

Deyes High School Curriculum Rationale



Science

Overarching curriculum, intent for SCIENCE KS3

- For all pupils to understand and develop a breadth of in-depth knowledge in biology, chemistry and physics, that challenges pupils' thinking and is ambitious for all.
- For all pupils to experience practical science, that allows substantive knowledge to link with disciplinary knowledge. Enhancing scientific enquiry, employability and a love of science.
- For all pupils to develop their scientific literacy, numeracy and autonomy to apply scientific knowledge to solve modern problems in the world around us.
- For all pupils to have a culturally rich experience that allows limitless futures no matter their background.

Key Stage 3 Science

Key stage 3 science offers an ambitious curriculum across year 7-9 and embeds the essential knowledge of the national curriculum and beyond so that all students are challenged no matter their background. We base our sequence around big ideas from the Best Evidence Science Teaching (BEST) and adapt this method to match our own intent. Our topics develop in challenge so that prior knowledge is built upon whilst interlinking with each other so essential knowledge is reinforced and developed as pupils progress from year 7 to year 11.

	Content Taught	NC Ref	Essential Knowledge	Assessment	Rationale and sequence
YEAR 8					
In year 8, students begin to have specialist teachers in either biology, chemistry and physics. As such, topics are taught in slightly varying orders across each term. In each term, students will rotate between the biology, chemistry or physics topic depending on which teacher specialism they have.					
HT1	Cells 2: Cell Transport	NC: Working Scientifically	-Diffusion -Osmosis -Active Transport	Cells 2 Formative Assessment: Daily, Weekly and Monthly Reviews focussing on reviewing	In this unit pupils will build on what they were taught in Year from Cells 1 in relation to diffusion. Pupils will begin to look at how

	<p>This unit will be taught over approximately 4 lessons.</p> <p>Cross connectivity: PE curriculum: study of respiration/diffusion in YR10.</p>	<p>NC: Biology B1.1d</p>	<p><u>Essential Reading:</u> <u>Reading for consolidation:</u> Cell Transport 1</p> <p><i>Reading for breadth:</i> Henrietta Lacks - Students Britannica Kids Homework Help</p>	<p>material on Essential Knowledge. Use of TLaC techniques in lessons to check pupil understanding of essential knowledge during each lesson.</p> <p><u>Cells 2 Summative Assessment:</u> End of Topic “Bring it All Together” task with application and culmination of understanding of the topic. Homework: Knowledge questions on the key knowledge required for this unit of work. Understanding of the curriculum assessed in cumulative test during school assessment points, using questions written to mirror structure and command words for exam boards, using KS3 Testbase SATs questions as a basis.</p>	<p>substances can travel across a semi-permeable membrane. Pupils will be introduced to the idea of other cell transport mechanisms such as diffusion and active transport.</p>
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<p>HT1</p>	<p>Waves 1: Light & Sound Waves</p> <p>This unit will be taught over approximately 10 lessons.</p>	<p>NC: Working Scientifically</p> <p>NC: Physics</p> <p>P3.1a P3.2a P3.2b P3.2c P3.2d P3.3a P3.4a P3.4b P3.4c</p>	<p>-Energy transferred by waves</p> <p>-Types of waves</p> <p>-Sound waves</p> <p>-Hearing</p> <p>-Light waves</p> <p>- Reflection</p> <p>- Refraction</p> <p>- Colour</p> <p>Essential Reading: Light & Sound 1</p>	<p><u>Waves 1 Formative Assessment:</u></p> <p>Daily, Weekly and Monthly Reviews focussing on reviewing material on Essential Knowledge.</p> <p>Use of TLaC techniques in lessons to check pupil understanding of essential knowledge during each lesson.</p> <p><u>Waves 1 Summative Assessment:</u></p> <p>End of Topic “Bring it All Together” task with application and culmination of understanding of the topic.</p> <p>Homework: Knowledge questions on the key knowledge required for this unit of work.</p> <p>Understanding of the curriculum assessed in cumulative test during school assessment points, using questions written to mirror structure and command words for exam boards, using KS3 Testbase SATs questions as a basis.</p>	<p>During this unit, pupils will build on what they have been taught at KS2 with regards to Light and Sound. Pupils will explain observations of how sounds travels using the idea of a longitudinal wave, and light travels as a transverse wave. Pupils will use apparatus such as an oscilloscope to demonstrate the amplitude and frequency of waves, and how sound waves change with volume or pitch. Pupils will also look at light waves to investigate how light is reflected and refracted as it moves through different mediums.</p>
<p>HT2</p>	<p>Atoms 3: Periodic Table</p>	<p>NC: Working Scientifically</p> <p>WS1a</p>	<p>-Mendeleev’s Periodic Table</p> <p>-Group 1</p>	<p><u>Atoms 3 Formative Assessment:</u></p>	<p>During this unit, pupils will build on what they have learned from Atoms 1 and 2. They will now begin to explore the groups</p>

	This unit will be taught over approximately 7 lessons.	<p>WS1b WS2c WS2d</p> <p>NC: Chemistry C6b C6d C4f C4g</p>	<p>-Group 2 -Group 7 -Group 0</p> <p>Essential Reading: The Periodic Table</p>	<p>Daily, Weekly and Monthly Reviews focussing on reviewing material on Essential Knowledge.</p> <p>Use of TLaC techniques in lessons to check pupil understanding of essential knowledge during each lesson.</p> <p><u>Atoms 3 Summative Assessment:</u> End of Topic “Bring it All Together” task with application and culmination of understanding of the topic. Homework: Knowledge questions on the key knowledge required for this unit of work. Understanding of the curriculum assessed in cumulative test during school assessment points, using questions written to mirror structure and command words for exam boards, using KS3 Testbase SATs questions as a basis.</p>	of the periodic table and look at patterns in reactivity following experimental analysis.
HT2	Human Health 2: Nutrition	<p>NC: Working Scientifically</p> <p>NC: Biology</p>	<p>-Food Groups -Balanced Diet -Unbalanced Diet -Adaptations of the digestive system.</p>	<p><u>Human Health Formative Assessment:</u> Daily, Weekly and Monthly Reviews focussing on reviewing</p>	During this unit, pupils will build on Human Health 1 and Cells 2 from Year 7 to apply their knowledge of organ systems to the digestive system. Pupils will look at the adaptations of the digestive system.

	<p>This unit will be taught over approximately 4 lessons.</p> <p>Cross connectivity: Food Technology curriculum: study of Eat Well Plate Yr7. Study of diet /nutrition in YR9. PE curriculum: Study of diet and nutrition in YR11.</p>	<p>B1.3a B1.3b B1.3c B1.3d</p>	<p>Essential Reading: Reading for consolidation Diet 1 Reading for breadth. James Lind Facts for Kids (kiddle.co)</p>	<p>material on Essential Knowledge. Use of TLaC techniques in lessons to check pupil understanding of essential knowledge during each lesson.</p> <p><u>Human Health Summative Assessment:</u> End of Topic “Bring it All Together” task with application and culmination of understanding of the topic. Homework: Knowledge questions on the key knowledge required for this unit of work. Understanding of the curriculum assessed in cumulative test during school assessment points, using questions written to mirror structure and command words for exam boards, using KS3 Testbase SATs questions as a basis.</p>	
HT3	<p>Particles & Matter 1: The Particle Model</p> <p>This unit will be taught over</p>	<p>NC: Working Scientifically NC: Physics P2.3a P5.1a P5.1b</p>	<p>Particle model Particle motion Changes of state Gas pressure Density Thermal energy transfer</p>	<p><u>Particles & Matter 1 Formative Assessment:</u> Daily, Weekly and Monthly Reviews focussing on reviewing material on Essential Knowledge.</p>	<p>During this unit, pupils will build on their prior knowledge in Year 7 to explain the differences in arrangements, in motion and in closeness of particles explaining changes of state with regards to internal energy. Pupils will look at similarities and differences including density between the</p>

	approximately 7 lessons.	P5.1c P5.1d P5.1e P5.2a	Essential knowledge reading for consolidation: Particle Model	Use of TLaC techniques in lessons to check pupil understanding of essential knowledge during each lesson. Particles & Matter 1 Summative Assessment: End of Topic “Bring it All Together” task with application and culmination of understanding of the topic. Homework: Knowledge questions on the key knowledge required for this unit of work. Understanding of the curriculum assessed in cumulative test during school assessment points, using questions written to mirror structure and command words for exam boards, using KS3 Testbase SATs questions as a basis.	different states of matter. Pupils will look at the history of explaining particle movement in gases, and the work that Robert Brown conducted to explain Brownian motion.
HT3	Chemical Reactions 1: Chemical Reactions This unit will be taught over approximately 10 lessons.	NC: Working Scientifically WS1a WS1b WS2c WS2d NC: Chemistry	-Oxidation Reactions -Combustion Reactions -Thermal Decomposition -Reactivity Series -Displacement Reactions -Extracting Metals -Catalysts	Chemical Reactions 1 Formative Assessment: Daily, Weekly and Monthly Reviews focussing on reviewing material on Essential Knowledge. Use of TLaC techniques in lessons to check pupil	During this unit, pupils will develop their understanding further on chemical reactions from what they had been taught in Year 7. Pupils will now begin to give examples and explain whether reactions are combustion, thermal decomposition, oxidation, or displacement. Pupils will be able to make predictions of the products formed during a chemical reaction, and

		C4a C4b C4c C4h	Essential knowledge reading for consolidation: Chemical Reactions	understanding of essential knowledge during each lesson. <u>Chemical Reactions 1 Summative Assessment:</u> End of Topic “Bring it All Together” task with application and culmination of understanding of the topic. Homework: Knowledge questions on the key knowledge required for this unit of work. Understanding of the curriculum assessed in cumulative test during school assessment points, using questions written to mirror structure and command words for exam boards, using KS3 Testbase SATs questions as a basis.	explain observations about the change in mass of reactants and products.
HT4	Bioenergetics 1: Photosynthesis This unit will be taught over approximately 7 lessons. Cross connectivity:	NC: Working Scientifically NC: Biology B1.3a B1.3b B1.3c B1.3d	-Plant organs/mineral uptake -Photosynthesis equation -Reactants/products -Leaf adaptation -Carbohydrate production Essential Reading: Reading for consolidation. Photosynthesis	<u>Bioenergetics 1 Formative Assessment:</u> Daily, Weekly and Monthly Reviews focussing on reviewing material on Essential Knowledge. Use of TLAc techniques in lessons to check pupil understanding of essential knowledge during each lesson.	During this unit, pupils will build their knowledge and understanding from what they had learnt from many of the topics taught in Biology, Chemistry and Physics. For example, pupils will apply prior knowledge from Cells and Chemical Reactions to understand that the dependence of almost all life on Earth comes from photosynthetic organisms. Pupils will be introduced to the idea of

	<p>Geography curriculum: Study of ecosystems in YR10.</p>		<p>Reading for breadth. Jan Ingenhousz Jan Ingenhousz and his discovery of the photosynthesis equation is celebrated in a Google Doodle (alphr.com)</p>	<p><u>Bioenergetics 1 Summative Assessment:</u> End of Topic “Bring it All Together” task with application and culmination of understanding of the topic. Homework: Knowledge questions on the key knowledge required for this unit of work. Understanding of the curriculum assessed in cumulative test during school assessment points, using questions written to mirror structure and command words for exam boards, using KS3 Testbase SATs questions as a basis.</p>	<p>carbohydrate production and use within the plant system.</p>
<p>HT4</p>	<p>Magnetism 1: The effects of magnets</p> <p>This unit will be taught over approximately 7 lessons.</p>	<p>NC: Working Scientifically</p> <p>NC: Physics P4.3a P4.3b P4.3c P4.3d P2.1a P2.1b P2.1c</p>	<p>Magnets Magnetic fields Magnets on Earth Compasses Electromagnets Electromagnets practical Uses of electromagnetism</p> <p><i>Essential knowledge reading for consolidation:</i> Magnets 1</p>	<p><u>Magnetism 1 Formative Assessment:</u> Daily, Weekly and Monthly Reviews focussing on reviewing material on Essential Knowledge. Use of TLaC techniques in lessons to check pupil understanding of essential knowledge during each lesson.</p> <p><u>Magnetism 1 Summative Assessment:</u></p>	<p>During this unit, pupils will build on their knowledge from Forces 1 in Year 7. Here, pupils will begin to explore magnetism from basic magnetism in bar magnets, how magnetic fields support life on Earth to uses of electromagnets.</p>

				<p>End of Topic “Bring it All Together” task with application and culmination of understanding of the topic. Homework: Knowledge questions on the key knowledge required for this unit of work. Understanding of the curriculum assessed in cumulative test during school assessment points, using questions written to mirror structure and command words for exam boards, using KS3 Testbase SATs questions as a basis.</p>	
HT5	<p>Chemical Changes 1: Endothermic and exothermic reactions</p> <p>This unit will be taught over approximately 5 lessons.</p>	<p>NC: Working Scientifically</p> <p>NC: Chemistry C5a C5b</p>	<p>-Exothermic Reactions -Endothermic Reactions</p> <p><i>Essential knowledge reading for consolidation:</i> Exothermic & Endothermic</p>	<p><u>Chemical Changes 1 Formative Assessment:</u> Daily, Weekly and Monthly Reviews focussing on reviewing material on Essential Knowledge. Use of TLaC techniques in lessons to check pupil understanding of essential knowledge during each lesson.</p> <p><u>Chemical Changes 1 Summative Assessment:</u> End of Topic “Bring it All Together” task with application</p>	<p>During this unit, pupils will build on Chemical Reactions 1 to explore exothermic and endothermic reactions. Here pupils will apply their learning to understanding of why chemical reactions occur.</p>

				<p>and culmination of understanding of the topic. Homework: Knowledge questions on the key knowledge required for this unit of work. Understanding of the curriculum assessed in cumulative test during school assessment points, using questions written to mirror structure and command words for exam boards, using KS3 Testbase SATs questions as a basis.</p>	
<p>HT5</p>	<p>Ecology 1: Interdependence</p> <p>This unit will be taught over approximately 4 lessons.</p> <p>Cross connectivity: Geography curriculum: Study of ecosystems in YR10.</p>	<p>NC: Working Scientifically</p> <p>NC: Biology B2.1b B3.1a B3.1b B3.1c</p>	<p>-Interdependence -Food webs/chains -Bioaccumulation/toxins -Food security/pollination</p> <p>Essential Reading: Reading for consolidation: Interdependence</p> <p>Reading for breadth. Rachel Carson Rachel Carson Facts for Kids (kiddle.co)</p>	<p><u>Ecology 1 Formative Assessment:</u> Daily, Weekly and Monthly Reviews focussing on reviewing material on Essential Knowledge. Use of TLaC techniques in lessons to check pupil understanding of essential knowledge during each lesson.</p> <p><u>Ecology 1 Summative Assessment:</u> End of Topic “Bring it All Together” task with application and culmination of understanding of the topic.</p>	<p>During this unit, pupils will begin to pull their knowledge from a range of units taught to date. Now they have the essential knowledge of plants/photosynthesis and pollination, they can begin to apply this learning to how other organisms depend on plants for survival.</p>

				<p>Homework: Knowledge questions on the key knowledge required for this unit of work. Understanding of the curriculum assessed in cumulative test during school assessment points, using questions written to mirror structure and command words for exam boards, using KS3 Testbase SATs questions as a basis.</p>	
<p>HT6</p>	<p>Motion 1: Moving Objects</p> <p>This unit will be taught over approximately 8 lessons.</p>	<p>NC: Working Scientifically</p> <p>NC: Physics P2.1a P2.1b P2.1c</p>	<ul style="list-style-type: none"> -Forces and motion -Speed -Speed practical -Relative motion -Distance time graphs -Acceleration -Effect of forces on motion -Stopping distance <p><i>Essential knowledge reading for consolidation:</i> Moving Objects</p>	<p><u>Motion 1 Formative Assessment:</u> Daily, Weekly and Monthly Reviews focussing on reviewing material on Essential Knowledge. Use of TLaC techniques in lessons to check pupil understanding of essential knowledge during each lesson.</p> <p><u>Motion 1 Summative Assessment:</u> End of Topic “Bring it All Together” task with application and culmination of understanding of the topic. Homework: Knowledge questions on the key knowledge required for this unit of work.</p>	<p>During this unit, pupils will apply what they have learnt from Forces 1 to begin to explain what forces cause motion within objects.</p>

				Understanding of the curriculum assessed in cumulative test during school assessment points, using questions written to mirror structure and command words for exam boards, using KS3 Testbase SATs questions as a basis.	
HT6	<p>Earth Chemistry 1: Atmosphere & Rocks</p> <p>This unit will be taught over approximately 5 lessons.</p>	<p>NC: Working Scientifically</p> <p>NC: Chemistry C8a C8b C8c</p>	<p>-Composition of Earth's atmosphere -Structure of Earth -Formation of Sedimentary Rock -Formation of Igneous Rock -Formation of Metamorphic Rock</p> <p><i>Essential knowledge reading for consolidation:</i> The Earth</p>	<p><u>Earth Chemistry 1 Formative Assessment:</u> Daily, Weekly and Monthly Reviews focussing on reviewing material on Essential Knowledge. Use of TLaC techniques in lessons to check pupil understanding of essential knowledge during each lesson.</p> <p><u>Earth Chemistry 1 Summative Assessment:</u> End of Topic "Bring it All Together" task with application and culmination of understanding of the topic. Homework: Knowledge questions on the key knowledge required for this unit of work. Understanding of the curriculum assessed in</p>	<p>Pupils will build on their prior knowledge at KS2 to look at the formation of different types of rock including sedimentary, metamorphic and igneous. Pupils will learn that these rocks are continually being broken down and new rocks formed described by the rock cycle.</p>

				<p>cumulative test during school assessment points, using questions written to mirror structure and command words for exam boards, using KS3 Testbase SATs questions as a basis.</p>	
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