Ashby School
Empowered to Learn

Curriculum Information

Key Stage 3

Science Faculty

"Students appreciate that Science is a way of thinking much more than it is a body of knowledge"

For yourself & for others

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Curriculum Intent

Science isn't just lab work carried out by people in white coats… it's everywhere! From the moment you get up in the morinng to the moment you go to sleep at night, science plays a huge part in our daily lived. At Ashby School, we inspire and enthuse students by encouraging them to discover and investigate the phenomena of the world around them and to witness that *Anything is Possible!*

Key Stage 3 Science

Young scientists at KS3 will investigate '10 big ideas' (Forces, Electromagnetism, Energy, Waves, Matter, Reactions, Earth, Organisms, Ecosystems and Genes) while learning to work scientifically. Practical work will be at the heart of what we do and will be taught by specialist science teachers in well-equipped laboratories. The curriculum uses mastery goals where young scientists can demonstrate their understanding by learning key facts and then applying this new knowledge. Students will learn to collect, analyse and present data, communicate ideas, justify opinions, test hypotheses and review theories. The knowledge and skills developed give a solid foundation to our GCSE and A level courses. We aim to develop inquisitive minds and a lifelong passion for enquiry and discovery whilst equipping students with the knowledge to understand the uses and implications of science, today and for the future.

The KS3 curriculum has been designed to build on the content taught at KS2, revisiting topics and developing a deeper understanding of the three sciences (Biology, Chemistry and Physics). Students will begin to see the connections between these subject areas and become aware of some of the big ideas underpinning scientific knowledge and understanding. Students will be able to relate scientific explanations to phenomena in the world around them and start to use modelling and abstract ideas to develop and evaluate explanations.

The curriculum has been developed using the *AQA Key Stage 3 Science Programme of Study*. This programme aims to develop a 'mastery of ideas and skills' in order to prepare students effectively for GCSE study and enable them to reach their full potential at KS4. This is organised around 10 'big ideas', with these ideas then subdivided into four smaller topics.

Forces	Speed	Gravity	Contact forces	Pressure
Electromagnets	Voltage and resistance	Current	Electromagnets	Magnetism
Energy	Energy costs	Energy transfer	Work	Heating and cooling
Waves	Sound	Light	Wave effects	Wave properties
Matter	Particle model	Separating mixtures	Periodic table	Elements
Reactions	Metals and non-metals	Acids and alkalis	Chemical energy	Types of reaction
Earth	Earth structure	Universe	Climate	Earth resources
Organisms	Movement	Cells	Breathing	Digestion
Ecosystem	Interdependence	Plant reproduction	Respiration	Photosynthesis
Genes	Variation	Human reproduction	Evolution	Inheritance

Key Stage 3 Science

In each school term, students cover the topics within a 'wave'. Teachers follow an agreed scheme of work and all staff utilise the same lesson resources, although the expectation is that staff will adapt these, as appropriate, to suit the needs of their classes. Lessons incorporate the activities set out by the 'Ashby School expectations for the content of KS3 lessons'.

KS3 topics are taught in pairs (giving blocks of ten lessons) with approximately five lessons allocated to each topic. During each block of ten lessons, students will usually be set a written homework task (or a task set via an online learning platform) and will also be given a short assessment (for which they will expected to revise at home). Additional homework tasks may be set by teachers as appropriate to the needs and progress of their classes. Homework is marked by staff in accordance with the school marking policy. Students will sit three, longer 'end of wave' tests each academic year.

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<table>
<tr><th colspan="4">Year 7</th></tr>
<tr><th colspan="2">Wave 1</th><th colspan="2">Wave 2</th><th colspan="2">Wave 3</th></tr>
<tr><td colspan="2">Genes 1</td><td colspan="2">Electromagnets 1</td><td colspan="2">Reactions 1</td></tr>
<tr><td>Variation</td><td>Human Reproduction</td><td>Voltage/Resistance</td><td>Current</td><td>Acids and Alkalis</td><td>Metals/Non-metals</td></tr>
<tr><td colspan="2">Every human in the world is different - even identical twins differ in some ways. In this Big Idea you will look at these differences and how they are caused. You will think about how variation can help organisms survive in difficult environments. You will also learn about human reproduction. You will begin by looking at the changes that take place during adolescence, and then discover how new life is created and develops, resulting in the birth of a baby.</td><td colspan="2">Electricity can be a bit of a mystery because you cannot see what is happening inside the wires. You will learn about what is happening in circuit and how to model. You will learn about electric charge and how objects can become charged and how we can use this idea to explain electric shocks and lightening.</td><td colspan="2">Chemical reactions are very useful. They make new substances such as medicines, fabrics and building materials. In this big idea you will learn about the chemical reactions of metals and of acids. You will find out how to use patterns in properties to predict products and discover how to make salts.</td></tr>
<tr><td colspan="2">Matter 1</td><td colspan="2">Earth 1</td><td colspan="2">Reactions 1</td></tr>
<tr><td>Particle Model</td><td>Separating Mixtures</td><td>Earth Structure</td><td>Universe</td><td></td><td></td></tr>
<tr><td colspan="2">The batteries in your phone rely on Lithium metal. Lithium exists on earth in rocks and as lithium chloride solution. In this big idea you will see how substances can be separated from their solution. You will also learn why substances have different properties in their solid, liquid and gas states and consider what happens when a substance changes from one state to another.</td><td colspan="2">Everything we need to live comes from the Earth, the oceans, the air, and the Sun. In this Big Idea you find out about what the Earth is made from and its structure. You will discover how materials are recycled in the rock cycle. You will also learn about the size and scale of our Solar System and galaxy. You will find out how the movement of the Earth and Moon explains the observations that we make of the Sun and the night sky.</td><td colspan="2" rowspan="3"></td></tr>
<tr><td colspan="2">Organisms 1</td><td colspan="2">Forces 1</td></tr>
<tr><td>Cells</td><td>Movement</td><td>Speed</td><td>Gravity</td></tr>
<tr><td colspan="2">In this Big Idea you will start by finding out why you have a skeleton and how it works together with your muscles to enable you to move. You will then look inside organisms to discover what plants and animals are made of. Finally, you will meet some tiny organisms that can only be seen under a microscope.</td><td colspan="2">What is the link between the Moon orbiting the Earth and a falling object on Earth? You will learn about forces, how they arise, and how they change the motion of an object. You will also learn how to measure speed and how to tell the story of a journey through a graph.</td></tr>
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Year 8					
Wave 4		Wave 5		Wave 6	
Organisms 2		Ecosystem 2		Ecosystem 1	
Breathing	Digestion	Respiration	Photosynthesis	Interdependance	Plant Reproduction
What do we need to stay healthy? In this Big Idea you will learn about how we breathe, and then look at the damage that can be caused through smoking, drinking alcohol, and taking drugs. Finally, you will study what makes a balanced diet and how your body breaks down the food you eat to release energy and the other nutrients you need to live and grow.		How do we get energy from food? In this Big Idea, you will find out how the body transfers energy from food so it can be used for movement, growth, and repair by the process of respiration. You will also discover how anaerobic respiration in microorganisms can be used to make bread and beer. You will learn how plants produce food by the process of photosynthesis, and look in detail at the structure of a leaf and why minerals are required for healthy growth.		Our environment is very important. It gives us the things we need to live, like food, water, and shelter. We share our environment with many different types of plants and animals. In this Big Idea you will learn about how these organisms are connected and how they interact within ecosystems. You will look closely at their feeding relationships and competition between species. You will also study the life cycle of a flowering plant. You will learn about the reproductive parts of a plant and the differences between wind-pollinated and insect-pollinated flowers. You will then follow the steps of reproduction from pollination to fertilisation, and finally to germination.	
Waves 1		Energy 1		Electromagnets 2	
Sound	Light	Energy Costs	Energy Transfer	Electromagnets	Magnetism
In a thunderstorm you see a flash of lightning and hear thunder. Your eyes and ears detect light and sound. In this Big Idea you learn about sound and hearing, and what changes when you make sounds of different pitch and loudness. You will learn how we see objects and how light behaves when it hits different materials. You will find out why you see the lightning before you hear the thunder.		In our daily lives we need food for our bodies and fuels for heating, transportation and generating electricity. In this big idea you will calculate energy in food and fuels, how electricty is generated and why it is useful to reduce the time we use appliances.You will model how energy is transferred and between different stores and learn how we can use energy calulations to tell us which processes are possible.		You have probably played with magnets and felt what happens when you push two magnets together. There are lots of magnets in your house and many of them you cannot see. In this Big Idea you will learn how to make a magnet using electricity, and about the different ways that you can make it stronger. You will learn how electromagnetic devices like bells and loudspeakers work. Finally, you will model magnetic fields and find out about the Earth's magnetic field.	
Matter 2		Reactions 2			
Periodic Table	Elements	Chemical Energy	Types of Reaction		
What is stuff made of? In this Big Idea you will learn about the elements that make up everything in the Universe. You will explore ways of classifying elements, and find out about the patterns in their physical and chemical properties.		Chemical reactions are vital to life. We depend on chemical reactions - including the products they make and the energy they transfer - for everything we do. In this Big Idea you will learn what happens to atoms in chemical reactions. You will find out how chemical reactions transfer energy, and why chemical reactions are important.			

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<tr><td colspan="4">Year 9</td></tr>
<tr><td colspan="2">Wave 7</td><td colspan="2">Wave 8</td><td rowspan="6">Consolidating KS3 Science in preparation for GCSE</td></tr>
<tr><td colspan="2">Genes 2</td><td colspan="2">Energy 2</td></tr>
<tr><td>Evolution</td><td>Inheritance</td><td>Work</td><td>Heating & Cooling</td></tr>
<tr><td colspan="2">The world is full of lots of different types of living things. In this Big Idea you will find out how the organisms that exist today have evolved, and how scientists are trying to prevent further species from becoming extinct and preserve biodiversity. You will also learn about how you inherit characteristics from your parents through genetic material, and how genetic material in some organisms is being modified.</td><td colspan="2">Athletes can use energy in chemical stores to run, jump, or throw. Where does this energy end up? There are lots of different ways of transferring energy between stores. In this Big Idea you will learn about doing work and transferring energy with radiation and particles. Sometimes we want to stop energy being transferred, and you will learn about different ways of stopping energy transfer due to friction and conduction.</td></tr>
<tr><td colspan="2">Waves 2</td><td colspan="2">Forces 2</td></tr>
<tr><td>Wave Effects</td><td>Wave Properties</td><td>Contact Forces</td><td>Pressure</td></tr>
<tr><td colspan="2">Tsunamis, sound, infrared, and light all have something in common. They are waves and transfer energy. In this Big Idea you will learn about what affects the energy that waves transfer, and how they interact with surfaces they hit and with matter they travel through. You will find out about ultrasound and some of its uses. You will learn how the wave model can help you to explain wave behaviour. Waves can cause damage, and not just by damaging objects on a large scale. Radiation can cause damage to the human body.</td><td colspan="2">You may have seen videos of skydivers jumping out of a plane and landing safely. Their motion changes between jumping and landing. Understanding the forces acting on an object allows you to explain how it is moving, or not moving. The air skydivers move through is a fluid - it is like a spread- out liquid. In this Big Idea you will learn about pressure in fluids (gases and liquids) and relate it to floating and sinking. You will also learn about the pressure of one solid object, like the skydiver, on another solid object, like the ground.</td></tr>
<tr><td colspan="2">Earth 2</td><td colspan="2" rowspan="3">Consolidating KS3 Science in preparation for GCSE</td></tr>
<tr><td>Climate</td><td>Earth Resources</td></tr>
<tr><td colspan="2">Where do we get the materials we need? All the materials we use come from the Earth, the oceans, or the atmosphere. In this Big Idea you will learn how we extract metals from the Earth, and what we can do to prevent vital resources running out. You will also find out about the atmosphere, and consider the causes and effects of global warming.</td></tr>
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