



Learning Aims and Curriculum Intent:

In Year 8 Science lessons at Forest, students will continue to develop not only science knowledge but also an understanding of science as a process. Students will develop the skills in asking questions, developing and using models, planning and carrying out investigations, analysing and interpreting data, using mathematical skills, constructing explanations, thinking critically and engaging in argument from evidence, and obtaining, evaluating, and communicating information. In Year 8 they will build upon the foundations of scientific knowledge that they developed in year 7 and develop more complex explanations, making links between the different topics and science disciplines. The topics studied include those essential concepts which will be developed further at GCSE and A level, and beyond.

Term	Content, Key Questions and Knowledge	Skills	Assessment
Michaelmas	<p>Chemical Reactions</p> <p>In year 7, students look at the properties of solids, liquids and gases in terms of their arrangement, movement, distance between particles and forces of attraction between particles. Year 8 allows for topic recap and students begin to discover the structure of an atom thus explaining what makes an atom. They will be introduced to the signs of a chemical reaction by observation and the reaction between both elements and compounds. Students will go on to learn about how we represent chemical reactions with word equations, chemical symbols and particle diagrams. Finally, students will explore combustion as a type of chemical reaction, defining it and exploring the products of this reaction and the changes to energy stores that take place.</p> <ul style="list-style-type: none"> • An element is a substance – what does ‘substance’ mean? • What are the signs of a chemical reaction? • What happens when two elements react together? • How is a compound different from an element and why are elements and compounds both described as substance? • What happens to atoms in during a chemical reaction? • What is the system for naming compounds? • How can we represent a chemical reaction? • How can we represent elements within a compound? • What is happening during a combustion reaction? • How can I determine practically which substance makes the best fuel? <p>Electricity and magnetism</p> <p>Year 8 is introduced to the basic concepts of electrical circuits: series and parallel circuits, potential difference, and resistance. These key concepts underpin their understanding of atomic structure and non-contact forces. Students will apply their prior knowledge of energy transfers and energy stores. Students will also use a model to deepen their understanding of the abstract explanations of electrical circuits, making links between the model and the concept, describing the model and linking that to describing events in the circuit, and evaluating the strengths and limitations of the model. Finally, students will learn that magnetism and electricity is all about the attraction and repulsion between charged particles and the forces exerted by these charges. Electricity and magnetism are in fact two aspects of one unified phenomenon: moving electric currents caused magnetic fields, and magnetic fields induce electric currents to flow.</p> <ul style="list-style-type: none"> • How can we explain static electricity? • What are the basic components of an electric circuit? • What is an electric current? • What is voltage? • What is resistance? • How can we use the ‘rope’ model to explain electric circuits? • How is a parallel circuit different from a series circuit? • How can we explain magnetism? • How can you make an electromagnet? <p>Bioenergetics</p> <p>In year 8 students will re-cap the processes of life, and in particular, further study respiration. They will look at the gas exchange system in humans and will get the opportunity to investigate an animal lung in closer detail. They will get to look at the process of photosynthesis and the structure of a leaf.</p> <p>Respiration, Breathing, Gas exchange, Photosynthesis, Structure of a leaf, Testing for starch</p>	<p>Representing chemical and word equations</p> <p>Observing, describing and recording experimental results, both qualitative and quantitative</p> <p>Working safely and following a set of instructions carefully</p> <p>Generating a hypothesis from an observation</p> <p>Justifying a hypothesis using scientific reasoning</p> <p>Identifying hazards and associated risks in the lab</p> <p>Identifying independent, dependent and control variables in an experiment</p> <p>Drawing an appropriate results table for any given method</p> <p>Understanding the difference between categorical, discrete and continuous data and select the most suitable graph for the data being used</p> <p>Drawing a line graph with correct scale, axes, points and smooth line/curve of best fit</p> <p>Writing a method to test a hypothesis.</p> <p>Identifying anomalies in an experiment.</p> <p>Plotting multiple graphs on the same axes and comparing them</p> <p>Using your graphs to determine if your hypothesis was correct.</p> <p>Drawing a conclusion and justifying it.</p> <p>Modelling using particle diagrams</p> <p>Set up simple electrical circuits to measure current and voltage.</p> <p>Use simple circuit diagrams to show the practical skills.</p> <p>To use bar magnets to plot a magnetic field on a piece of paper.</p> <p>To build an electromagnet and test how to increase/decrease the strength of the electromagnet.</p> <p>Students will observe a lung dissection and be able to identify the different parts of the respiratory system and their function.</p> <p>Students will test a leaf for the presence of starch and identify the different parts of a leaf and link them to their function.</p>	<p>Each topic consists of two formative progress quizzes: 1 and 2 with a total of 20 marks each.</p> <p>Michaelmas test</p>

Lent	<p>Acids and alkalis</p> <p>In year 8 students will thoroughly investigate many aspects of acids and alkalis. They investigate a range of different household substances and test their pH. They will use a range of different indicators, and make their own using red cabbage. They will be introduced to chemical word equations to describe the reaction between an acid and an alkali, and an acid and a metal.</p> <ul style="list-style-type: none"> • What are acids and bases? • How can we make an indicator? • How is universal indicator more useful than other types of indicator? • How do acids react with metals? • What happens in a neutralisation reaction? • How do indigestion tablets work? • What are the key steps in the preparation of a salt? • How can we distinguish concentrated acids from dilute acids? • Is there a link between the pH of an acid and its reactivity? <p>Light and Sound</p> <p>Students will discover electromagnetic waves and their features. They will investigate how the pitch and volume of sound can be represented and how sound travels. They will also look at the properties of light and determine the law of reflection.</p> <ul style="list-style-type: none"> • What are waves, what are their features and what properties do they have? • How are sounds made and how do they travel? • How do sounds vary and how are these different sounds represented as waves? • How do we detect sounds? • What are echoes and ultrasound and how are they useful? • How are the properties of light? • What is the law of reflection? • How are images formed in a mirror? • How can light bend? • How do we see light? • How do we see in colour? • How might we investigate the after-image effect? <p>Microbes and diseases</p> <p>Students will get the opportunity to study microorganisms in detail and perform a variety of different practical experiments. They will learn about the spread of disease and how to prevent and protect humans from future pandemics.</p> <ul style="list-style-type: none"> • What does it mean to be healthy? • When might microorganisms be useful? • What makes microorganisms pathogenic? • Safely follow an experiment in order to grow bacteria in a school lab successfully • Why is it important to use an aseptic technique when culturing organisms? • What is the best way to prevent a disease from spreading and why? • How do we protect ourselves from disease? • How do we get antibiotic resistance? • How do vaccines protect us in the long term? • Where do medicines come from? 	<p>Observing, describing and recording experimental results, both qualitative and quantitative</p> <p>Working safely and following a set of instructions carefully</p> <p>Generating a hypothesis from an observation</p> <p>Justifying a hypothesis using scientific reasoning</p> <p>Identifying hazards and associated risks in the lab</p> <p>Identifying independent, dependent and control variables in an experiment</p> <p>Drawing an appropriate results table for any given method</p> <p>Understanding the difference between categorical, discrete and continuous data and select the most suitable graph for the data being used</p> <p>Drawing a line graph with correct scale, axes, points and smooth line/curve of best fit</p> <p>Writing a method to test a hypothesis.</p> <p>Identifying anomalies in an experiment.</p> <p>Plotting multiple graphs on the same axes and comparing them</p> <p>Using your graphs to determine if your hypothesis was correct.</p> <p>Drawing a conclusion and justifying it.</p> <p>Students will use a variety of indicators to identify acids and alkalis and link them to their respective pH.</p> <p>Students will devise their own experiment to test different indigestion remedies. They will plan their investigation, review any safety procedures, and record observations and results in a scientific manner.</p> <p>They will make crystals during salt formation.</p> <p>Students will observe wave patterns on an oscilloscope to visualise wavelength, frequency and amplitude.</p> <p>There will be ample opportunity to use ray boxes, mirrors, prisms and coloured filters to investigate reflection, refraction and colour absorption/reflection.</p> <p>The students will observe an eye dissection.</p>	<p>Each topic consists of two formative progress quizzes: 1 and 2 with a total of 20 marks each.</p>
Trinity	<p>Space</p> <p>Students will carry out a research project to produce an educational resource on a space topic of their choice.</p> <ul style="list-style-type: none"> • How can I identify reliable sources of information? • How can I successfully summarise information from sources and make this my own? • How can I cite and reference research? 	<p>Evaluation and assessment of presentation to include quality of research, communication and presentation skills.</p>	<p>End of Year Assessment.</p>

Examples of Homework	Worksheets, presentations, research skills. Writing up practical experiments. Learning organ systems, structure of a leaf, and be able to label diagrams of gas exchange etc. Drawing ray diagrams to show reflection and refraction. Completing chemical word equations and naming compounds.	
Key terminology	Element, compound, mixture. Chemical reaction, physical process. Current, voltage, circuits, cells, bulbs, ammeter, voltmeter, resistance. Respiration, photosynthesis, parts of a leaf, gas exchange in human respiratory system. Acids, alkali, pH, neutralisation, indicator. Longitudinal and transverse waves, wavelength, frequency, amplitude. Laws of reflection and refraction. Structure of eye and ear. Microorganisms, disease, pathogen, antibiotic, virus.	
Super-curricular enrichment and scholarly extension	<ol style="list-style-type: none"> 1. Super curricular Activities: <ul style="list-style-type: none"> o Join science clubs or societies: Join STEAM society or Astronomy Club. 1. Books: <ul style="list-style-type: none"> o "Chemical Reactions" by Avi Reisman o "The Science Book: Big Ideas Simply Explained" by DK o "A Short History of Nearly Everything" by Bill Bryson (covers various scientific topics) o "Microbes: Discover an Unseen World" by Nicola Davies 2. Documentaries: <ul style="list-style-type: none"> o "The Mystery of Matter: Search for the Elements" (PBS series) o "The Farthest: Voyager in Space" o "The Power of Plants" (BBC documentary) o "How the Universe Works" (Discovery Channel series) 3. Places to Visit in London: <ul style="list-style-type: none"> o Science Museum: Explore exhibits on electricity, magnetism, space, and microbes. Attend interactive shows and demonstrations. o Natural History Museum: Discover exhibits on the evolution of life, biodiversity, and the interconnectedness of ecosystems. o Royal Observatory Greenwich: Learn about space, astronomy, and the history of navigation. Visit the Planetarium for a cosmic experience. o Kew Gardens: Discover the role of plants in photosynthesis and explore the diverse plant species. o London Zoo: Explore the animal kingdom and learn about the role of microbes in animal health. 	
Useful websites	<p>Here are some useful websites that can complement the topics covered in year 8 science:</p> <ol style="list-style-type: none"> 1. Royal Society of Chemistry (RSC) Education: The RSC Education website provides resources, experiments, and interactive activities related to chemical reactions, elements, compounds, acids, and bases. Visit: https://edu.rsc.org/ 2. NASA's Students' Corner: NASA's website offers educational resources, games, and activities for students interested in space and astronomy. Explore topics such as the solar system, space missions, and more. Visit: https://www.nasa.gov/students 3. Khan Academy: Khan Academy offers free educational videos, tutorials, and quizzes on a wide range of science topics, including electricity, magnetism, light, and more. Visit: https://www.khanacademy.org/ 4. BBC Bitesize: BBC Bitesize provides interactive learning resources, articles, and quizzes for various subjects, including science. Their science section covers topics like chemical reactions, microbes, and space. Visit: https://www.bbc.co.uk/bitesize/subjects/zng4d2p 5. National Geographic Kids: National Geographic Kids website offers articles, videos, and games on science, nature, and the environment. You can find information on topics like ecosystems, animals, and photosynthesis. Visit: https://www.natgeokids.com/uk/ 6. Exploratorium: The Exploratorium website provides interactive online exhibits, activities, and videos on various science topics, including electricity, magnetism, and light. Visit: https://www.exploratorium.edu/explore 7. STEM Learning: STEM Learning offers resources, lesson plans, and activities for science, technology, engineering, and math (STEM) education. They have specific resources for different science topics. Visit: https://www.stem.org.uk/ 	
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