

Department: Science

Vision Statement

The vision for Science at Colton Hills is for all students to “Learn, Do and Use” Science such that all students have developed an understanding of how they, their world, and their universe works. Colton Hills views the Science curriculum as a seven-year journey to gain expertise and experience.

Strapline: Learn, Do and Use Science

Curriculum Story:

Students learn about themselves and their bodies, other organisms, chemical reactions, forces, energy.... Well, everything really! The curriculum revisits key themes such as *Our Place in the Universe* and *Understanding Processes* throughout the seven years.

Skills developed:

- To gain substantive knowledge, disciplinary skills, and wider understanding in Science [LEARN].
- To develop those scientific skills over time, demonstrating increased precision and confidence [DO].
- To increasingly apply their knowledge and understanding to new scenarios, in a way that demonstrates expertise, common sense, and both critical and scientific thinking. [USE].

[illegible]

Year 7: Fundamentals of Science

Biology

Chemistry

Physics

Topics	Why we teach this	Links to last topic	Links to future topics	Key skills developed	Cultural capital opportunities	Links to whole school curriculum
Autumn 1						
Starting Points Consolidation	We understand that with a need to focus on KS2 SATS, students often benefit from a consolidation of work from years 5 and 6. This short module ensures a strong foundation for the Key Stage 3, GCSE and A-Level/AAQ Science to come.	Living things and their habitats Animals, including humans Properties and changes of materials Earth and space Forces Evolution & Inheritance Light Electricity	Links to All Future Topics Links to Biology GCSE topics Links to Chemistry & Physics GCSE topics	Scientific Literacy Numeracy Critical Thinking Analysis Problem Solving	STEM Careers	Numeracy & Mathematics Literacy & English Sport & PE Geography
Science Safety & Skills Cells & Breathing Particle Model	Safety First! Keeping students safe so they can engage with the future practical work is key. Understanding our own bodies Understanding materials	Links to Primary Science	Links to All Future Topics Links to Biology GCSE topics	Scientific Literacy Numeracy Critical Thinking Analysis	Humans as organisms STEM Careers	Sport & PE

			Links to Chemistry & Physics GCSE topics	Problem Solving		
Autumn 2						
Separating Mixtures Contact Forces & Pressure	Understanding Materials Understanding Force Interactions	Links to Primary Science	Links to Chemistry GCSE topics Links to Physics GCSE topics	Scientific Literacy Numeracy Critical Thinking Analysis	STEM Careers	Sport & PE Mathematics Food Technology
Spring 1						
Inheritance & Evolution Sounds & Light	Understanding where we came from, as a species Understanding wave phenomena	Links to Primary Science	Links to Biology GCSE topics Links to Physics GCSE topics	Scientific Literacy Numeracy Critical Thinking Analysis	Debate: Creation v Science STEM Careers	English RS Performing Arts
Spring 2						
Sounds & Light Periodic Table & Matter	Understanding wave phenomena Understanding elements and their properties	Links to Primary Science	Links to Physics GCSE topics Links to Chemistry GCSE topics	Scientific Literacy Numeracy Critical Thinking Analysis	STEM Careers	Numeracy

Summer 1						
Energy Costs & Transfers	Understanding how energy is “used” and “charged for”	Links to Primary Science	Links to Physics GCSE topics	Scientific Literacy Numeracy Critical Thinking Analysis	STEM Careers Understanding electricity bills	Mathematics Technology
Summer 2						
Speed & Gravity	Understanding the difference between mass, weight and gravity Ability to measure speed and relative speed	Links to Primary Science	Links to Physics GCSE topics	Scientific Literacy Numeracy Critical Thinking Analysis	Space Exploration STEM Careers	Mathematics PSHE (Road Safety)

Year 8: Knowing Science

Biology Chemistry Physics

Topics	Why we teach this	Links to last topic	Links to future topics	Key skills developed	Cultural capital opportunities	Links to whole school curriculum
Autumn 1						
Human Reproduction & Variation Acids & Alkalies	To understand how humans procreate To understand why we are different To distinguish between acids and alkalies	Links to cells Links to fundamental chemistry	Links to Biology GCSE topics Links to Chemistry GCSE topics	Scientific Literacy Numeracy Critical Thinking Analysis	Real life acids and alkalies STEM Careers	RSE / PSHE (Variation, Contraception, Equality) Health & Childcare
Autumn 2						
Metals & Non-Metals Earth Structure & Universe Interdependence	To describe and understand elements on the periodic table To describe the structure of the earth, and celestial objects To understand how living things in an environment are related	Links to atoms, elements & the Periodic table Links to space Links to biodiversity and ecology	Links to Chemistry GCSE topics Links to Chemistry and Physics GCSE topics Links to Biology GCSE topics	Scientific Literacy Numeracy Critical Thinking Analysis	STEM Careers	Technology Geography
Spring 1						
Plant Reproduction Wave Effects & Properties	How a plant is structured for reproduction How waves behave and interact with their surroundings	Links to human reproduction, plant biology, ecology Links to waves and communication	Links to Biology GCSE topics Links to Physics GCSE topics	Scientific Literacy Numeracy Critical Thinking Analysis	The need for seed banks STEM Careers	Food technology Music Technology

Spring 2						
Climate & Earth Resources Work	What is the green house effect? What is global warming? How is energy transferred usefully?	Links to ecology Links to chemical resources Links to energy	Links to Chemistry GCSE topics Links to Physics GCSE topics	Scientific Literacy Numeracy Critical Thinking Analysis	STEM Careers	PSHE (Environmental Responsibility) Technology
Summer 1						
Heating & Cooling Respiration	How is energy transferred and stored usefully as heat? How does energy get “used” in the body?	Links to energy Links to bioenergetics	Links to Physics GCSE topics Links to Biology GCSE topics	Scientific Literacy Numeracy Critical Thinking Analysis	STEM Careers	Technology Health & Child Care
Summer 2						
Photosynthesis	How is sunlight used to produce food?	Links to bioenergetics	Links to Biology GCSE topics	Scientific Literacy Numeracy Critical Thinking Analysis	The need to grow enough food STEM Careers	Food technology PSHE (Sustainable food production)

Year 9: Describing Science

Biology

Chemistry

Physics

Topics	Why we teach this	Links to last topic	Links to future topics	Key skills developed	Cultural capital opportunities	Links to whole school curriculum
Autumn 1						
Magnetism & Electromagnetism	To understand how devices work	Links to forces	Links to Physics GCSE topics	Scientific Literacy	STEM Careers	Food technology
Movement & Digestion	To understand how our bodies function	Links to cells	Links to Biology GCSE topics	Numeracy Critical Thinking Analysis	Healthy Diet	PSHE (healthy eating)
Autumn 2						
Voltage, Current and Resistance	To understand how circuits work	Links to electricity, mains power	Links to Physics GCSE topics	Scientific Literacy	Importance of electricity in every day life	Technology, Electrical Engineering
Chemical Energy	To understand how chemical reactions happen	Links to elements compounds and mixtures	Links to Chemistry GCSE topics	Numeracy Critical Thinking Analysis	STEM Careers	
Spring 1						
Types of Chemical Reaction	To understand how different chemical reactions happen	Links to chemical energy	Links to Chemistry GCSE topics	Scientific Literacy	STEM Careers	
Required Practical Skills	To develop core skills around practical work needed for GCSE	All	All	Numeracy Critical Thinking Analysis		

Spring 2						
Cell Biology Atomic Structure Energy	What are cells, their organelles and their functions What is an atom? How is energy stored and transferred usefully?	Links to KS3 Cells Links to KS3 Atoms Links to KS3 Energy	Links to A-Level Biology topics Links to A-Level Chemistry topics Links to A-Level Physics topics Links to BTEC/AAQ topics	Scientific Literacy Numeracy Critical Thinking Analysis	Idea of using models STEM Careers	Technology
Summer 1						
Cell Biology Bioenergetics Atomic Structure Structure & Bonding Energy Electricity	What are cells, their organelles and their functions? What is photosynthesis? What is respiration? What is an atom? How do atoms form compounds? How is energy transferred and stored usefully? How do circuits work	Links to KS3 cells Links to KS3 Photosynthesis Links to KS3 Atoms Links to KS3 Energy Links to KS3 Electricity and Magnetism	Links to A-Level Biology topics Links to A-Level Chemistry topics Links to A-Level Physics topics Links to BTEC/AAQ topics	Scientific Literacy Numeracy Critical Thinking Analysis	Costs of electricity Environmental impact of using energy resources STEM Careers	Technology Electrical Engineering
Summer 2						
Bioenergetics Quantitative Chemistry	What is photosynthesis? What is respiration? How do we measure chemicals?	Links to KS3 respiration	Links to A-Level Biology topics	Scientific Literacy Numeracy	Mains electricity – costs and dangers STEM Careers	PE/Sport Technology

Electricity	How do circuits work?	Links to all KS3 chemistry Links to KS3 Electricity and Magnetism	Links to A-Level Chemistry topics Links to A-Level Physics topics Links to BTEC/AAQ topics	Critical Thinking Analysis		
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Year 10: Explaining Science

Biology

Chemistry

Physics

Topics	Why we teach this	Links to last topic	Links to future topics	Key skills developed	Cultural capital opportunities	Links to whole school curriculum
Autumn 1						
Infection & Response	How do pathogens effect us, and how can we stop them?	Links to KS3 and GCSE Cells	Links to A-Level Biology topics	Scientific Literacy	Covid and keeping everyone safe	PSHE (Public Health)
Chemical Changes	How do chemical reactions work?	Links to all KS3 chemistry	Links to A-Level Chemistry topics	Numeracy	STEM Careers	
Particle Model of Matter	How are particles arranged, and what is density?	Links to particle model	Links to A-Level Physics topics	Critical Thinking		
			Links to BTEC/AAQ topics	Analysis		
Autumn 2						
Organisation	How do cells form tissues, organs, organ systems and organisms?	Links to KS3 and GCSE Cells	Links to A-Level Biology topics	Scientific Literacy	Nuclear Power debate	PE/Sport
Chemical Changes	How are new products made in chemical reactions?	Links to all Chemistry	Links to A-Level Chemistry topics	Numeracy	STEM Careers	Technology
Energy Changes	What are exo- and endo-thermic reactions?		Links to A-Level Physics topics	Critical Thinking		
Radioactivity	What are the properties of alpha, beta and gamma radiation?	Links to Particle Model of Matter	Links to BTEC/AAQ topics	Analysis		

Spring 1						
Organisation Homeostasis & Response Rate of Chemical Change Forces	How do cells form tissues, organs, organ systems and organisms? How does our body control itself? How can reactions be sped up? How do we interact with the world around us?	Links to KS3 cells, GCSE cells Links to Organisation Links to all chemistry topics Links to all Physics topics	Links to A-Level Biology topics Links to A-Level Chemistry topics Links to A-Level Physics topics Links to BTEC/AAQ topics	Scientific Literacy Numeracy Critical Thinking Analysis	STEM Careers	PE/Sport Medicine Technology
Spring 2						
Inheritance, Variation & Evolution Organic Chemistry Forces	How are genes expressed? Why is crude oil useful? How does motion happen?	Links to KS3 Genes Links to Earth Resources Links to all Physics topics	Links to A-Level Biology topics Links to A-Level Chemistry topics Links to A-Level Physics topics Links to BTEC/AAQ topics	Scientific Literacy Numeracy Critical Thinking Analysis	STEM Careers Road safety	PSHE/RSE (Reproduction, genetics, characteristics) Technology
Summer 1						
Inheritance, Variation & Evolution Chemical Analysis	How are genes expressed? How are chemicals identified? How does motion happen?	Links to KS3 Genes Links to all chemistry topics Links to all physics topics	Links to A-Level Biology topics Links to A-Level Chemistry topics	Scientific Literacy Numeracy Critical Thinking Analysis	STEM Careers Road safety	PSHE/RSE (Reproduction, genetics, characteristics) Technology

Forces			Links to A-Level Physics topics Links to BTEC/AAQ topics			
Summer 2						
Revision for Mock Examinations Mock Examinations Mock Review and Reteach of Misconceptions	To prepare for Public Examinations	All	All	Scientific Literacy Numeracy Critical Thinking Analysis	STEM Careers	

Year 11: GCSEs

Biology Chemistry Physics

Topics	Why we teach this	Links to last topic	Links to future topics	Key skills developed	Cultural capital opportunities	Links to whole school curriculum
Autumn 1						
Ecology	To understand the world around us	Interdependence	All	Scientific Literacy	STEM Careers	PSHE (Environment)
Chemistry of the Atmosphere	To understand how the atmosphere has changed	Elements, Compounds and Mixtures		Numeracy		History
Waves	To understand how we use waves to communicate	Wave Effects		Critical Thinking		Technology
				Analysis		
Autumn 2						
Revision for Mock Examinations	To prepare for Public Examinations	All	All	Scientific Literacy	STEM Careers	
Ecology	To understand the world around us	Interdependence		Numeracy		PSHE (Environment)
Using Resources	To understand how we can use materials from the Earth	Chemical Resources		Critical Thinking		
Magnets & Electromagnets	To understand how devices work	Magnets		Analysis		

Spring 1						
Revision	To prepare for Public Examinations	All	All			
Spring 2						
Revision	To prepare for Public Examinations	All	All	Exam Technique		
Summer 1						
Revision GCSE Examinations	To prepare for Public Examinations	All	All	Exam Technique		