SCIENCE – YEAR 10 CURRICULUM OVERVIEW 2020 / 2021

TOPIC TITLE	TOPIC OVERVIEW	KNOWLEDGE & SKILLS	ASSESSMENT	WIDER LINKS
Year 10 - Term 1 **P1 Conservation and dissipation of energy**	**Conservation and dissipation of energy** In this physics topic students will explore concepts relating to energy and work.: • What are energy stores and how is it conserved? • How does energy move between stores? • How do we define efficiency? • How are energy and power linked?	**Conservation and dissipation of energy** • Understand that there are different energy stores but that energy must be conserved. • Apply the equation for calculating the efficiency of appliances and other electrical items. • Link the power of an appliance with the energy transferred.	**Conservation and dissipation of energy** Homework is set weekly and is based around exam questions. End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	**Conservation and dissipation of energy** **KS3** <u>Literacy:</u> Extended answer practise. <u>Numeracy:</u> Calculating efficiency. Calculating power. <u>Key links to other units:</u> Year 8 - Energy. Year 9 - Energy resources.
P4 Electrical Circuits	**Electrical Circuits** In this physics topic students will explore: • What is resistance in a circuit? • What are the characteristics of different components? • How can the way we build circuits affect the resistance? •	**Electrical Circuits** • Review of basic electronic component symbols. Applying equations to calculate charge flow. • Investigating the resistance characteristics of different components. • Investigating how the length of a wire affects its resistance. • Explaining the use of LDRs and thermistors • Review series and parallel circuits • Investigate resistance in series and parallel circuits.	**Electrical Circuits** Homework is set weekly and is based around exam questions. End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	**Electrical Circuits** <u>Literacy:</u> Extended answer practise. <u>Numeracy:</u> Calculating current charge and potential difference. <u>Key links to other units:</u> Year 8 - Electricity and magnetism. Year 9 - Electricity in the home.

		Key skills • Building series and parallel circuits • Measuring current and potential difference		
B5 Communicable Diseases	**Communicable Diseases** In this biology topic students explore ideas related to health and a healthy lifestyle. • What are pathogens? • How can we prevent infections? • How do humans and plants respond to infections?	**Communicable Diseases** • Link the causes of ill health to risk factors and lifestyle • Explain how different diseases often interact • Describe how different pathogens are spread • Disease spread can be controlled through hygiene and vaccination • Plants and animals can suffer from diseases caused by bacteria, fungi, viruses and protists • Humans and plants can protect themselves against certain diseases **Key skills** • Use aseptic technique to grow pathogens in the lab (triple science only) and investigate how disinfectants and/or antibiotics can affect growth	**Communicable Diseases** Homework is set weekly and is based around exam questions. End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	<u>Literacy:</u> Extended answer practise. <u>Numeracy:</u> Interpreting graphical evidence. <u>Key links to other units:</u> Year 7 – Cells. Year 8 – Healthy Living. Year 8 – Human organ systems. Year 10 – Preventing and treating disease.
B6 Preventing and Treating Disease	**Preventing and Treating Disease** In this biology topic students learn about ways in which we can treat diseases and symptoms of diseases • How do vaccinations work?	**Preventing and Treating Disease** • Explain how vaccinations work • Know the difference between antibiotics and painkillers • Understand the stages of the drug discovery and development process including pre-clinical and clinical trials • Describe how monoclonal antibodies are made and their potential uses for disease treatment (triple science).	**Preventing and Treating Disease** Homework is set weekly and is based around exam questions. End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	**Preventing and Treating Disease** <u>Literacy:</u> Extended answer practise <u>Numeracy:</u> <u>Key links to other units:</u> Year 7 – Cells Year 8 – Healthy Living Year 10 Communicable disease

	• Why are antibiotics and painkillers different? • How are drugs discovered and developed?			
B7 Non-Communicable Diseases	**Non-Communicable Diseases** In this biology topic students learn about diseases and conditions that cannot be passed to others. • What are non-communicable diseases? • What are the risk factors for cancer and diabetes?	**Non-Communicable Diseases** • Certain risk factors may make a person more susceptible to non-communicable diseases. • Students need to know the difference between malignant and benign tumours and how they may be treated. • Risk factors for cancer such as smoking are explored together with its effect on a foetus. • Diet and exercise levels are closely linked with diabetes. • Alcohol, other carcinogens and radiation can cause damage to cells. **Key Skills** • Linking risks to diseases and exploring whether risk factors are causal or not.	**Non-Communicable Diseases** Homework is set weekly and is based around exam questions. End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	**Non-Communicable Diseases** <u>Literacy:</u> Extended answer practise <u>Numeracy:</u> <u>Key links to other units:</u> Year 7 – Cells Year 8 – Healthy Living Year 10 – Cells and microscopes Year 10 - Non-communicable disease Year 10 – Preventing and treating disease
C3 Structure and Bonding	**Structure and Bonding** Students learn how atoms can combine • How do atoms form molecules? • What are giant ionic and metallic structures and nanoparticles?	**Structure and Bonding** • Review the structure of ionic compounds. • Review the periodic table and formation of ions. • Draw diagrams showing how the atoms interact. • Describe and explain how nanoparticles can be sued.	**Structure and Bonding** Homework is set weekly and is based around exam questions. End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	**Structure and Bonding** <u>Literacy:</u> Extended answer practise <u>Numeracy:</u> <u>Key links to other units:</u> Year 7 – Atoms, elements, compounds Year 8 – Periodic table

		Key Skills • Draw dot cross diagrams to show covalent bonding.		Year 9 – Atomic structure Year 10 – Chemical calculations Year 10 – Organic reactions
At the end of Term 1, students will sit an 'end of term' exam spanning all topics covered so far.				
Year 10 - Term 2 **C4 Chemical Calculations**	**Chemical Calculations** Students learn a new unit of measurement, the mole • What are relative masses and moles and how can they be determined? • How do we express concentrations?	**Chemical Calculations** • Review relative molecular mass **Key skills** • Balance equations and use these to calculate the masses of reactants and products • Apply the formula for calculating concentration	**Chemical Calculations** Homework is set weekly and is based around exam questions. End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	**Chemical Calculations** <u>Literacy:</u> Extended answer practise <u>Numeracy:</u> Calculating RAM Calculating molar quantities Calculating concentrations <u>Key links to other units:</u> Year 7 – Particles Year 8 – Periodic Table Year 9 – Atomic structure Year 9 – Periodic table Year 10 – Structure and bonding
C6 Electrolysis	**Electrolysis** In this short chemistry topic we will look at: • How can substances be separated using electrolysis?	**Electrolysis** • Review the structure of ionic compounds. • Explain the electrolysis of molten compounds. • Investigate and explain the electrolysis of aqueous solutions. • Write half equations to describe electrolysis. **Metal Extraction** • Review the reactivity of the group 1 metals.	**Electrolysis** Homework is set weekly and is based around exam questions. End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	**Electrolysis** <u>Literacy:</u> Extended answer practise <u>Numeracy:</u> <u>Key links to other units:</u> Year 7 – Particles Year 9 – Atomic structure Year 9 – Periodic table Year 10 – Structure and bonding

		• Recall the reactivity series. • Describe displacement, oxidation and reduction reactions. • Explain how metals can be extracted by reduction. • Describe new methods of extracting metals. **Key skills** • Carry out a practical investigation using a dissolved salt to extract a metal		
P2 Energy Transfer by Heating	**Energy Transfer by Heating** In this physics topic we will look at ways in which thermal energy is transferred: • What are the similarities and differences between conduction, convection and radiation? • Which factors affect thermal energy transfer? • What is specific heat capacity?	**Energy Transfer by Heating** • Review energy and how it cannot be created or destroyed, only transferred. • Investigate heat loss and how this can be reduced used thermal insulators. • Apply the equation for specific heat capacity.	**Energy Transfer by Heating** Homework is set weekly and is based around exam questions. End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	**Energy Transfer by Heating** <u>Literacy:</u> Extended answer practise <u>Numeracy:</u> Calculating Calculating molar quantities Calculating concentrations <u>Key links to other units:</u> Year 8 – Energy Year 9 – Energy resources
C7 Energy Changes	**Energy Changes** In this topic students focus on why chemical reactions happen and how these rates of reaction can be altered: • What causes reactions to happen?	**Energy Changes** • Review why chemical reactions take place • Carry out investigations that explore how concentration affects reaction rate • Discover how we can alter conditions in a reaction to achieve the required rate	**Energy Changes** Homework is set weekly and is based around exam questions. End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	**Energy Changes** <u>Literacy:</u> Extended answer practise <u>Numeracy:</u> Calculating bond energies <u>Key links to other units:</u> Year 7 –Particles Year 7 – Reactions

	• How do temperature, concentrations, pressure and catalysts affect rate? • What happens at equilibrium?	• Evaluate the use of fuel cells (triple science only) **Key skills** • Investigate variables that affect energy changes in a substance • Identify exothermic and endothermic reactions from their energy profiles • Investigate chemical cells (triple science only.		Year 9 - Chemical changes Year 9 – Rates and equilibrium
B8 Respiration	**Respiration** This biology topic looks at how organisms use glucose • What do mitochondria do?	**Respiration** • Understand that respiration can take place with or without oxygen Describe how the liver removes poisonous substances from the body **Key skills** • State the respiration equation.	**Respiration** Homework is set weekly and is based around exam questions. End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	**Respiration** <u>Literacy:</u> Extended answer practise <u>Numeracy:</u> <u>Key links to other units:</u> Year 7 – Cells Year 9 – Cell structure and function Year 9 – Respiration
B9 Photosynthesis	**Photosynthesis** This biology topic will look at how plants: • How do plants make glucose? • What are the reactants and products in photosynthesis? • How do plants use glucose?	**Photosynthesis** • Look at structure within the plant that allow the organism to make glucose • Rates of photosynthesis can be manipulated by altering conditions **Key skills** • Carry out an investigation to understand factors affecting the rate of photosynthesis	**Photosynthesis** Homework is set weekly and is based around exam questions. End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	**Photosynthesis** <u>Literacy:</u> Extended answer practise <u>Numeracy:</u> <u>Key links to other units:</u> Year 7 – Cells Year 9 – Cell structure and transport Year 9 – Photosynthesis
At the end of Term 2, students will sit an ‘end of term’ exam spanning all topics covered so far.				
Year 10 - Term 3 **P6 Molecules and Matter**	**Molecules and Matter** This physics topic looks at how the arrangement of atoms determines a	**Molecules and Matter** • States of matter are determined by the arrangement of particles	**Molecules and Matter** Homework is set weekly and is based around exam questions.	**Molecules and Matter** <u>Literacy:</u> Extended answer practise

	substance's state • What is density? • How does the energy in particle's affect state? What are the forces within substances and what energy is needed to change the state of a substance?	• Energy changes within substances can cause a change of state and numerical values can be assigned to these changes • Gas pressure is determined by random collisions and can be affected by temperature **Key skills** • Measure the mass and volume of objects to determine density • Apply the density calculation. • Apply Boyle's law (triple science only).	End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	<u>Numeracy:</u> Calculating density Using graphs to show changes of state <u>Key links to other units:</u> Year 7 – Elements, atom, compounds Year 7 – Particles Year 9 – Atomic structure Year 10 – Energy changes
P6 Radioactivity	**Radioactivity** This physics topic looks at the three types of radiation • Why do some substances emit radiation? • How did the discovery of atomic structure help our understanding of radioactive emission?	**Radioactivity** • Some isotopes decay because they are unstable • Emissions may be alpha, beta or gamma • Radioactive emissions have different penetrating powers and travel different distances • Radiation can be used in medicine • Fission and the importance of nuclear reactors **Key Skills** • Calculate radioactive decay using half-life	**Radioactivity** Homework is set weekly and is based around exam questions. End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	**Radioactivity** <u>Literacy:</u> Extended answer practise <u>Numeracy:</u> Calculating half-lives and time taken for a radioactive source to completely decay <u>Key links to other units:</u> Year 7 – Elements, atoms, compounds Year 7 – Particles Year 9 – Atomic structure
C12 Chemical Analysis	**Chemical Analysis** This chemistry topic looks at how properties of substances can be investigated. • Chemical analysis • What are formulations?	**Chemical Analysis** • Pure substances have distinct melting and boiling points • Elements burn with a specific flame colour • Chemical tests can be carried out to determine the presence of gases and ions.	**Chemical Analysis** Homework is set weekly and is based around exam questions. End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	**Chemical Analysis** <u>Literacy:</u> Extended answer practise <u>Numeracy:</u> <u>Key links to other units:</u> Year 7 – Atoms, elements and compounds

	• How can it be determined what is in a substance?	• Chromatography can be used to analyse known and unknown substances **Key skills** • Recall the tests for the presence of a variety of substances. • Carry out investigations to identify substances.		Year 8 – Periodic table Year 9 – Atomic structure
C13 The Earth's Atmosphere	**The Earth's Atmosphere** This chemistry topic looks at how human actions affect the environment. • How has earth's atmosphere changed over time? • How are greenhouse gases linked with pollution and climate change?	**The Earth's Atmosphere** • The atmosphere has changed over time to allow organisms to evolve • Evidence points toward human activity being the cause of climate change • Burning fossil fuels produces atmospheric pollutants.	**The Earth's Atmosphere** Homework is set weekly and is based around exam questions. End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	**The Earth's Atmosphere** <u>Literacy:</u> Extended answer practise <u>Numeracy:</u> <u>Key links to other units:</u> Year 7 – Atoms, elements, compounds Year 8 – Earth Year 10 – The Earth's resources.
B15 Genetics and Evolution	**Genetics and Evolution** This biology topic looks at how organisms have evolved over time • How has our understanding of genetics developed? • What have the theories of evolution been over time? • What can fossils tell us? • How do organisms become extinct? • Why do some bacteria become resistant to antibiotics?	**Genetics and Evolution** • DNA carries genetic information • There have been different theories of evolution, most notably Darwin • Speciation involves isolation (triple science only) • Fossils give us good evidence of evolution but the record is not complete • Mass extinctions have affected many species • Bacteria can evolve rapidly and this alters the effectiveness of our medicines • We can classify animals according to their characteristics and more recently using DNA evidence and powerful microscopes.	**Genetics and Evolution** Homework is set weekly and is based around exam questions. End of topic Kerboodle Checkpoint Assessment quizzes or written assessment.	**Genetics and Evolution** <u>Literacy:</u> Extended answer practise <u>Numeracy:</u> <u>Key links to other units:</u> Year 7 – Cells Year 8 – Healthy Living Year 9 – Cell structure and transport Year 10 – Non-communicable diseases.

	• How are organisms grouped?			
At the end of Term 3, students will sit an ‘end of year’ exam spanning all topics.				