



## Curriculum Overview – Science

### Why is the study of Science important?

Have you ever wondered why the sky is blue? If there are more than 118 elements? Whether there are more undiscovered species of plant or animal?

Could they be answered by the brightest minds in science? The curiosity that lies behind these questions and the drive to find the answers is what makes us human and it lies in the heart of Science. Answering questions is essentially the whole purpose of science and answering these questions simply brings more questions to the surface. Great scientists, those at the very frontier of what we understand as science knowledge, would still declare that the more we understand about the universe, the more there is to find out.

Science is an active process. From Year 7 we have planned a range of relevant and exciting scientific activities that involve the full range of all the aspects of science. We feel that to be able to think like a scientist you must understand the foundations that led us to our current understanding in the 21 century.

### What skills will you gain from Science?

You are a citizen in this world, and you need to know how the natural and modern world works. It will teach you to...

- Understand theories that explain phenomena
- Apply basic ideas and models that support understanding
- Evaluate models and theories
- Present theories in mathematical form
- Recall quantitative relationships
- Derive quantitative relationships between various measured quantities
- Explain how theories are borne out by experiment
- Apply experimental procedure and understand that it is a measure of success of a theory
- Present, interpret and evaluate experimental data
- Apply mathematical skills to solve problems
- Develop a deeper understanding of everyday experiences including the natural world and modern devices

*"Our curriculum will be structured so that no pupil is prevented from pursuing a course or programme based on their gender, ability, ethnicity, religion or sexual orientation. Pupils with disabilities or special educational needs will, as far as is possible, be provided with reasonable adjustments to enable them to access an ambitious and relevant curriculum."*



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## What knowledge will you gain from the study of Science?

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- Develop scientific knowledge and conceptual understanding of Science.
- Develop understanding of the nature, processes and method involved in Science.
- Develop and learn to apply observational, practical, modelling, enquiry and problem-solving skills, both in the laboratory, in the field and in other learning environments.
- Develop your ability to evaluate claims linked to Science through critical analysis of the methodology evidence and conclusions, both qualitatively and quantitatively.

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## How does Science help you in other subject areas?

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Study of any subject in our curriculum takes full advantage of links with other subject areas- we term these as interdisciplinary links and we make the most of them because we know that deep learning requires the transference of knowledge and skills from one topic of learning to another. Once you can transfer your learning across topics and subject areas then you are really mastering what you know and how to apply your understanding and skills.

Science touches on so many other subjects such as Mathematics, PE and Geography. You will learn methods of thinking and research that are widely applicable to other subject areas helping your thinking in all subjects. Through developing mathematical techniques as well as applying reasoning your skills to present and justify information can be applied to most careers and further education.



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## What can you do to deepen your knowledge and skills of Science?

Our Science departments offers lots of great opportunities for you to really engage with this fabulous subject. We offer STEM events and activities that may include opportunities to visit local colleges and universities. There may be visits to science museums and events that celebrate great scientists and discoveries. We offer after school, support sessions for GCSE students.

We promote the use of Tassomai and Seneca learning to enhance your science knowledge at home.



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## How are you assessed in Science?

Throughout the 5 years of Science you are assessed using the following assessment objectives which ensure that you can cumulatively build your subject understanding in preparation for future GCSE and A Level study. There are 3 assessment points each year. We assess how students at their current stage of study are on track to reach their end of stage targets which are formulated on aspirational expectation from their KS2 starting points. We make an informed prediction from our holistic assessments based on our subject mapping of expectation across the Science curriculum.

The formal examination in year 11 will focus on the three following areas:

### **A01 Demonstrate knowledge and understanding of:**

- scientific ideas
- scientific techniques and procedures.

### **A02 Apply knowledge and understanding of:**

- scientific ideas
- scientific enquiry, techniques and procedures.

### **A03 Analyse information and ideas to:**

- interpret and evaluate
- make judgements and draw conclusions
- develop and improve experimental procedures.

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## How can Science help you in your future?

Whether you have continued your study of Science into A level or not you will have gained access to this enriching subject and its study will have taught you to think differently and deeply.

Science is offered at most prestigious universities either as a single honours or a joint honours subject studied alongside other disciplines e.g. chemical engineering, veterinary sciences and medicine. The very fact that you have been able to study Science your analytical thinking and mathematical reasoning will help your future application be they for colleges, universities, apprenticeships or employment.

Careers that the study of Science supports include:

- Teaching
- Medicine
- Veterinary science
- Chemical Engineering
- Forensic Science
- Pharmacy



# INSERT SUBJECT – Curriculum Maps



## Year 7:

<b>Topics Term 1</b>	Changes to our body and reproduction. <ol style="list-style-type: none"> <li>Sex cells</li> <li>Internal and external reproduction</li> <li>Reproductive organs</li> <li>Pregnancy</li> <li>gestation</li> <li>puberty</li> <li>Menstrual cycle</li> <li>Project investigating reproduction</li> </ol>	Variation and the environment. <ol style="list-style-type: none"> <li>Variation</li> <li>Genetic and environmental variation</li> <li>adaptations</li> <li>adaptations</li> <li>Changes in Environment</li> <li>Survival of fittest</li> <li>Food chains</li> <li>Food webs</li> <li>Pyramid of number and biomass</li> <li>Variation core practical</li> </ol>	The universe. <ol style="list-style-type: none"> <li>Gravity</li> <li>The earth and the moon</li> <li>The earth and the sun</li> <li>What causes the seasons</li> <li>The magnetic earth</li> <li>How do eclipses occur?</li> <li>Models of the solar system</li> <li>Stars galaxies and the universe</li> <li>The solar system</li> <li>Project – discovering the planets</li> <li>Gravity</li> </ol>
<b>Review</b>	<b>Assessment on three topics</b>		
<b>Topics Term 2</b>	Microscopes and cells. <ol style="list-style-type: none"> <li>Life processes</li> <li>Organ systems</li> <li>Microscopes</li> <li>Including core practical work in lab book</li> <li>Animal cells</li> <li>Plant cells</li> <li>Making cell slides</li> <li>Including core practical work in lab book</li> <li>Bacterial cells</li> <li>Specialised cells</li> <li>Modelling cells</li> </ol>	Separating mixtures. <ol style="list-style-type: none"> <li>Elements, compounds and mixtures</li> <li>solutions</li> <li>Separating substances</li> <li>Separating substances</li> <li>Separating substances</li> <li>Separating substances</li> <li>Planning</li> <li>Core practical</li> <li>Core practical</li> <li>Core practical</li> </ol>	Magnetism and electricity <ol style="list-style-type: none"> <li>Magnets</li> <li>Magnetic fields</li> <li>Electromagnets</li> <li>Investigating electromagnets</li> <li>Electrical Circuits</li> <li>Changing the current</li> <li>Series and parallel circuits</li> <li>Voltage, Current and resistance</li> <li>Fruity Batteries</li> <li>Static electricity</li> <li>Electrical safety</li> <li>Generating electricity</li> </ol>
<b>Review</b>	<b>Assessment on six topics</b>		
<b>Topics Term 3</b>	States of matter <ol style="list-style-type: none"> <li>States of matter</li> <li>Changing states</li> <li>Investigation</li> <li>Investigation</li> <li>Diffusion</li> <li>Dissolving</li> <li>Gas pressure</li> </ol>	Acids, alkalis and neutralisation. <ol style="list-style-type: none"> <li>Using indicators</li> <li>Using indicators</li> <li>Making an indicator</li> <li>neutralisation</li> <li>Neutralisation in daily life</li> <li>Core practical</li> <li>Core practical</li> </ol>	Motion and forces. <ol style="list-style-type: none"> <li>Different forces</li> <li>Mass and weight</li> <li>Friction</li> <li>Balanced and unbalanced forces</li> <li>Resultant forces</li> <li>Calculating speed</li> <li>Distance time graphs</li> <li>Calculating speed core practical</li> <li>Calculating speed core practical</li> </ol>
	<b>End of year project</b>		
	<b>End of year assessment</b>		

## Year 8:

	Biology	Chemistry	Physics
<b>Topics Term 1</b>	Food and digestion <ol style="list-style-type: none"> <li>1. Food groups</li> <li>2. Balanced diet</li> <li>3. Issues with dieting</li> <li>4. Food tests part 1</li> <li>5. Food tests part 2</li> <li>6. Digestive system part 1</li> <li>7. Digestive system part 2</li> <li>8. adaptation</li> <li>9. enzymes</li> <li>10. Visking tube practical</li> </ol>	The atom and periodic table <ol style="list-style-type: none"> <li>1. Elements, compounds and mixtures L1</li> <li>2. Elements, Compounds and mixtures L2</li> <li>3. The history of the atom.</li> <li>4. The history of the atom part two.</li> <li>5. Atomic structure</li> <li>6. Atomic structure part two</li> <li>7. The history of the periodic table</li> <li>8. The periodic table.</li> <li>9. Metals and non-metals</li> <li>10. Reading the periodic table</li> <li>11. Electronic structure</li> <li>12. Mastery</li> </ol>	Motion and forces. <ol style="list-style-type: none"> <li>1. Different forces</li> <li>2. Mass and weight</li> <li>3. Friction</li> <li>4. Balanced and unbalanced forces</li> <li>5. Resultant forces</li> <li>6. Calculating speed</li> <li>7. Distance time graphs</li> <li>8. Calculating speed core practical</li> <li>9. Calculating speed core practical</li> </ol>
<b>Review</b>	<b>Assessment on three topics</b>		
<b>Topics Term 2</b>	Breathing and respiration. <ol style="list-style-type: none"> <li>1. Structure of gas exchange system</li> <li>2. Alveoli</li> <li>3. Circulatory system</li> <li>4. heart</li> <li>5. Blood</li> <li>6. Aerobic respiration</li> <li>7. exercise</li> <li>8. Comparing gas exchange</li> <li>9. Burning candles</li> <li>10. Effect of smoking/ asthma/ CPD/cystic fibrosis</li> <li>11. Yeast respiration core prac</li> </ol>	Acids, alkalis and neutralisation. <ol style="list-style-type: none"> <li>1. Using indicators</li> <li>2. Using indicators</li> <li>3. Making an indicator</li> <li>4. neutralisation</li> <li>5. Neutralisation in daily life</li> <li>6. Core practical</li> <li>7. Core practical</li> </ol>	Waves. <ol style="list-style-type: none"> <li>1. What are waves</li> <li>2. Making sound waves</li> <li>3. Detecting sound waves</li> <li>4. Using sound waves</li> <li>5. Combining waves</li> <li>6. Light waves</li> <li>7. Detecting light waves</li> <li>8. Reflection of light</li> <li>9. Refraction of light</li> <li>10. Colour</li> </ol>
<b>Review</b>	<b>Assessment on six topics</b>		
<b>Topics Term 3</b>	How does a plant grow? <ol style="list-style-type: none"> <li>1. classification</li> <li>2. Flower structure</li> <li>3. pollination</li> <li>4. Seed dispersal</li> <li>5. Germination</li> <li>6. Photosynthesis</li> <li>7. Photosynthesis core practical</li> <li>8. Core practical continued</li> <li>9. Deforestation project</li> <li>10. Deforestation project</li> </ol>	Chemical reactions. <ol style="list-style-type: none"> <li>1. An introduction to chemical reactions</li> <li>2. The conservation of matter</li> <li>3. An introduction to word equations</li> <li>4. Reactions of metals with oxygen</li> <li>5. Reading chemical formula</li> <li>6. Counting atoms</li> <li>7. Formula compounds and elements</li> <li>8. Measuring change in mass (part 1)</li> <li>9. Measuring change in mass (part 2)</li> <li>10. Multiple choice quiz</li> </ol>	Energy. <ol style="list-style-type: none"> <li>1. Energy stores</li> <li>2. Energy transfers</li> <li>3. Formation of fossil fuels</li> <li>4. Non-renewable energy resources</li> <li>5. Renewable energy resources</li> <li>6. Fuels</li> <li>7. Temperature and heat</li> <li>8. Transferring heat conduction</li> <li>9. Transferring heat Convection</li> <li>10. Transferring heat radiation</li> </ol>
	<b>End of year assessment</b>		

## Year 9:

	Biology	Chemistry	Physics
Topics Half term 1	CB1 1. Microscopes 2. Plant and animal cells 3. Plant and animal cells core practical 4. Specialised cells 5. Inside bacteria 6. Enzymes and nutrition 7. Enzymes and lock and key	CC1/2 1. States of matter 2. Mixtures 3. Filtration and crystallisation 4. Paper chromatography 5. Core practical 6. Distillation 7. Distillation 8. Drinking water	CP1 1. Vectors and scalars 2. Distance/time graphs 3. Acceleration 4. Acceleration core prac 5. Velocity/time graphs 6. Resultant forces
	<b>Baseline Assessment for GCSE</b>		
Topics Half term 2	CB1 1. Enzyme activity 2. Core prac enzymes 3. Transporting substances 4. Core practical osmosis	CC3 1. Structure of an atom and atom history 2. Atomic mass and number 3. Isotopes CC4 4. Elements and the periodic table 5. Atomic number and the periodic table 6. Electronic configurations	CP3 1. Energy stores and transfers 2. Energy stores and transfers 3. Energy efficiency 4. Keeping warm 5. Stored energies 6. Non-renewable resources 7. Renewable resource
	<b>End of Topic Assessments</b>		
Topics Half term 3	CB2 1. Mitosis 2. Growth in animals 3. Growth in plants 4. Stem cells 5. The nervous system part 1 6. The nervous system part 2	CC5/6/7 1. Ionic bonds 2. Ionic lattices 1. Properties of ionic compounds Properties of ionic compounds 2. Covalent bonding 3. Molecular compounds part 1 4. Molecular compounds part 2	CP4 1. Describing waves. 2. Wave velocity 3. Investigating waves core prac 4. Refraction CP5 5. Electromagnetic waves 6. Core prac investigating refraction 7. Electromagnetic waves 8. Electromagnetic spectrum
	<b>End of Topic Assessments</b>		
Topics Half term 4	1. Neurotransmission speed Part 1. 2. Neurotransmission speed part 2 CB3 3. Meiosis 4. DNA Alleles 5. Inheritance part 1 6. Inheritance part 2	CC5/6/7 1. Allotropes of carbon part 1 2. Allotropes of carbon part 2 3. Properties of metals part 1 4. Properties of metals part 2 5. Bonding models part 1	CP5 1. Electromagnetic spectrum 2. Using the long wavelengths 3. Using the short wavelengths 4. EM radiation dangers
	<b>End of Topic Assessments</b>		
Topics Half term 5	CB3 1. Gene mutations part 1 2. Gene mutations part 2 3. Variation	CC8 1. Acids, indicators and pH 2. Looking at acids 3. Bases and salts 4. Core prac preparing copper sulphate 5. Alkalis and balancing equations	CP2 1. Newton's First law 2. Mass and weight part 1 3. Mass and weight part 2 4. Newton's first Law 5. Newton's Second Law
Review	<b>End of Topic Assessments</b>		
Topics Half term 6	CB4 Human evolution 1. Darwin's theory 2. Classification 3. Breeds and varieties 4. Genes in agriculture and medicine	CC8 6. Core prac neutralisation 7. Alkalis and neutralisation 8. Reactions of acids with metals and metal carbonates 9. Solubility	
Review	<b>End of year exam</b>		

## Year 10:

	Biology	Chemistry	Physics
Topics Half term 1	Continue cb2: 1. Stem cells 2. The nervous system part 1 3. The nervous system part 2 4. Neurotransmission speed Part 1. 5. Neurotransmission speed part 2 CB3 6. Meiosis 7. DNA Alleles 8. Inheritance part 1 9. Inheritance part 2 10. Gene mutations part 1 11. Gene mutations part 2 12. Variation	<b>CC8</b> 1. Acids, indicators and pH 2. Looking at acids 3. Bases and salts 4. Core prac preparing copper sulphate 5. Alkalis and balancing equations 6. Core prac neutralisation 7. Alkalis and neutralisation 8. Reactions of acids with metals and metal carbonates 9. Solubility	<b>CP3</b> 1. Energy stores and transfers 2. Energy stores and transfers 3. Energy efficiency 4. Keeping warm 5. Stored energies 6. Non-renewable resources 7. Renewable resource
Topics Half term 2	<b>CB4: Human evolution</b> 1. Darwin's theory 2. Darwin and clippy beak 3. Antibiotic resistance 4. Classification 5. Breeds and varieties 6. Genes in agriculture and medicine	<b>CC9:</b> 1. Masses and empirical formulae 2. Masses and empirical formulae 3. Conservation of mass 4. Conservation of mass 5. Moles	<b>CP4</b> 1. Describing waves. 2. Wave velocity 3. Investigating waves core prac 4. Refraction
<b>Baseline for GCSE</b>			
Topics Half term 3	<b>CB5:</b> 1. Health and disease 2. Non-communicable diseases 3. Cardiovascular disease 4. Pathogens 5. Spreading pathogens 6. Physical and chemical defences 7. The immune system 8. Antibiotics	<b>CC10/11/12</b> 1. Electrolysis 2. Core prac electrolysis of copper sulphate 3. Products from electrolysis 4. Reactivity 5. Ores 6. Oxidation and reduction 7. Life cycle and recycling 8. Dynamic equilibrium	<b>CP5</b> 1. Electromagnetic waves 2. Core prac investigating refraction 3. Electromagnetic waves 4. Electromagnetic spectrum 5. Electromagnetic spectrum 6. Using the long wavelengths 7. Using the short wavelengths 8. EM radiation dangers
<b>Mock Exam</b>			
Topics Half term 4	<b>CB6</b> 1. Photosynthesis 2. Factors affecting photosynthesis 3. Core Prac. light intensity and p/s 4. Absorbing water and mineral ions 5. Transpiration and translocation	<b>CC13/14/15</b> 1. Group 1 2. Group 7 3. Halogen reactivity 4. Group 0	<b>CP6</b> 1. Half-life part 1 2. Half-life part 2 3. Dangers of radiation <b>CP7/8</b> 4. Work 5. Power 6. Objects affecting each other 7. Vector diagrams
Topics Half term 5	<b>CB7:</b> 1. Hormones 2. Hormonal control of metabolic rate 3. Menstrual cycle 4. Hormones and the menstrual cycle 5. Contraception 6. Control of blood glucose 7. Diabetes	<b>CC13/14/15</b> 1. Rates of reaction 2. Factors affecting ror 3. Core prac reaction rates 4. Core prac reaction rates 5. Catalysts and activation energy 6. Exo and endo thermic reactions 7. Energy changes in reactions	<b>CP9</b> 1. Electric circuits 2. Current and potential difference 3. Current, charge and energy 4. Resistance 5. Core practical investigating resistance 6. Transforming energy 7. Power 8. Transferring energy by electricity 9. Electrical safety



## Year 11:

	Biology	Chemistry	Physics
<b>Topics Half term 1</b>	<b>CB6</b> <ol style="list-style-type: none"> <li>1. Photosynthesis</li> <li>2. Factors affecting photosynthesis</li> <li>3. Core Prac. light intensity and p/s</li> <li>4. Absorbing water and mineral ions</li> <li>5. Transpiration and translocation</li> </ol>	<b>CC10/11/12</b> <ol style="list-style-type: none"> <li>1. Electrolysis</li> <li>2. Core prac electrolysis of copper sulphate</li> <li>3. Products from electrolysis</li> <li>4. Reactivity</li> <li>5. Ores</li> <li>6. Oxidation and reduction</li> <li>7. Life cycle and recycling</li> <li>8. Dynamic equilibrium</li> </ol> <b>CC9:</b> <ol style="list-style-type: none"> <li>9. Masses and empirical formulae</li> <li>10. Masses and empirical formulae</li> <li>11. Conservation of mass</li> <li>12. Conservation of mass</li> <li>13. Moles</li> </ol> <b>CC13/14/15</b> <ol style="list-style-type: none"> <li>14. Group 1</li> <li>15. Group 7</li> <li>16. Halogen reactivity</li> <li>17. Group 0</li> </ol>	<b>CP6</b> <ol style="list-style-type: none"> <li>1. Atomic models</li> <li>2. Inside the atom</li> <li>3. Electrons in orbit</li> <li>4. Background radiation</li> <li>5. Types of radiation</li> <li>6. Radioactive decay</li> </ol> <b>CP7/8</b> <ol style="list-style-type: none"> <li>1. Work and power</li> <li>2. Objects affecting each other.</li> <li>3. Vector diagrams</li> </ol>
<b>Review</b>	<b>Mock Exams</b>		
<b>Topics Half term 2</b>	<b>CB7:</b> <ol style="list-style-type: none"> <li>1. Hormones</li> <li>2. Hormonal control of metabolic rate</li> <li>3. Menstrual cycle</li> <li>4. Hormones and the menstrual cycle</li> <li>5. Contraception</li> <li>6. Control of blood glucose</li> <li>7. Diabetes</li> </ol>	<b>CC13/14/15</b> <ol style="list-style-type: none"> <li>1. Rates of reaction</li> <li>2. Factors affecting ror</li> <li>3. Core prac reaction rates</li> <li>4. Core prac reaction rates</li> <li>5. Catalysts and activation energy</li> <li>6. Exo and endo thermic reactions</li> <li>7. Energy changes in reactions</li> </ol>	<b>CP9</b> <ol style="list-style-type: none"> <li>1. .Electric circuits</li> <li>2. Current and potential difference</li> <li>3. Current, charge and energy</li> <li>4. Resistance</li> <li>5. Core practical investigating resistance</li> <li>6. Transforming energy</li> <li>7. Power</li> <li>8. Transferring energy by electricity</li> <li>9. Electrical safety</li> </ol>
<b>Review</b>	<b>Mock Exams</b>		
<b>Topics Half term 3</b>	<b>CB8:</b> <ol style="list-style-type: none"> <li>1. Efficient transport and exchange</li> <li>2. 2.The circulatory system may take 2 lessons</li> <li>3. 3.The heart This may take 2 lessons</li> <li>4. 4.Cellular respiration</li> <li>5. 5.Core prac respiration rates</li> </ol>	<b>CC16/17</b> <ol style="list-style-type: none"> <li>1. Hydrocarbons in oil and natural gas</li> <li>2. Fractional distillation</li> <li>3. Alkanes</li> <li>4. Complete and incomplete combustion</li> <li>5. Combustible fuels and pollution</li> <li>6. Breaking down hydrocarbons</li> <li>7. The early atmosphere</li> <li>8. The changing atmosphere</li> <li>9. The atmosphere today</li> <li>10. Climate change</li> </ol>	<b>CP10/11</b> <ol style="list-style-type: none"> <li>1. Magnets and magnetic fields</li> <li>2. Electromagnetism</li> <li>3. Magnetic forces Higher</li> <li>4. Transformers</li> <li>5. Transformers and energy</li> <li>6. Test CP10-11</li> </ol>
<b>Topics Half term 4</b>	<b>CB9:</b> <ol style="list-style-type: none"> <li>1. Ecosystems</li> <li>2. Abiotic factors and community</li> <li>3. Core practical quadrats and transects</li> <li>4. Biotic factors and communities</li> </ol>		<b>CP 12/13</b> <ol style="list-style-type: none"> <li>1. Particles and density</li> <li>2. Core prac investigating density.</li> <li>3. Energy and changes of state</li> <li>4. Energy calculations</li> </ol>

	<ul style="list-style-type: none"> <li>5. Parasitism and mutualism</li> <li>6. Biodiversity and humans</li> <li>7. Preserving biodiversity</li> <li>8. The water cycle</li> <li>9. The carbon cycle</li> <li>10. The nitrogen cycle</li> </ul>		<ul style="list-style-type: none"> <li>5. Core prac investigating water</li> <li>6. Temperature and pressure</li> <li>7. Bending and stretching</li> <li>8. Core prac spring</li> <li>9. Extension and energy transfers</li> </ul>
<b>Topics Half term 5</b>	Revision	Revision	Revision



**Website:**  
<https://www.allsaintscatholiccollege.com>



**Contact:**  
 0161 338 2120



**Email address:**  
[schooloffice@allsaintscatholiccollege.com](mailto:schooloffice@allsaintscatholiccollege.com)