

Science KS3 Curriculum Map – Year 9 2022-2023

Year	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
<p>Year 9 – 2022-2023</p> <p>At Castle Donington College, the Science curriculum has been designed as a 5-year spiral course.</p> <p>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.</p>	<p><u>Cell structure and organisation</u> <u>Cell division</u></p> <p><u>Knowledge Content</u></p> <ul style="list-style-type: none"> -How to use a microscope and draw specimens viewed at the microscopic level -Explain the structure and function of cells (animal, plant, bacterial and yeasts) -Applying knowledge of the processes of movement of substances o examples in animals and plants - Be able to calculate magnification -Describe cell division (mitosis) - Understand growth and differentiation in cells - Evaluate the use of stem cells and the ethics involved <p><u>Threshold concepts</u></p> <p><u>Link to Prior learning</u> KS3 Students need to know the basic structure of cells before they can move on to other biology concepts. They need to know that organisms are</p>	<p><u>Atomic structure</u> <u>The periodic table</u> <u>Structure and bonding</u></p> <p><u>Knowledge Content</u></p> <ul style="list-style-type: none"> -Know the atomic model and the history of the atom -Describe the differences between Ions, atoms and isotopes - Understand the electron configuration of atoms and elements - Explain the history of the Periodic Table - Describe Group 1 and 7 reactions and the trends on the Periodic table - Describe the different separation techniques - Describe metallic bonding - Explain ionic bonding, including giant ionic structures - Explain covalent bonding, including simple molecules and allotropes of carbon <p><u>Threshold concepts</u></p> <p><u>Link to Prior learning</u> KS3 Building on the knowledge of solids, liquids and gases, as a revisit and introducing</p>	<p><u>Conservation and dissipation of energy</u> <u>Energy transfers by heating</u></p> <p><u>Knowledge Content</u></p> <ul style="list-style-type: none"> - Know all of the Energy stores and energy transfers - Understand the Law of Conservation of energy - Calculate Work done - Use equations to work out Gravitational Potential Energy, Kinetic Energy and elastic potential energy - Calculate Efficiency - Power - Describe energy transfer by conduction, convection and radiation - Explain how to Heat and insulate buildings - Calculate the Specific heat capacity of a substance <p><u>Threshold concepts</u></p> <p><u>Link to Prior learning</u> KS3 Students understand that some kind of energy store is necessary for something to happen, in order to develop the understanding that when forces make things change, they transfer energy between different energy stores. It then supports the</p>	<p><u>Energy resources</u> <u>Organisation and the digestive system</u> <u>Organising animals and plants</u></p> <p><u>Knowledge Content</u></p> <ul style="list-style-type: none"> -Global energy demands - Compare renewable and non-renewable energy resources - Describe the organisation of the human body - Digestive system - Know how chemical Food tests can be used to test foods - Know that enzymes are biological catalysts - Explain enzyme action in digestion - Describe the Circulatory system (blood, vessels, heart) -Explain the process of gas exchange <p><u>Threshold concepts</u></p> <p><u>Link to Prior learning</u> KS3 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</p>	<p><u>Photosynthesis</u> <u>Respiration</u></p> <p><u>Knowledge Content</u></p> <ul style="list-style-type: none"> - Explain photosynthesis in plants - Describe the factors affecting the rate of photosynthesis - Making and using glucose in plants -Understand and know the differences in aerobic and anaerobic respiration - Describe how the body responds to exercise - Explain metabolism and action of the liver <p><u>Link to Prior learning</u> KS3 Students know that plants are producers and have been introduced to the word equation for photosynthesis. Students have also learnt that the circulatory system transports substances around the body including glucose and oxygen KS4 Photosynthesis and respiration link – opposite reactions to each other Photosynthesis is ideally studied during the Spring or summer months as so that there are leaves and</p>	<p><u>Electric circuits</u> <u>Electricity in the home</u></p> <p><u>Knowledge Content</u></p> <ul style="list-style-type: none"> - Draw and construct electrical circuits, including current, potential difference, resistance and charge flow -Describe the IV characteristics of components - Calculate resistance in series and parallel circuits - Explain how electricity is transported via the National Grid - To be able to wire a plug - Electrical appliances -Be able to calculate Power, current and potential difference <p><u>Link to Prior learning</u> 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</p>

	<p>made up of one or more cells. If they don't have this understanding, then they cannot progress. Content on overview</p> <p>KS4 Revisiting cells and what was covered at KS3. This is the fundamental basis for the whole of biology. Without this knowledge then progress cannot be made.</p> <p><u>Big Question</u></p>	<p>atoms. An understanding of atoms is needed to explain how reactions occur. Students will be able to link their knowledge of solids, liquids and gases to elements and compounds, as well as separating mixtures based on their state changes.</p> <p>KS4 Revisiting atomic structure and what was covered at KS3. This is the fundamental basis for the whole chemistry. Without this knowledge then progress cannot be made. If students do not understand the structure of an atom, then they will not be able to understand bonding, which links into where elements are on the Periodic table</p> <p><u>Big Question</u> Why are some elements reactive while others are not? Why has Dmitri Mendeleev's version of the modern periodic table been accepted?</p>	<p>development of the understanding that when things happen, energy is transferred between energy stores.</p> <p>KS4 Revisiting energy and what was covered at KS3. This is the fundamental basis for the whole Physics. Without this knowledge then progress cannot be made</p> <p><u>Big Question</u> What is energy?</p> <p>Explain why the phrase "heat rises" is incorrect With reference to the law of conservation, can energy be lost?</p>	<p>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</p> <p>KS4 The Energy resources topic follows on from P1 and P2 so students will be able to make sense of it as they have the background knowledge</p> <p>B3 and B4 are also linked - again revisiting cells and adding the next layer of knowledge into how animals and plants are organised at a tissue, organ and system level.</p> <p><u>Big Questions</u> Why do we need renewable energy? How are substances exchanged in the body?</p>	<p>plants available for the practical activities that are required</p> <p><u>Big Question</u> How do tumours spread? Describe the different ways that plants use glucose for Why do you breathe heavily after intensive exercise?</p>	<p>can transform our everyday lives.</p> <p>KS4 Students study electricity as a unit in Year 8. This GCSE unit in Year 10 extends and challenges their understanding to apply mathematical principles to their observations. P4 and P5 are interlinked by using circuits to explain electricity in our homes</p> <p><u>Big Question</u> What is an electric current? How do series and parallel circuits differ?</p>
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