Bitesize My GCSE Science
C6	Electrolysis	Identify and describe oxidation and reduction reactions in terms of electron transfer	RP3 Electrolysis RP4 Temperatures changes	Kerboodle Google classroom BBC Bitesize My GCSE Science
C7	Energy Changes	Use bond energy values to calculate approximate energy change in reactions		Kerboodle Google classroom BBC Bitesize My GCSE Science
C8	Rates of Reaction	Use the particle model and collision theory to explain changing reaction rates.	RP5 Rates of reaction (concentration)	Kerboodle Google classroom

		Explain how catalysts can affect the rates of reaction in terms of activation energy.		BBC Bitesize My GCSE Science
C9	Crude Oil	How fractional distillation can be used to separate crude oil into useful fractions. How the properties and usefulness of these fractions relate to their molecular structure. Understanding the process and importance of cracking. Describing complete and incomplete combustion of hydrocarbons with balanced symbol equations.		Kerboodle Google classroom BBC Bitesize My GCSE Science
P1	Conservation and dissipation of energy	How to work out energy stored in a moving object or when it is lifted or stretched How energy is stored and transferred and what happens after it is used How to compare machines and appliances in terms of their efficiency		Kerboodle Google classroom BBC Bitesize My GCSE Science
P2	Energy transfer by heating	How energy is transferred by heating through conduction How to work out the energy needed to heat an object	Determining the heat capacity of a metal	Kerboodle Google classroom BBC Bitesize My GCSE Science
P4	Electric circuits	How to calculate the flow of charge How to work out the resistance and potential difference in an electric circuit	Investigating resistance Investigating different electrical components	Kerboodle Google classroom BBC Bitesize My GCSE Science
P5	Electricity in the home	How mains electricity differs from the electricity supplied by batteries How to calculate the power of an electrical appliance		Kerboodle Google classroom BBC Bitesize My GCSE Science
P7	Radioactivity	How an unstable nucleus changes when it becomes stable and why the radiation it gives out is harmful What nuclear fission and fusion are		Kerboodle Google classroom BBC Bitesize My GCSE Science
P8	Forces in balance	The difference between a vector and a scalar and how to represent a vector How to find the resultant of two forces and to resolve a force into perpendicular components		Kerboodle Google classroom BBC Bitesize My GCSE Science

Yr11	Topic Area	Key knowledge/skills (what <u>has</u> to be learnt)	Examples of key compulsory practicals for students	Resources/support at home
B10	The human nervous system	<p>The principles of homeostasis and why it is 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>Kerboodle</p> <p>Google classroom</p> <p>BBC Bitesize</p> <p>My GCSE Science</p>
B10	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>Kerboodle</p> <p>Google classroom</p> <p>BBC Bitesize</p> <p>My GCSE Science</p>
B13	Reproduction	<p>How the DNA of an organism can be analysed. Know about the variants of genes known as alleles.</p> <p>How meiosis in cell division forms gametes.</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.</p>		<p>Kerboodle</p> <p>Google classroom</p> <p>BBC Bitesize</p> <p>My GCSE Science</p>
B14	Variation and evolution	<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>Kerboodle</p> <p>Google classroom</p> <p>BBC Bitesize</p> <p>My GCSE Science</p>
B15	Genetics and evolution	<p>The history of genetics and the work of Gregor Mendel.</p>		<p>Kerboodle</p> <p>Google classroom</p> <p>BBC Bitesize</p>

		How fossils are formed and how they can reveal how organisms have changed over time. How the DNA based systems for classifying organisms work.		My GCSE Science
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.		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.		Kerboodle Google classroom BBC Bitesize My GCSE Science
C9	Crude Oil	How fractional distillation can be used to separate crude oil into useful fractions. How the properties and usefulness of these fractions relate to their molecular structure. Understanding the process and importance of cracking. Describing complete and incomplete combustion of hydrocarbons with balanced symbol equations.		Kerboodle Google classroom BBC Bitesize My GCSE Science
C12	Chemical analysis	Identifying unknown gases and ions using a wide range of tests	RP Calculating Rf values	Kerboodle Google classroom BBC Bitesize My GCSE Science
C13	Earth's Atmosphere	How the composition of the Earth's atmosphere developed over its history, how climate change is caused by greenhouse gases and this needs to be addressed.		Kerboodle Google classroom BBC Bitesize My GCSE Science
C14	Earth's resources	How to analyse data on diminishing finite resources and carrying out Life Cycle Assessments to judge the impact of making new materials.	RP Purifying water	Kerboodle Google classroom

				BBC Bitesize My GCSE Science
P8	Forces in balance	The difference between a vector and a scalar and how to represent a vector How to find the resultant of two forces and to resolve a force into perpendicular components		Kerboodle Google classroom BBC Bitesize My GCSE Science
P9	Motion	The difference between speed and velocity and what is meant by acceleration		Kerboodle Google classroom BBC Bitesize My GCSE Science
P10	Forces and motion	What is meant by terminal velocity and why objects fall through water at a constant velocity What is meant by the conservation of momentum and when we can use the rule. How to measure the stiffness of a spring and what is meant by elasticity. How to calculate the weight on an object from its mass and the gravitational field strength of where it is.	Stretch tests Investigating forces and acceleration	Kerboodle Google classroom BBC Bitesize My GCSE Science