



Aspire & Challenge

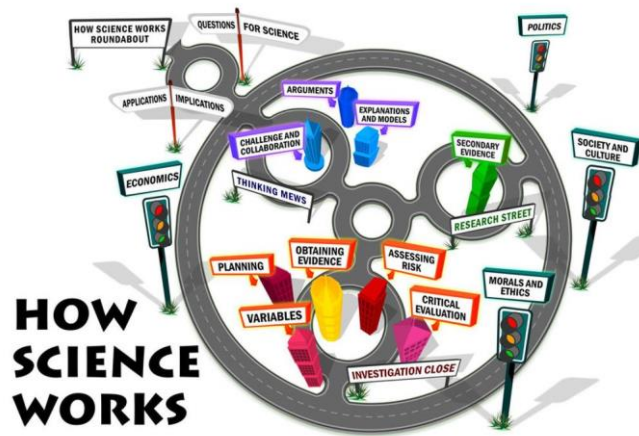
KS3 Science

Curriculum Overview

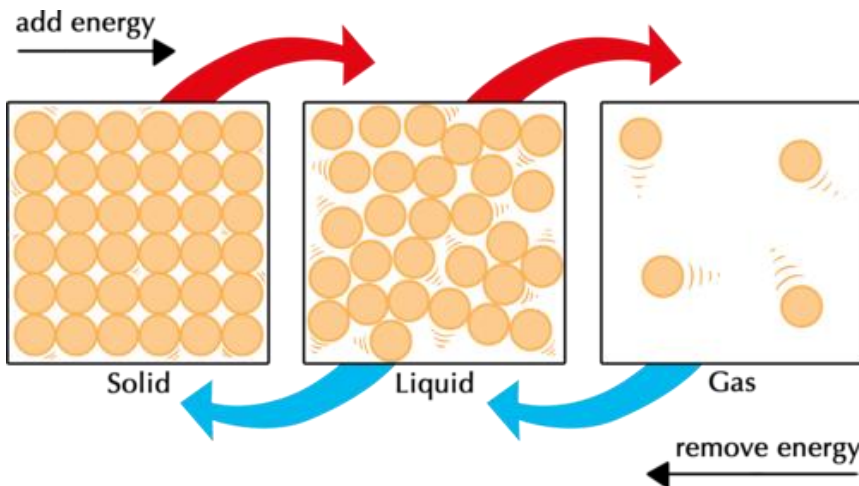
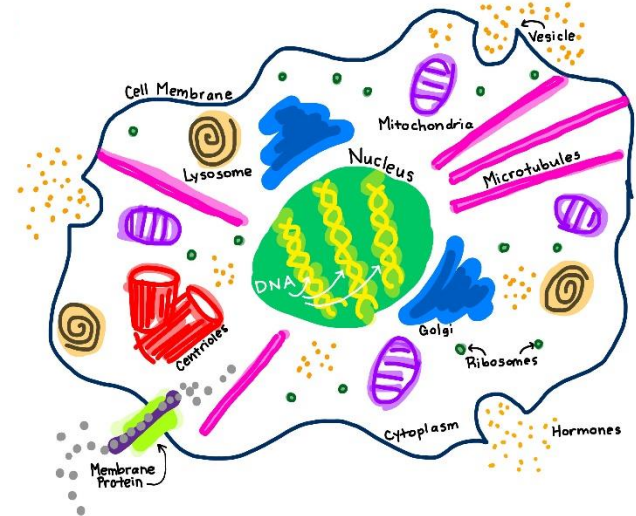
Year 7



Autumn Term



Cellular Biology: Organelles, Structure, Function



Topic	Number of lessons	Overview	Key knowledge and skills	Progression and links	Assessment & recording; factual recall checks
How Science works and lab safety	7	In this unit students are introduced to the practical aspect of science learning how to conduct experiments safely and the importance of keeping accurate records of experimental observations.	<p>To be able to recall the different hazard symbols we might see in the lab and identify any hazards when carrying out practical work.</p> <p>To identify different lab equipment and when we might use it in the lab.</p> <p>Define the three types of variable and apply this knowledge to an experiment and complete a series of risk assessments for experiments.</p> <p>Burn metals (magnesium, copper and zinc) safely using the Bunsen burner and tongs.</p> <p>Carry out a practical safely reacting different acids with different metals.</p> <p>Test common gases such as: Oxygen, Carbon Dioxide and Hydrogen.</p> <p>Record observations with precision and good detail.</p>	<p><u>Literacy:</u> How to write up an experiment</p> <p><u>Problem Solving:</u> How to design an experiment to produce meaningful data.</p> <p><u>Numeracy:</u> How to process and display data.</p> <p><u>Reading:</u> Following written instructions to carry out practical work.</p>	<ul style="list-style-type: none"> • 5 questions a day; recall activity in most lessons. • Close the gap questions • Self and peer feedback on tasks completed • Formative assessment during the unit • Summative assessment at the end of the unit

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Cells and Microscopes	8	<p>In this unit students cover the fundamental topic of cells in biology.</p> <p>Students will learn that the smallest basic unit of life is a cell and the basics of how a cell functions.</p> <p>Students will discover that they live in a world in which they are surrounded by multicellular and unicellular organisms of many different varieties.</p>	<p>Describe a cell as the smallest basic unit of life. Students will be able to compare the contents of plants and animal cells and explain the function of their respective organelles.</p> <p>Describe examples of specialised cells. Link the structure of specialised cells to their functions.</p> <p>Model the process of diffusion. Name some substances that move into and out of cells by the process of diffusion.</p> <p>Describe and explain what is meant by unicellular organism.</p> <p>Describe the structure and function of an amoeba</p> <p>Describe the structure and function of a euglena</p>	<p><u>Problem Solving:</u> Preparing cells to view under a microscope.</p> <p><u>Numeracy:</u> Calculating the magnification when using a microscope.</p> <p><u>Creativity:</u> Design and name a unicellular organism.</p>	<ul style="list-style-type: none"> • 5 questions a day; recall activity in most lessons. • Close the gap questions • Self and peer feedback on tasks completed • Formative assessment during the unit • Summative assessment at the end of the unit

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Particles and their behaviour.	10	<p>In this unit students will explain the properties of the materials around them using the particle model.</p> <p>They will conduct investigations to help deduce the properties of solids, liquids and gases and link these to the arrangement of their particles.</p>	<p>Draw annotated before and after diagrams of particles and use words to explain observations about boiling, freezing and melting.</p> <p>Use models to investigate:</p> <ul style="list-style-type: none"> Density, based on the arrangement and mass of particles. The properties of solids, liquids and gases based on the arrangement and moved of their particles. Reasons for the different boiling points of different substances based on the arrangement of movement of particles and energy transfers. <p>Select data and information about boiling points and use them to contribute to conclusions.</p> <p>Explain difference between evaporation, sublimation and boiling based on the arrangement and movement of particles</p> <p>Explain why it is important to control variables to provide evidence for a conclusion in an evaporation investigation.</p> <p>Describe examples of diffusion and give evidence for diffusion.</p> <p>Draw annotated before and after diagrams of particles, and use words, to explain diffusion.</p> <p>Explain unfamiliar observations about gas pressure in terms of particles.</p> <p>Predict what will happen to gas pressure as conditions are changed in terms of particles and their energy.</p> <p>Collect, analyse and draw a conclusion from primary data providing evidence for gas pressure.</p>	<p><u>Creativity:</u> create a model to represent the arrangement of particles in a solid, liquid and gas.</p> <p><u>Problem Solving:</u> conduct experiments to observe the properties of different states of matter.</p> <p><u>Numeracy:</u> select data and information about melting and boiling points and use them to contribute to conclusions.</p>	<ul style="list-style-type: none"> 5 questions a day; recall activity in most lessons. Close the gap questions Self and peer feedback on tasks completed Formative assessment during the unit Summative assessment at the end of the unit

Spring Term

Types of Force



Friction Force



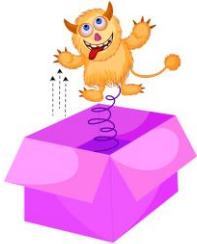
Gravity Force



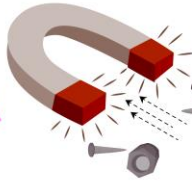
Applied Force



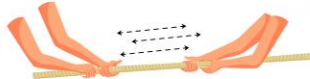
Drag Force



Spring Force



Magnetic Force

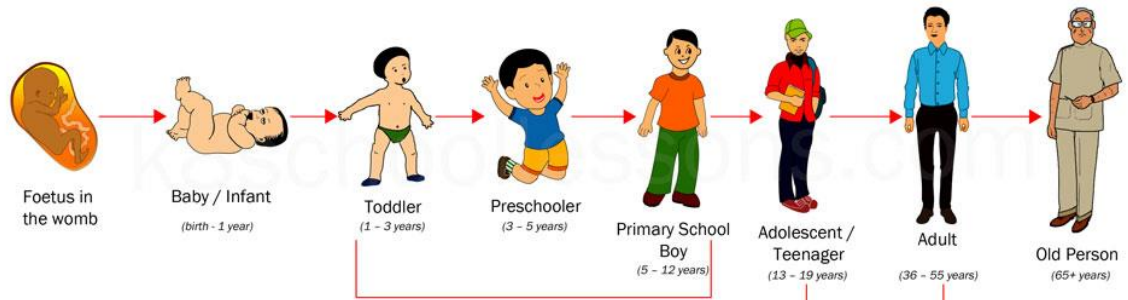


Tension Force



Buoyant Force

SOUND SCIENCE



ABBEY
COLLEGE

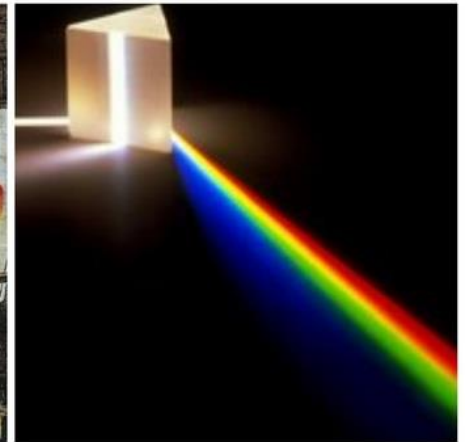
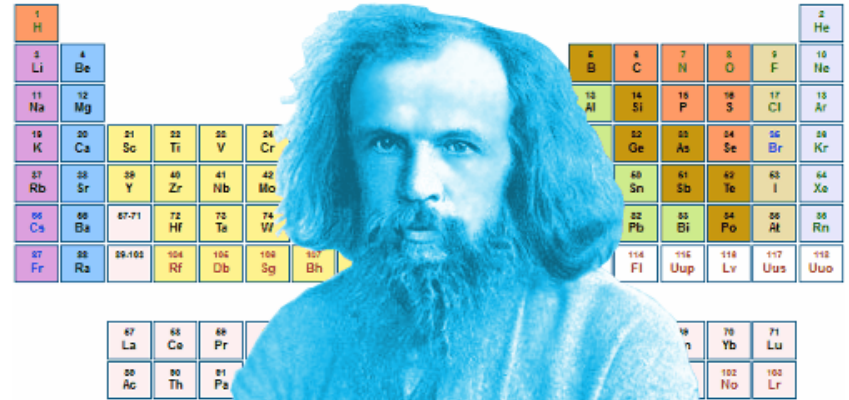
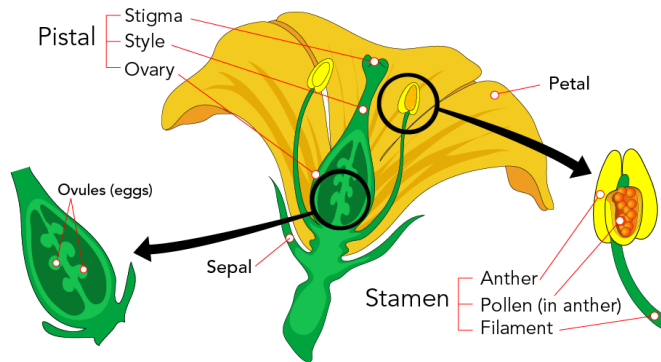
Aspire & Challenge

Topic	Number of lessons	Overview	Key knowledge and skills	Progression and links	Assessment & recording; factual recall checks
Forces	10	<p>In this unit students will be introduced to the concept of forces and some of the fundamental laws of motion.</p> <p>Students will conduct investigations that lead to understand of why objects accelerate or decelerate.</p> <p>Students will investigate the phenomenon of moments and relate the concept to real world situations.</p>	<p>Describe what forces are and name some examples. Explain what some named forces do.</p> <p>Recognise an equilibrium and describe situations that are in equilibrium.</p> <p>Describe the link between resultant force and the motion of objects. Explain why the speed or motion of an object can change.</p> <p>Explain why the speed or direction of motion of objects can change using force arrows.</p> <p>Describe and use Hooke's law to predict the extension of a spring.</p> <p>Present data in a graph and identify a quantitative relationship in the pattern.</p> <p>Plan and carry out an experiment to investigate friction, selecting suitable equipment.</p> <p>State the law of moments and use calculations in explanations of resultant forces and moments.</p>	<p><u>Problem Solving:</u> Use diagrams to resolve forces to calculate a resultant force.</p> <p>Apply the concept of moments to every day situations.</p> <p>Design an experiment to investigate friction selecting suitable equipment.</p> <p><u>Numeracy:</u> Calculate the velocity of objects in motion.</p> <p>Interpret distance-time graphs and calculate average speed.</p>	<ul style="list-style-type: none"> • 5 questions a day; recall activity in most lessons. • Close the gap questions • Self and peer feedback on tasks completed • Formative assessment during the unit • Summative assessment at the end of the unit

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Sound	8	<p>In this topic students will consider how sound is generated and how it travels in different mediums.</p> <p>Using this knowledge students will use oscilloscope traces to define features of sounds.</p> <p>Students will also explore how sound can be used as a tool in cleaning and medical scenarios.</p>	<p>Describe how sound is produced and travels.</p> <p>Compare and contrast the speed of sound and light.</p> <p>Compare the time for sound to travel in different materials using data given.</p> <p>Explain what is meant by supersonic travel.</p> <p>Describe how an echo is created and use this to design an experiment to measure the speed of sound.</p> <p>Define amplitude, frequency and wavelength use them to;</p> <ul style="list-style-type: none"> Describe the link between amplitude and loudness using diagrams. Describe how to find the amplitude of a wave from an oscilloscope trace. Describe the link between frequency and pitch. Describe how to find the frequency of a wave using an oscilloscope trace. Compare and contrast waves of different frequency using diagrams. <p>Name some parts of the ear and describe how the ear works. With this knowledge, explain how your hearing can be damaged and the risks of hearing damage linked to sound level and time of exposure.</p> <p>Define ultra-sonic. Explain in terms of frequency why we used ultrasound for cleaning and physiotherapy and imaging.</p>	<p><u>Creativity & Oracy:</u></p> <p>Using a slinky model different sound waves whilst explain to an audience how they resemble their respective waves.</p> <p><u>Problem Solving:</u></p> <p>Design an experiment to measure the speed of sound.</p> <p><u>Numeracy:</u></p> <p>Use information about different animals to define auditory range in different organisms.</p>	<ul style="list-style-type: none"> 5 questions a day; recall activity in most lessons. Close the gap questions Self and peer feedback on tasks completed Formative assessment during the unit Summative assessment at the end of the unit

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Reproduction Part 1	7	<p>Students will learn about the reproductive system and the changes that the human body goes through during puberty.</p> <p>Students will learn that the menstrual cycle prepares the female for pregnancy and stops is the egg is fertilised by a sperm.</p> <p>Students will learn about how a foetus relies on the mother to provide it with oxygen and nutrients as it develops from fertilisation through to birth.</p>	<p>Describe the main changes that take place during puberty in both males and females.</p> <p>Name the main structures and explain the functions of the male and female reproductive system, including gametes.</p> <p>Describe the process of fertilisation and where it occurs in the body.</p> <p>Use diagrams to show the main steps that take place from the production of sex cells to the formation of an embryo.</p> <p>State the definition of gestation and state how long a pregnancy in a human being usually lasts.</p>	<p><u>Literacy</u></p> <p>Planning and adapting writing style to suit audience and purpose .</p> <p><u>Numeracy:</u></p> <p>Use data to construct graphs about gestation periods in different animals.</p> <p>Construct a table to accurately record observations.</p> <p>Convert raw data into percentages, ranges, means, modes and median values.</p>	<ul style="list-style-type: none"> • 5 questions a day; recall activity in most lessons. • Close the gap questions • Self and peer feedback on tasks completed • Formative assessment during the unit • Summative assessment at the end of the unit

Summer Term



Topic	Number of lessons	Overview	Key knowledge and skills	Progression and links	Assessment & recording; factual recall checks
Reproduction Part 2	5	<p>Students will learn about the adaptations of plants that enable them to reproduce sexually to produce seeds which are formed following fertilisation in the ovary.</p> <p>Students will compare different adaptations that plants have to enable them to disperse their seeds and evaluate the different methods.</p>	<p>Identify the main structures in a flower and link their structure to their function.</p> <p>Describe the process of pollination.</p> <p>State what is meant by fertilisation in plants. Describe how seeds and fruits are formed. Explain how the germination of seeds occurs. State what is meant by seed dispersal.</p> <p>Describe methods of seed dispersal and use the features of seeds and fruit to explain how they are adapted to their method.</p> <p>Plan and design an experiment to test a hypothesis about seed dispersal, clearly explaining all the variables involved.</p>	<p><u>Problem Solving:</u></p> <p>Design an experiment test a hypothesis about seed dispersal in plants.</p> <p><u>Numeracy:</u></p> <p>Convert raw data into percentages, ranges, means, modes and median values.</p>	<ul style="list-style-type: none"> • 5 questions a day; recall activity in most lessons. • Close the gap questions • Self and peer feedback on tasks completed • Formative assessment during the unit • Summative assessment at the end of the unit

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Atoms, elements and compounds.	8	<p>Students will learn that the elements that are in the same group of the periodic table all react in a similar way and sometimes show a pattern in reactivity</p> <p>Elements down groups and across periods in the periodic table show patterns in physical properties.</p> <p>Students will discover that most substance are not pure elements but compounds or mixtures contain atoms of different elements. They have different properties to the elements that they contain.</p>	<p>Correctly write down the chemical symbols of 16 chemical elements and given chemical symbols, write down their names and suggest the advantages of using the same chemical symbols in all languages.</p> <p>State what is meant by an atom and an elements use this knowledge to represent atoms and elements using particle diagrams.</p> <p>State what a compound is and represent elements, mixtures and compounds using particle diagrams.</p> <p>Compare the properties of a compound to the properties of the elements who atoms it contains.</p> <p>Compare and contrast the properties of elements and compounds and give a reason for their differences.</p> <p>Name simple compounds using their chemical formulae.</p> <p>Given chemical formulae, name the element present and their relative proportions.</p> <p>Deduce a pattern in the formula of similar compounds and use it to suggest formulae for unfamiliar ones.</p> <p>Given the relative masses of atoms, find the element whose atoms contribute the greatest mass to the compound.</p> <p>State what a Polymer is, some uses of polymers and explain how polymers properties make them suitable for their uses.</p> <p>Explain how polymer properties depend on their molecules and compare properties of different polymers.</p>	<p><u>Creativity:</u> Represent atoms, elements and compounds using diagrams and make a model to represent each.</p> <p><u>Problem Solving:</u> Deduce patterns in substances to group them together.</p> <p>Use knowledge of atoms to estimate the number of atoms in different substances.</p>	<ul style="list-style-type: none"> 5 questions a day; recall activity in most lessons. Close the gap questions Self and peer feedback on tasks completed Formative assessment during the unit Summative assessment at the end of the unit

Topic	Number of lessons	Overview	Key knowledge and skills	Progression and links	Assessment & recording; factual recall checks
Light	8	<p>Students will learn about the properties of light and when it meets different mediums some of it is absorbed and some reflected.</p> <p>Students will use experiment to discover that light travels in straight lines and when incident on a mirror is reflected at the same angle at which it was incident at.</p> <p>Students will learn that when light enters a medium of a different density that it can bend depending on whether the medium is more or less dense than the light was previously in.</p> <p>Students will learn how objects appear different colours.</p>	<p>Describe what happens when light interacts with materials.</p> <p>Explain using ray diagrams:</p> <ul style="list-style-type: none"> • What observers see during an eclipse. • How images are formed in a plane mirror using a ray diagram. • The formation of shadows. • What happens when light is refracted <p>Name some parts of the eye.</p> <p>Using knowledge of refraction name the lens to correct short sight and the lens used to correct long sight and describe how lenses correct short-sight and long-sight</p> <p>State and explain what happens to light when it passes through a prism.</p> <p>State the difference between colours of light in terms of frequency.</p> <p>Explain how filters and coloured materials subtract light. Use this knowledge to predict how coloured objects will appear given different coloured lights and filters.</p> <p>Explain the formation of secondary colours and predict the colours of objects in lights of secondary colours, giving a reason for the prediction.</p>	<p><u>Problem Solving:</u></p> <p>Design an experiment to replicate the events of an eclipse.</p> <p>Explain the formation of secondary colours and correctly predict the colour of different objects in different colour lights.</p> <p><u>Creativity:</u></p> <p>Design and build a simple pin hole camera</p>	<ul style="list-style-type: none"> • 5 questions a day; recall activity in most lessons. • Close the gap questions • Self and peer feedback on tasks completed • Formative assessment during the unit • Summative assessment at the end of the unit