Science KS3 Curriculum Map – Year 8 2022-2023

Year	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Year 8 – 2022-2023 At Castle Donington College, the Science curriculum has been designed as a 5-year spiral course. Science will inspire pupils to be curious and develop a love for learning and knowledge. Pupils will be given the opportunity to develop key foundational scientific knowledge so they will engage and further broaden their sense of the world around them. All pupils, regardless of their backgrounds, are entitled to the keys of scientific knowledge to allow them to be successful and well-informed individuals.	**Cells to organ systems** **Knowledge Content** -Distinguish between cells, tissues, organs and organ systems. -Describe the structures and functions of the human digestive system, circulatory system and gas exchange system. -Explain how the human circulatory, digestive and gas exchange systems work together to keep cells alive. -Know that the human body contains a skeleton and muscles for support, protection and movement. -Describe the processes of aerobic and anaerobic respiration in humans and micro-organisms, including fermentation Threshold concepts Link to Prior learning **KS2 –** Understand that animals cannot make their own food and must eat plants or animals for energy. Know that each part of the digestive	**Forces** **Knowledge Content** -To be able to draw force diagrams, showing balanced and unbalanced forces - Calculate the size and direction of the resultant force of two forces - Describe what happens when two equal sized forces act on an object, both acting along the same straight line but in opposite directions. - Describe the relationship between force and extension including Hooke's Law. - Explain how friction, generated by the interaction between two objects, can stop them from moving Threshold concepts Link to Prior learning **KS2 –** Know that gravity makes objects fall to the Earth. Will understand that forces can be contact and non-contact and are a push or pull. That friction is a force that acts between moving surfaces **KS3** Understand the different types of forces	**Chemical reactions** **Knowledge Content** -Describe examples of physical change from chemical changes. -Explain observations of a chemical reaction in terms of the formation of a new substance with different properties. -Identify thermal decomposition as an endothermic reaction -Recognise that a compound has properties (including solubility) that are different from its constituent elements. -Predict the conservation of mass during a displacement reaction -Describe acids and alkalis and neutralisation reactions Threshold concepts Link to Prior learning **KS2 –** Solid, liquid and gas are the 3 main states of matter. The particle model represents atoms and molecules in particle pictures. The properties of different materials affect their use. Physical changes are reversible, and chemical changes are non-reversible. Chemical changes can happen when chemicals are	**Interdependence and evolution** **Knowledge Content** -Recall that an ecosystem is made up of a community of organisms interacting with the environment in which they live. -Explain the order of organisms in a given food chain, using ideas about producers, consumers, predators and prey. -Recognise that food web diagrams represent several interconnected food chains within a community of organisms -Identify abiotic and biotic components of an ecosystem. -Use a food web diagram to predict and explain effects that a change in the size of a population could have on other populations in the same community. -Explain how organisms affect, and are affected by, their environment (including the accumulation of toxic materials). Threshold concepts	**Waves** **Knowledge Content** -Describe how light travels in straight lines. -Explain how shadows are formed. --Identify what vibrates to make sound. -Explain how daylight / sunlight can be split into colours of the spectrum -Explain the differences between luminous and non-luminous objects -Explain how an image is formed on a screen behind a pinhole. Link to Prior learning **KS2 –** Energy is transferred by sound in the form of longitudinal waves transmitted by vibrating air particles. Sound waves can be reflected by hard materials and reflected by soft materials **KS3-** Revisits energy – consolidating knowledge from Year 7 Energy. To understand how the ear is designed to capture sound waves, and that echoes occur by reflection form hard surfaces. How light	**Electricity** **Knowledge Content** -Identify and draw circuit symbols and build simple circuits -Draw the circuit symbol for common components. --Identify circuit diagrams that represent a series circuit. -Identify following units; amps for current, volts for voltage and ohms for resistance and how they are measured -Distinguish between current and voltage -Describe what an electromagnet is and the magnetic effect of an electric current -Consider the advantages and disadvantages of different ways of generating electricity Link to Prior learning **KS2 –** Magnetic materials are attracted by a magnet, and there are only a few magnetic materials which include iron and steel. Understand that objects and appliances may need electricity for them to work. Be able to make simple electric circuits, and

	system has a different role to play in digesting food. All animals need air to survive, and that breathing takes air in and out of our lungs **KS3** Links to Year 7 topic of cells. To stay alive, cells need a constant supply of energy and molecules for chemical reactions, and they need to get rid of waste. In a multicellular organism the cells are organised into tissues, organs and organ systems that work together to support the life processes of cells to keep the organism alive. Links and revisits cells, but then also introduces enzymes **KS4 -** B1 Cell structure & transport B2 Cell division B3 Organisation and the digestive system B4 Organising animal and plants <u>Big Question</u> How do cells, tissues and organ systems work together to keep us alive? How does the body breakdown, absorb and use the nutrients that we eat in our food? How do our bodies get gases around our bodies? Compare and contrast aerobic and anaerobic respiration in humans	and the things that forces can do **KS4** P1Conservation and dissipation of energy stores P8 Forces in balance P9 Motion P10 Force and motion <u>Big Question</u> What is the difference between weight and mass? How do we measure forces? What do the different forces do?	mixed, and some of the new materials made can be useful **KS3** Revisits some of the key concepts covered during the 'atoms' topic and builds on the core principle that electron configuration determines the reactivity of an element. These lessons and activities will allow students to link their knowledge of atoms to their chemical reactions. Students will learn the fundamentals of reactions of metals, acids, alkalis and bases, carrying out investigations where appropriate. **KS4 -** C1 Atomic structure C3 Structure and bonding C5 Chemical changes C7 energy changes <u>Big Question</u> Why is an understanding of the reactivity series and pH scale, important to our lives?	<u>Link to Prior learning</u> **KS2 –** Know that animals and plants are adapted to the conditions of the habitats in which they live. That living things also depend on one another to survive. A food chain shows how each living thing gets food and energy **KS3** -Seasonal – sampling methods can be conducted outside, and the students are introduced to the sampling methods they need to know at GCSE. They will understand that food chains begin with producers, and that plants are producers. Know that almost every human activity can affect organisms in their habitats, often in a negative way **KS4 -** B14 Variation and evolution B15 Genetics and evolution B16 Adaptations, interdependence, and competitions B17 Organising an ecosystem B18 Biodiversity and ecosystems <u>Big Questions</u> What affects the populations of organisms and how do they adapt to changes in the environment?	travels as transvers waves that carry energy. Light can be reflected, absorbed and refracted. This topic normally comes towards the end of GCSE and can end up being rushed. **KS4 -** P7 Radioactivity P12 Wave properties P13 Electromagnetic waves P14 Light <u>Big Question</u> How can energy such as sound and light can be transferred by different types of waves? Why do some objects emit light and some don't?	know that circuits only work if they are complete. Know that all metals are good conductors of electricity, and that materials which do not allow electricity through them are called insulators, such as wood, plastic and rubber etc **KS3** Students need to understand Matter is held together by electrostatic forces, and these influence chemical changes. Electricity and magnetism initially seem to be distinct phenomena, but are later found to be closely interrelated. Understanding electricity and magnetism helps us to develop our technology and find applications that can transform our everyday lives. **KS4 -** P4 Electric circuits P5 Electricity in the home P15 Electromagnetism <u>Big Question</u> How are electrical circuits constructed and represented in diagrams, and how is electricity generated?

				Suggest what factors would affect the rate of photosynthesis. Explain your answer.		