Curriculum Coverage in the Department of Science

	Year 7	Year 8	Year 9	Year 10	Year 11
Autumn Term 1	**Topic: Working Scientifically** **Overview:** • Asking scientific questions • Working safely • Planning investigations • Recording data • Presenting data • Analysing data • Evaluating data **Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson.** **Topic: Cells** **Overview: Introduction to cells as the building blocks of all living things. Students look at the structures in plant and animal cells, specialised cells and how substances move in and out of cells.** **Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson.** **Topic: Particles and their behaviour** **Overview: Students are introduced to the particle model and how to use it to explain the properties of substances in the three states of matter. The concepts of density and diffusion are also explored.** **Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson.**	**Topic: Health and Lifestyle** **Overview: Students will be introduced to the components of a balanced diet and its importance in maintaining health. They will study the process of digestion, concentrating on the role of enzymes, bacteria and some of the main organs in the digestive system. Students will also look at the effects of drugs on the body.** **Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson.** **Topic: The Periodic Table** **Overview: Students develop their knowledge about elements, learning how to distinguish between metal and non-metal elements. Chemical and physical properties are introduced, and the uses of some typical metals and non-metals, and elements in Group 1, 7 and 0 are explored.** **Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson.** **Topic: Electricity and Magnetism** **Overview: Students are introduced to electric fields, current and magnetism. Students will look at how to build simple circuits and take measurements of current and potential difference. Students will study electromagnets and plan how to**	**Topic: Cell Biology** **Overview** **Students will study the following concepts during the cell biology topic:** **• Plant and animal cells.** **• Eukaryotic and prokaryotic cells.** **• Microscopes (microbiology).** **• Microscopes REQUIRED PRACTICAL.** **• Magnification calculations.** **• Specialised plant and animal cells.** **• The cell cycle.** **• Stem cells** **• Therapeutic cloning.** **• Diffusion.** **• Osmosis in plant and animal cells.** **• Osmosis REQUIRED PRACTICAL.** **• Active transport.** **• Exchange surfaces in multicellular organisms.** **Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson.**	**Topic: Infection and response** **Overview** **Students will study the following concepts during the infection and response topic:** **• Pathogens and disease.** **• Preventing infection.** **• Viral diseases.** **• Bacterial diseases.** **• Fungal diseases.** **• Protist diseases.** **• Human defense response.** **• Vaccinations.** **• Antibiotics and painkillers.** **• Bacterial resistance to antibiotics.** **• Discovering and developing new drugs.** **Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson.** **Topic: Chemical changes and quantitative chemistry** **Overview** **Students will study the following concepts during the chemical changes and quantitative chemistry topic:** **• Reactivity series.** **• Displacement reactions.**	**Topic: Homeostasis and response** **Overview** **Students will study the following concepts during the homeostasis and response topic:** **• Homeostasis.** **• The nervous system.** **• Reaction time REQUIRED PRACTICAL.** **• Reflex actions.** **• The endocrine system.** **• Control of blood sugar and diabetes.** **• Negative feedback (HT only).** **• Reproduction and the menstrual cycle.** **• Hormones and the menstrual cycle (HT only).** **• Artificial control of fertility.** **• Infertility treatments (HT only).** **Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson.** **Topic: Organic chemistry and chemical analysis** **Overview** **Students will study the following concepts during the Organic chemistry and chemical analysis topic:**

		investigate the shape of magnetic fields. Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson.		• Extracting metals. • Reactions of metals and oxygen. • Reactions of metals and water. • Making salts REQUIRED PRACTICAL. • Neutralisation and the pH scale. • Strong and weak acids (HT only). • Relative formula mass. • Percentage composition. • Conservation of mass. • Concentration calculations. • Calculating moles (HT only). • Reacting mass calculations (HT only). • Limiting reactants (HT only). Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson.	• Hydrocarbons. • Fractional distillation. • Properties of hydrocarbons. • Combustion of hydrocarbons. • Cracking hydrocarbons. • Pure substances and mixtures. • Chromatography. • Chromatography REQUIRED PRACTICAL. • Testing for gases. Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson. Mock exams (Biology, Chemistry and Physics – Paper 1)
Autumn Term 2	Topic: Forces Overview: Students are introduced to forces that are all around them. Students learn that forces act on stationary objects, and without forces nothing would be able to move. They also investigate how forces change the shape of objects and investigate Hooke's Law. Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson. Topic: Structure and function of body systems Overview: Students build on the concept of cells and are introduced to levels of organisation within multicellular organisms. The focus then turns to two organ systems, the respiratory system and the skeletal system.	Topic: Biological Processes Overview: Students will study the process of photosynthesis, how leaves are adapted to maximise this process, and its importance for all life on Earth. They will look at the effects of minerals on plant growth. The focus will then be on respiration, beginning with aerobic respiration which they will then compare to anaerobic respiration in animals and fermentation in plants. Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson. Topic: Separation Techniques Overview: Students learn about pure substances and mixtures, how to determine if a substance is pure and the terms, solute, solvent, solution and solubility. They learn about the different ways of separating mixtures,	Topic: Atomic structure and periodic table Overview Students will study the following concepts during the atomic structure and periodic table topic: • Atoms, elements, compounds and mixtures. • Chemical formula. • Balancing equations. • Crystallisation. • Distillation. • Chromatography. • Structure of the atom. • Electron structures. • History of the atom. • Ions. • Isotopes. • History of the periodic table. • Electron structure and the periodic table. • Group 1. • Group 7.	Topic: Electricity Overview Students will study the following concepts during the electricity topic: • Direct and alternating current. • The national grid. • Cables and plugs. • Calculating power (E = Pt). • Calculating power (P = IV). • Fuse ratings. • Calculating power ($P = I^2R$). • Electrical components. • Resistance and current. • Calculating resistance (V = IR). • Resistance of a wire REQUIRED PRACTICAL. • Calculating charge (Q = It). • Calculating charge (E = VQ). • Component characteristics REQUIRED PRACTICAL. • Thermistors and LDRs. • Series circuits.	Topic: Forces Overview Students will study the following concepts during the forces topic: • Vectors and scalars. • Types of forces. • Resultant forces. • Centre of mass. • Resolution of forces (HT only). • Parallelogram of forces (HT only). • Calculating acceleration (F = Ma). • Calculating acceleration (ΔV = at) • Calculating acceleration ($V^2 - U^2 = 2as$) • Speed and distance time graphs. • Velocity time graphs. • Force and acceleration REQUIRED PRACTICAL. • Weight and terminal velocity.

	Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson.	**including filtration, evaporation, distillation and chromatography.** **Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson.** **Topic:** **Overview** **Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson.**	**• Group 0.** **Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson.**	**• Parallel circuits.** **• Adding resistors in series and parallel circuits REQUIRED PRACTICAL.** **Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson.** **Topic: Bioenergetics** **Overview** **Students will study the following concepts during the bioenergetics topic:** **• Photosynthesis.** **• Leaf adaptations.** **• Limiting factors.** **• Rate of photosynthesis REQUIRED PRACTICAL.** **• How plants use glucose.** **Making the most of photosynthesis (HT only)** **• Aerobic respiration.** **• Anaerobic respiration.** **• The response to exercise.** **• Metabolism.** **Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson.**	**• Forces and breaking.** **• Momentum (HT only).** **• Elastic objects.** **• Calculating extension (F = ke).** **• Force and elasticity REQUIRED PRACTICAL.** **Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson.**
Spring Term 1	**Topic: Elements, Atoms and Compounds** **Overview: Students are introduced to the concepts of atoms, elements, molecules and compounds. They use their knowledge of particles to start**	**Topic: Energy** **Overview: Introduction to energy resources, stores and transfers. Students learn how electricity is generated, methods and energy transfer by particles, radiation and forces. Students will have an**	**Topic: Energy** **Overview** **Students will study the following concepts during the energy topic:**	**Topic: Energy changes and electrolysis** **Overview**	**Topic: Inheritance, variation and evolution** **Overview**

	running molecules and compounds and writing chemical symbols and chemical formulae. **Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson.** **Topic: Sound** **Overview: Introduction to longitudinal and transverse waves. Students will learn about the features of waves and how they are represented. Students will study how the amplitude and frequency of sound wave affects its loudness and pitch.** **Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson.**	**opportunity to develop their mathematical skills to real life scenarios when calculating work done and power.** **Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson.** **Topic: Ecosystems and adaptation** **Overview: Students will begin by looking at the feeding relationships within food chains and webs and how this can result in bioaccumulation. Students will student the interdependence of organisms and then look in detail at the adaptation of a number of organisms.** **Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson.**	**• Energy stores.** **• Conservation of energy.** **• Calculating work done (W = fs).** **• Calculating power (E = Pt).** **• Calculating gravitational potential energy (E_p = mgh).** **• Calculating kinetic energy (E_k = 0.5 m v^2).** **• Calculating elastic potential energy (E_e = 0.5 k e^2).** **• Insulating buildings.** **• Renewable and non-renewable energy resources.** **Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson.**	**Students will study the following concepts during the energy changes and electrolysis topic:** **• Electrolysis of molten ionic compounds.** **• Electrolysis of aqueous solutions.** **• Electrolysis REQUIRED PRACTICAL.** **• Extracting aluminium using electrolysis.** **• Exothermic and endothermic reactions.** **• Energy changes REQUIRED PRACTICAL.** **• Reaction profiles.** **• Bond energy calculations (HT only).** **Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson.**	**Students will study the following concepts during the inheritance, variation and evolution topic:** **• Types of reproduction.** **• Types of cell division.** **• Genetic cross diagrams.** **• Determining gender using genetic cross diagrams.** **• Genetic disorders.** **• Screening for genetic disorders.** **• Variation.** **• Evolution by natural selection.** **• Selective breeding.** **• Genetic engineering.** **• Evidence for evolution.** **• Extinction.** **• Classification.** **• Binomial naming system.** **• New systems of classification.** **Assessment: Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson.** **Mock exams (Biology, Chemistry and Physics – Paper 1)**
Spring term 2	**Topic: Reproduction** **Overview: Students are introduced to the process of sexual reproduction in both plan and animal cells. The unit begins with a study of human reproductive systems and then goes onto plant reproduction, including fertilisation, germination and seed dispersal.** **Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson.** **Topic: Reactions** **Overview: Students develop their knowledge by looking at different**	**Topic: Metals and other materials** **Overview: Students will learn about the reactions of metals with acids, oxygen and water, and write word equations for these reactions. Displacement reactions will be explored, and students will look at the properties of ceramics, some polymers and some composites.** **Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson.** **Topic: Motion and Pressure** **Overview: Introduction to speed, pressure and turning forces.**	**Topic: Organisation** **Overview** **Students will study the following concepts during the organisation topic:** **• Tissues and organs in animals.** **• The human digestive system.** **• The chemistry of food.** **• Food tests REQUIRED PRACTICAL.** **• Enzymes.** **• Enzymes REQUIRED PRACTICAL.** **• The blood and blood vessels** **• Breathing and gas exchange.** **• The heart.**	**Topic: Waves** **Overview** **Students will study the following concepts during the waves topic:** **• Wave properties.** **• Refraction.** **• Wave front diagrams (HT only).** **• Calculating wave speed (v = f λ)** **• Wave speed in water and solid REQUIRED PRACTICAL.** **• The electromagnetic spectrum.** **• The electromagnetic spectrum in communications.** **• The electromagnetic spectrum in medicine.**	**Topic: Chemistry of the atmosphere and using resources** **Overview** **Students will study the following concepts during the chemistry of the atmosphere and using resources topic:** **• The Earths atmosphere.** **• Greenhouse gases and climate change.** **• Atmospheric pollutants.** **• Finite and renewable resources.** **• Potable water.**

	types of chemical reactions, including oxidation, combustion and decomposition. Students with learn how to represent chemical substances and reactions using ratios and how to write word equations and balanced formula equations. Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson.	Students look at how motion can be described using distance-time graphs. They will also be introduced to pressure in gases, liquids, and on solids. Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson.	• Problems with the heart. • Non-communicable disease and diet. • Cancer. • Smoking. • Alcohol. • Tissues and organs in plants. • Transport systems in plants. • Evaporation and transpiration. • The rate of transpiration. Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson.	• Infrared radiation REQUIRED PRACTICAL. Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson.	• Analysis and purification of water samples REQUIRED PRACTICAL. • Treating waste water. • Extracting metals (HT only) • Life cycle assessments. • Reduce, reuse, recycle. Assessment: Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson. Mock exams (Biology, Chemistry and Physics – Paper 2)
Summer Term 1	Topic: Light Overview: Students are introduced to some properties of light and how light travels. Students will learn about the behaviour of light in different situations where light interacts with matter, such as reflection, refraction and dispersion. Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson. Topic: Inheritance Overview: Students will look at the variation in characteristics in organisms within a species and determine whether these are a result of inherited variation, environmental variation or both. They study how characteristics are inherited through chromosomes and evolution through the process of natural selection. Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson.	In the summer term students will study modules in Reactivate Biology, Reactivate Chemistry and Reactivate Physics. The Reactivate modules are designed to reactivate and consolidate the knowledge learned in Y7 and Y8 and to develop certain concepts in readiness for GCSE. Topic: Reactivate Biology Overview: Students will study the following concepts: • Cells • Specialised cells • Systems and organs • Digestive System • Circulatory System • Transport • The Leaf and Photosynthesis • Respiration Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN). Topic: Reactivate Chemistry Overview:	Topic: Bonding structure and properties of matter Overview Students will study the following concepts during the bonding structure and properties of matter topic: • States of matter. • Changes of state. • Ionic bonding. • Giant ionic structures. • Covalent bonding. • Simple covalent molecules. • Giant covalent molecules. • Fullerenes and graphene. • Metallic bonding. • Giant metallic structures. Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson.	Topic: Magnetism and electromagnetism Overview Students will study the following concepts during the magnetism and electromagnetism topic: • Magnetic fields. • Magnetic fields of electric current. • The motor effect (HT only). Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson. Topic: The rate and extent of chemical change Overview Students will study the following concepts during the rate and extent of chemical change topic: • Rate of reaction. • Collision theory.	Topic: Revision for GCSE exams Overview Review all key concepts from the curriculum in preparation for GCSE Examinations Assessment: Past paper exam questions, low stakes questions, Homework quizzes on satchel one / SENECA, Self review (NN) Quiz.

		Students will study the following concepts: • **The Particle Model and State Change** • **Inside Atoms** • **Elements, Compounds and Mixtures** • **The Periodic Table** • **Electron Structure** • **Bonding** • **Conservation of Mass** • **Endothermic and exothermic reactions** **Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN).**		**• Surface area and rate of reaction.** **• Temperature and rate of reaction.** **• Concentration and rate of reaction.** **• Catalysts.** **• Reversible reactions.** **• Dynamic equilibrium (HT only).** **• Altering conditions (HT only).** **Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson.**	
Summer Term 2	**Topic: The Earth** **Overview: Students learn about the composition of the Earth and the Atmosphere. They are reintroduced to three different types of rocks, sedimentary, igneous and metamorphic rocks. The rock cycle and carbon cycle are explored, allowing students to consider how materials are recycled naturally. The students also study the greenhouse effect, global heating and climate change.** **Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson.** **Topic: Space** **Overview: Students are introduced to some of the celestial objects that they can see in the night sky as well as other objects in the Universe. They gain an understanding of how the planets in our Solar System**	**Topic: Reactivate Physics** **Overview:** **Students will study the following concepts:** • **Energy stores and transfers** • **Conservation and dissipation** • **Current, PD and resistance** • **Series and Parallel** • **Wave properties** • **EM Spectrum** • **Force and Interactions** • **Resultant forces** **Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN).** **End of Year test on Reactivate Modules.**	**Topic: Particle model of matter** **Overview** **Students will study the following concepts during the particle model of matter topic:** **• Density.** **• Density REQUIRED PRACTICAL.** **• States of matter.** **• Changes of state.** **• Specific heat capacity.** **• Specific heat capacity REQUIRED PRACTICAL.** **• Specific latent heat.** **• Internal energy.** **• Gas pressure and temperature.** **Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson.**	**Topic: Ecology** **Overview** **Students will study the following concepts during the ecology topic:** **• Ecosystems.** **• Biotic and abiotic factors.** **• Sampling techniques REQUIRED PRACTICAL.** **• Adaptations in plants and animals.** **• Feeding relationships.** **• Materials cycling.** **• The Carbon cycle.** **• The effects of the human population explosion.** **• Land pollution.** **• Water Pollution (bioaccumulation and eutrophication).** **• Air pollution.** **• Global warming.**	

	formed. They will also learn why seasonal changes occur in the UK and other regions on Earth. Assessment: Homework quizzes on Satchel One, Self-Review Quiz (NN), End of Topic Test and close the gap lesson. **End of year assessment.**			**Assessment: Homework quizzes on satchel one / SENECA, Self review (NN) Quiz, End of topic test and closing the gap lesson.** **Mock exams (Biology, Chemistry and Physics – Paper 1)**	