

Key Stage 3 Curriculum Map: Science

Year 7	Autumn 1		Autumn 2	
	<p>Topic 1 Acids and Bases Q - How do we work safely in a laboratory?</p> <p>Students will cover: risk assessing / how to work safely in a lab, and the steps they can take to be responsible for their own safety during practical work. Names of apparatus. What pH is and how is it measured? Neutralisation, uses of neutralisation. Measuring volume precisely, using simple lab apparatus, planning SC1, research and application to the real world.</p> <p>Assessment 1: Recall of apparatus and safety, Acids and bases.</p>	<p>Topic 2 Cells Q – What is the basic unit of life?</p> <p>Students will cover: the structure of plant and animal cells. How to use a microscope to view cells. The adaptations of specialised cells to allow them to do their job. Introducing the importance of models in science.</p>	<p>Topic 3 Forces Q – Why and how do objects move?</p> <p>Students will cover: different types of forces. How to measure force. Looking for patterns in data. Introducing graph skills. Working safely in a laboratory. How to represent balanced and unbalanced forces. Air and water resistance.</p>	<p>Topic 4 Particles Q – What is all matter made from?</p> <p>Students will cover: classifying materials, states of matter, changes of state. The difference between Brownian motion and diffusion. Evaporation. Gas pressure. Developing and explaining how a model can be used to explain concepts. Diffusion, and planning experiments, graph skills and introducing how to evaluate methods.</p> <p>Assessment 2: Acids, bases, cells, forces</p>
Spring 1		Spring 2		
<p>Topic 5 Energy Q – How is energy stored and used?</p> <p>Students will cover: ways of describing energy. Energy stores and transfers. Energy resources and the problems with fossil fuels. Ways of describing energy. Investigating alternative forms of energy. Investigating the energy stored in food. Units to describe energy. Alternative forms of energy and the energy stored in food.</p> <p>Assessment 3: Forces, particles, energy</p>	<p>Topic 6 Simple chemical reactions Q – How can we recognise when a reaction has occurred?</p> <p>Students will cover: how to light and use a Bunsen, measuring temperature and volume precisely. How to identify when a reaction has occurred. Introducing word equations. Combustion, thermal decomposition and endo and exothermic reactions. Applying knowledge and understanding of particle theory.</p>	<p>Topic 7 Nutrition and Digestion Q - How do organ systems function? How do we keep ourselves healthy?</p> <p>Students will cover: healthy and unhealthy diets, food tests, the digestive system and how enzymes work. Linking back to the energy in food.</p> <p>Assessment: 4 Forces, Particles, energy, reactions and nutrition.</p>		
Summer 1		Summer 2		
<p>Topic 8 Solutions Q – How do particles mix in solutions and can these be separated?</p> <p>Students will cover: mixtures and solutions. Temperature and solubility. Dissolving. How to separate mixtures via distillation, evaporation and chromatography. Applying Knowledge and understanding of particle theory to explain the outcomes, practical skills, safety in the workplace. The conservation of matter. Units.</p> <p>Assessment 5: End of Year 7 exam Topics 1 to 8</p>	<p>Topic 9 Electricity Q - Can I build and explain a working circuit?</p> <p>Students will cover: how to set up a circuit, fault finding, health and safety, problem solving. Static electricity. Charge and current. Measuring current and potential difference. Developing models.</p>	<p>Topic 10 Reproduction Q - How do organs systems function? How do animals reproduce? What happens as we reach adolescence?</p> <p>Students will cover: adolescence and body changes. Self-awareness, Maturity. Reproductive anatomy. Fertilisation, implantation and pregnancy. The menstrual cycle. Making links back to KS2 plant reproduction. Investigating how pollination and seed dispersal occur. The importance of pollinators to our food production. Their effects of drugs on our health including the effects of smoking and alcohol on the unborn child.</p>		

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	<p>Topic 1 Heating and cooling Q – What happens to the particles in materials when they are heated and cooled?</p>	<p>Topic 2 Atoms, Elements, Compounds and mixtures Q – Why is the periodic table organised the way it is? How are particles arranged in molecules and compounds and why are they arranged in specific numbers?</p>	<p>Topic 3 Sound and Hearing Q – How do I hear the world around me?</p>	<p>Topic 4 Gas exchange and respiration Q - How do our organ systems function? How can we keep ourselves healthy?</p>	<p>Topic 5 Forces in Action Q – What causes forces to increase or decrease and how can we measure the effects of this?</p>
<p>Students will cover: the difference between thermal energy and temperature. What is density? Expansion and contraction, Linking back to Yr 7 particle theory to explain these concepts. Heat transfers linking back to energy; conduction, convection and radiation. Applying knowledge and understanding of all of this to explain how a vacuum flask works.</p>	<p>Students will cover: the differences between atoms, elements, compounds and mixtures. Why the periodic table of the elements is organised as it is. The properties of metals. What happens when you react 2 elements together and start to use formulae. Using word equations to explain the reactions. Designing and carrying out experiments to determine if a substance is a compound or element. Taking accurate readings to produce a cooling curve.</p>	<p>Students will cover: how sound energy is transferred, linking this back to Yr 7 energy stores. Pitch and loudness. How hearing loss occurs and discuss ways to prevent this / keeping us safe. Applications of sound e.g. ultrasonic cleaning, microphones, loud speakers.</p>	<p>Students will cover: how the ribs and diaphragm allow humans to do gas exchange and how the lungs are adapted for this. The size of your lungs and the composition of inhaled and exhaled air. Aerobic respiration and the word equation for this. Anaerobic respiration. The effects of exercise on breathing rate and the effects of smoking.</p>	<p>Students will cover: how to calculate speed and how to represent it on graphs. Pressure and how this applies to animals. Hydraulics and pneumatics. Moments.</p>	
Assessment 1: Heating and cooling, atoms, elements, compounds and mixtures.			Assessment 2: Sound, gas exchange, heating and cooling.		
Spring 1			Spring 2		
<p>Topic 6 Muscles and the skeleton Q – How do our organ systems function? How can we keep ourselves healthy?</p>	<p>Topic 7 Magnetism Q - What is magnetism and how does this link to electricity?</p>	<p>Topic 8 The Earth Q – How are rocks formed and recycled?</p>	<p>Topic 9 Ecosystems and biodiversity Q – How are humans affecting the planet and why is it important to maintain biodiversity on Earth?</p>		
<p>Students will cover: how bones, muscles, tendons and ligaments work together to cause movement. Linking this to forces / moments. Also the other functions of the skeleton.</p>	<p>Students will cover: magnetic fields and how to represent these. What makes a material a magnet and why some materials can be magnetised. Electromagnets and the uses of these. How magnets can be used to make a motor.</p>	<p>Students will cover: the composition of the Earth and its atmosphere. You will learn about the rock cycle and the formation / structure of igneous, metamorphic and sedimentary rock. How fossils are formed.</p>	<p>Students will cover: the importance of plants in the production of the Earth's atmosphere. How the structure of the leaf allows photosynthesis to occur. Why plants need mineral ions and how other organisms obtain their nutrients via chemosynthesis. Food chains and how human influences can disrupt these and damage ecosystems, making links back to Yr 7 energy. How organisms are adapted to their environment and about competition between organisms.</p>		
Assessment: 3 Forces, atoms, the skeleton			Assessment: 4 Magnets, the Earth, forces, sound		
Summer 1			Summer 2		
<p>Topic 10 DNA Q – What is DNA and how does this cause the diversity of life on the Earth?</p>	<p>Topic 11 Light Q – How do we see?</p>	<p>Topic 12 Gravity and Space Q – How do objects in space interact?</p>			
<p>Students will cover: chromosomes and DNA, linking this back to Yr 7 cells. The role scientists made in the most important discovery of the 20th century. How DNA causes variation and leads to natural selection / adaptation / extinction. The importance of conserving biodiversity.</p>	<p>Students will cover: how light is transmitted and the speed of light. The laws of reflection. Reflection, refraction and the dispersion of light. About colours and how a camera works, linking this to the human eye.</p>	<p>Students will cover: the universe, the solar system, day, night and the seasons. Gravity and the difference between mass and weight. The phases of the moon, eclipses and how we could detect alien life. Size and scale.</p>			
Assessment 5: End of Year 8 exam Topics 1 to 11					

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	Autumn 1			Autumn 2	
Year 9	Topic B1 Cell structure and transport Q – How do cells function	Topic B2 Cell division (4 lessons) Q – How and why do cells replace themselves?	Topic B4 Transport in plants and animals Q – How do plant and animals ensure that their cells receive all the nutrients they require?	Topic B4 Transport in plants and animals - continued Q – How do plant and animals ensure that their cells receive all the nutrients they require?	Topic B5 Communicable diseases and simple defence mechanisms. Q- What makes us ill?
	Students will cover: cell structure (plant, animal and bacteria), specialised cells and how substances enter and exit cells (diffusion, osmosis and active transport). Using a microscope to observe cells and investigate diffusion and osmosis practically.	Students will cover: how and why cells divide (mitosis) and find out how they specialise. Stem cells and the uses of stem cells in modern medicine.	Students will cover: how the heart and circulatory system work in animals and how the lungs are adapted to function efficiently comparing this to gas exchange and transport in plants. How plants transport water / minerals, sugars in xylem and phloem. Factors that affect the rate of transpiration.	Students will cover: how the heart and circulatory system work in animals and how the lungs are adapted to function efficiently comparing this to gas exchange and transport in plants. How plants transport water / minerals, sugars in xylem and phloem. Factors that affect the rate of transpiration.	Students will cover: how viruses and bacteria cause disease and start to find out how the human body protects itself. This topic is continued at the start of Year 10.
	Assessment 1: covers B1 and B2 topics		Assessment 2: covers B 1, 2 , 4 and 5 topics		
Biology	Spring 1			Spring 2	
	Topic Metals Q - How do we obtain metals? Q - How do we represent reactions?	Topic Atomic structure Q - What are Atoms?	Topic Separating Mixtures Q - How do we make salts?	Topic Clean Water Q - How does clean water get to our taps?	
	Students will cover: The Properties of metals. Word equations and balancing equations. The periodic table and the Reactivity Series. Explore the factors that cause corrosion.	Students will cover: The Structure of atom and the history of the atom. Isotopes. Understanding of Formulae	Students will cover: Distillation and Chromatography Acids and Bases to make Salts. Linking back to Year 7 work on these topics.	Students will cover: How water of appropriate quality is essential for life. How, for humans, drinking water should have sufficiently low levels of dissolved salts and microbes. How water that is safe to drink is called potable water and how this is not pure water in the chemical sense because it contains dissolved substances. Treating waste water.	
	Assessment 1: covers Metals and Atomic structure			Assessment 2: covers Metals, Atomic structure and Clean water.	
Chemistry	Summer 1			Summer 2	
	Topic Energy Q - How is energy used usefully or wasted?	Topic Energy Resources and Generating Electricity Q - What are the best ways of using energy to generate electricity, travel or heat our homes?	Topic: Heat Transfer Q -How is a house kept at the right temperature inside?	Topic: Molecules and Matter Q - How does heating a substance change its temperature or state?	
	Students will cover: the development of energy stores and the processes by which energy can be transferred. Work done, energy changes in gravitational, kinetic and elastic potential stores using the relevant mathematical relationships. Conservation of energy through changes in the stores. Dissipation of energy leading to the idea of efficiency. The rate of energy transfer in different systems through the through the concept of power.	Students will cover: the different sources of energy that are used to generate electricity, run transport or provide heating for homes. Non renewable and renewable resources such as biofuels, nuclear, fossil fuels, wave power, wind power, geothermal, solar, hydroelectricity and tidal technology and an evaluation of these. Comparing the energy resources and how the different resources could be applied in combination to meet changing energy demands of electricity.	Students will cover: Understanding of the heating and cooling processes, which transfers energy within a material or from one object to another. Thermal conductivity and the differences in the processes of thermal conduction . Finally, the reduction of energy transfers to the surroundings by insulation, such as loft or cavity wall insulation will be studied and applied to the context of reducing energy loss in buildings to reduce heating costs including prioritising home improvements in line with payback time.	Students will cover: the concept of density by calculating the density of solids and liquids. This leads to a discussion of the states of matter and changes of state. The changes in the properties of matter are used to analyse the changes in temperature occurring during heating (specific heat capacity) and the concept of latent heat for change of state. Describing latent heat of fusion and vaporisation mathematically, calculating energy changes during the appropriate state changes. Relationships between the pressure and temperature of a fixed mass of gas.	
Assessment 1: Energy and Energy Resources			Assessment 2: Energy, Energy Resources and Heat Transfer and Molecules and Matter		
Physics	Summer 1			Summer 2	
	Topic Energy Q - How is energy used usefully or wasted?	Topic Energy Resources and Generating Electricity Q - What are the best ways of using energy to generate electricity, travel or heat our homes?	Topic: Heat Transfer Q -How is a house kept at the right temperature inside?	Topic: Molecules and Matter Q - How does heating a substance change its temperature or state?	
	Students will cover: the development of energy stores and the processes by which energy can be transferred. Work done, energy changes in gravitational, kinetic and elastic potential stores using the relevant mathematical relationships. Conservation of energy through changes in the stores. Dissipation of energy leading to the idea of efficiency. The rate of energy transfer in different systems through the through the concept of power.	Students will cover: the different sources of energy that are used to generate electricity, run transport or provide heating for homes. Non renewable and renewable resources such as biofuels, nuclear, fossil fuels, wave power, wind power, geothermal, solar, hydroelectricity and tidal technology and an evaluation of these. Comparing the energy resources and how the different resources could be applied in combination to meet changing energy demands of electricity.	Students will cover: Understanding of the heating and cooling processes, which transfers energy within a material or from one object to another. Thermal conductivity and the differences in the processes of thermal conduction . Finally, the reduction of energy transfers to the surroundings by insulation, such as loft or cavity wall insulation will be studied and applied to the context of reducing energy loss in buildings to reduce heating costs including prioritising home improvements in line with payback time.	Students will cover: the concept of density by calculating the density of solids and liquids. This leads to a discussion of the states of matter and changes of state. The changes in the properties of matter are used to analyse the changes in temperature occurring during heating (specific heat capacity) and the concept of latent heat for change of state. Describing latent heat of fusion and vaporisation mathematically, calculating energy changes during the appropriate state changes. Relationships between the pressure and temperature of a fixed mass of gas.	
Assessment 1: Energy and Energy Resources			Assessment 2: Energy, Energy Resources and Heat Transfer and Molecules and Matter		