Science Overview of KS3 Curriculum Topics

Term	Year 7	Year 8	Year 9
1	**Chemistry:** Particles and their behaviour: Students learn about particles in the three states of matter; Solids, liquids and gases and how each state can change to form another state of matter by heating or freezing. They also learn about diffusion of liquid and gas particles as well as gaspressure. Elements, atoms and compounds: Students learn about atoms, elements and their chemical symbols, periodic table, compound, word equations and chemical formula.	**Chemistry:** The periodic table: Students learn about the groups and periods of the periodic table to see how elements in the same groups react in the same way and have similar chemical and physical properties. Separation techniques: Students learn about mixtures and how different techniques such as filtration, evaporation and chromatography (a technique used in forensics) are used to separate mixtures.	**Chemistry 1:** Fundamental ideas in Chemistry:Students learn about the structure of an atom, how electrons are arranged in shells and how group one elements react with water. Limestone and Building Materials:Students learn about how limestone is made, how it is quarried and how it goes through its cycle to make useful materials such as cement, glass, mortar and concrete for building materials. Metals and their uses: Students learn about how metals are extracted depending on their reactivity against carbon, how are purified and become useful. First part of crude oil
2	Chemical reactions: Students learn about signs of chemical reactions and carry out various practical to demonstrate how chemical reactions happen in everyday life. Acids and alkalis: Students learn about acids and alkalis how to test for these using various indicators. They also learn about neutralisation reactions to explain how salts are made.	Metals and acids: Students learn about the reaction of different metals and acids to see how hydrogen gas and a salt are made. They also learn how to name a salt. The Earth: Students learn about the structure of the Earth, how volcanoes eruption lead to formation of igneous rocks and how these change into sedimentary and metamorphic rocks. (The rock cycle)	Crude Oil and Fuels: Students learn about how crude oil is made, extracted and separated by fractional distillation to make useful substances such as fuels for heating, cooking and transport. Other Useful substances from crude oil: Students learn how large chains of hydrocarbon alkanes are cracked to make smaller alkanes for fuels as well as alkenes to make plastics (polymers). Plant oils and their uses:Students learn about extraction of plant oils and how fats (saturated and unsaturated) are made from vegetable oils in hydrogenation reactions. They also explore how emulsions are made using emulsifiers. Changes in the Earth and its atmosphere: Students learn about the structure of the Earth, how the gases in the atmosphere have changed over years and how carbon is cycled in our environment.

3	**Physics:** Forces: Students learn about different forces, how to draw force diagrams, calculate the resultant force and comment on the motion of moving objects. Sound: Students learn about sound and how it needs particles to travel. They also learn about some of the applications of sound such as ultrasound in finding the distance of objects form the source.	**Physics:** Electricity and magnetism: Students learn about electrical circuits and how to set these up. They also explore magnets and how the combination of these two make electromagnets which are very useful in super-fast maglev trains. Energy: Students learn about different forms of energy, the conservation law of energy and how energy only changes form and doesn't get created or destroyed. They also learn to analyse Sankey diagrams to comment on electrical devices efficiency.	**Physics 1:** Transfer of energy by heating processes and the factors that affect the rate at which energy is transferred: Students learn about the methods of heat transfer in solids (conduction), in liquids and gases (convection) and in everything even space (radiation). They also learn how evaporation causes cooling and condensation causes warming. Energy transfers and efficiency: Students learn how to insulate a building to minimise the waste energy and how to calculate the efficiency of an electrical device. The usefulness of electrical appliances: Students learn how to calculate the cost of electricity and how to save money on electrical bills.
4	Light: Students learn about the light energy and how unlike sound it doesn't need particles to travel. They also learn how light reflect and refract. Space: Students learn about our solar system and its planets. They learn how days and nights occur and how seasons change.	Motion and pressure: Students learn about speed, distance-time graphs to calculate speed, pressure in gases, liquids and gases and how to calculate it as well as the law of moments.	Methods we use to generate electricity: Students learn how electricity is generated in a power station using renewable and non-renewable sources of energy; how electricity reaches us via the National Grid. The uses of waves for communication: Students learn about waves properties, how to calculate the speed, the electromagnetic spectrum and how different waves are used in different parts of our everyday life.
5	**Biology:** Cells: Students learn about the structure of different cells such as animals and plants and how each part is adapted to work together for cells to function. Structure and function of body systems: Students learn about specialised cells and different body systems.	**Biology:** Health and lifestyle: Students learn about different types of foods, the digestive system and how it works, drugs, alcohol, smoking and their negative effects on the body. Ecosystem processes: Students learn about photosynthesis, chemosynthesis, aerobic and anaerobic respiration, food chains and webs and ecosystems.	**Biology 1:** Keeping healthy:Students learn about healthy balance diet, the rate at which all the chemical reactions occur in the cells, the effects of unhealthy diet on our body, our immune system and how it defend our body against pathogens. Nerves and hormones: Students learn about the nervous system and how different nerves and the brain coordinate, how hormones control a lot of processes such as reproduction and the menstrual cycle in humans as well as fruit ripening and growth in plants.

			<u>The use and abuse of drugs:</u>Students learn about drugs, their effects on our body and the importance of drug trials (blind and double blind) before sold to the public.
6	<u>Reproduction:</u> Students learn about reproduction systems in humans and plants. **<u>Working scientifically</u>**: Students learn how to plan a scientific investigation. They learn about different variables and how to control some of these in an investigation to make a fair investigation. They learn how to draw a suitable table of results and a graph to represent their findings and how to write conclusions and evaluate their investigation.	<u>Adaptation and inheritance:</u> Students learn about adaptations and competition in living things, inheritance and DNA, natural selection and extinction. **<u>Working scientifically:</u>**Students learn how to plan a scientific investigation. They learn about different variables and how to control some of these in an investigation to make a fair investigation, how to make the investigation reliable, reproducible, precise and accurate. They learn how to draw a suitable table of results and a graph to represent their findings and how to write conclusions and evaluate their investigation.	<u>Interdependence and adaptation:</u> Students learn about the adaptation of plants and animals and how living organisms living in the same habitat depend on one another. <u>Energy and biomass in food chains:</u>Students learn about the transfer of energy and biomass in a pyramid and how these reduce in each stage due to movement, respiration, waste and reproduction. <u>Waste material from plants and animals:</u>Students learn how organic waste are decayed by microorganisms when the decay conditions (moisture, warmth and oxygen) are right and how these are returned to the soil for new plants to grow. <u>Genetic variation and its control:</u> Students learn about inheritance and genes which control our characteristics. They also learn about the two types of reproduction; sexual and asexual and how each have advantages as well as disadvantages. <u>Evolution:</u> Students learn about the main theories of evolution by Lamarck and Darwin.

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