



The Mall School

## Year 6 Science

### Scheme of work 2023-24

Autumn Term				
Unit	Topic	Learning Objectives	Activities/Resources/Links	Assessment
1	<i>Autumn 1</i>  Lab safety	To know lab safety rules	Hand out exercise books and presentation of work rules and safety rules.	
	Metals, elements & chemical reactions  The atom	1 To understand the difference between a substance and an element  To understand that atoms are the basic unit of matter, and every element is composed of a corresponding type of atom  To know that the periodic table classifies all the known elements	Discuss the difference between a substance (water, salt, wood ...) and the elements that compose it. Atom videos – ‘how do we know they exist – a brief history’. Cloze exercise  How many elements are there? How many can pupils name? Show how they are arranged in the periodic table, roughly according to atomic size/mass.  Do a tour of some of the most important elements. Compare properties of helium and hydrogen and consider the difference ‘one proton’ makes.	Starters and plenaries Marking in book Peer Self End of unit test



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		<p>2 To know the special properties of metals</p> <p>To know the properties of specific metals &amp; their uses</p>	<p>Discuss the properties of metals that make them especially useful.</p> <p>Discuss &amp; investigate properties and uses of specific metals – show videos/circus of metals &amp; metal objects to identify. Do magnet test. Complete worksheet.</p> <p>Look at some unusual metals: Mercury, Gallium (demonstrate heating), and Scandium. Videos</p>	
		<p>3 To understand that metals are extracted from ores</p> <p>To understand that metals can be combined in alloys</p> <p>To understand that metals can be identified by their densities</p>	<p>Look at how metals are extracted from ores/show videos of smelting/circus of ores to examine</p> <p>Show selection of common alloys/show video of history of early alloys and their historical importance (bronze age etc)</p> <p>Determine the densities of mystery metals to identify them (using Archimedes' principle).</p>	



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	<p>4/5 To conduct various chemical experiments and understand the nature of the reactions that take place</p> <p>To understand that the elements that make up chemical compounds, matter is conserved, and elements are conserved</p>	<p>Conduct flame tests on metal compounds to determine metal present/ 'why are certain colours associated with specific metals?'/ explain the atomic origins of light emissions.</p> <p>Pupils heating copper and magnesium in air to show oxidation or combustion reactions (safety warning over magnesium flash) / show thermal decomposition by heating <math>\text{CuSO}_4</math> to produce anhydrous <math>\text{CuSO}_4</math> – then add water to show reversible reaction</p> <p>Show 'mystery of matter' video of how Priestley and Lavoisier discovered 'pure air' (oxygen) and that matter is composed of elements/ Show the formulae for the chemical reactions above to demonstrate how the elements involved in chemical reactions (and hence matter) is conserved – a fundamental principle of classical physics</p>	
	<p>5/6 To know what is meant by nuclear or atomic physics</p> <p>To know the contribution of Marie Curie to our understanding of science</p>	<p>Discuss how radioactive decay and nuclear reactions can change one element into another/Consider whether lead can be transformed into gold – the alchemist's dream – by knocking protons/neutrons out of the nucleus/The California particle accelerator experiment</p> <p>'Mystery of matter' video to show Curie's discovery of radioactive elements.</p>	



2	<i>Autumn 2</i> Healthy bodies, diet & exercise	1 To understand how our understanding of a healthy balanced diet has changed and continues to change To understand what a clinical trial is	Use example of scurvy to show how our knowledge of healthy diet has improved over history – show scurvy videos/Explain how Lind conducted the first clinical trial (an experiment on humans) & the historical consequences of finding a cure for scurvy/what follow-up clinical trials could pupils conduct  Give examples of recent research into healthy diets and show how current knowledge is still developing – e.g. regarding butter versus margarine/Problem of biased research when profits to be made/Look at current ‘superfoods’ and food to avoid  Conduct clinical trial in class to investigate whether certain forms of exercise or ‘brain gym’ affect performance in mental maths tests/Discuss problem of bias and ‘other explanatory factors’	Starters and plenaries Marking in book Peer Self End of unit test
		2 To understand what the main food groups are, and their function in a balanced diet	Explore different main food groups and why they are essential for a balanced diet/Use food label cards to determine whether specific foods are good or bad for you/Pupils devise healthy diets	



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		<p>3 To understand the nature and purpose of the circulatory system, and the organs involved</p>	<p>Explore how nutrients and oxygen and water are transported round the body, and why – growth, repair and energy/Consider function of lungs, heart and intestines/show videos demonstrating these processes/label diagram to show the processes of the circulatory system/Explain cellular respiration and metabolism/show video of what goes on inside the cells of the body</p>	
		<p>4 To know how exercise affects the heart To know how to locate &amp; measure your pulse</p>	<p>Explain how to measure pulse &amp; how pulses vary/Conduct experiments to measure change in heart rate on doing certain kinds of exercise/Discuss why exercise increase heart rate, why people who are fit have lower heart rates and faster recovery times, and why exercise is good for a healthy heart</p>	
		<p>5 To understand the function of the muscles &amp; why we feel tired when we exercise To learn the purpose of warming up &amp; warming down</p>	<p>Explain the main muscles of the body and what their function is/Discuss why muscles need more blood when we exercise/Pupils label diagrams and learn names of key muscles/Explain voluntary and involuntary muscles  Explain why we need to warm up and warm down before/after exercise</p>	
		<p>6 To know what a drug is, and to understand the potential effects on the body</p>	<p>Define what a drug is/Explain that drugs can be beneficial or harmful, often depending on context and dosage/Consider health effects, benefits and dangers of specific drugs: tobacco, alcohol, cannabis etc/Devise information posters</p>	



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**Spring Term**

Unit	Topic	Learning Objectives	Activities/Resources/Links	Assessment
3	<i>Spring 1</i>  Changing circuits  Climate change	1 To know the two forms of electricity (static & current), and that a circuit is needed for electricity to flow	Revise main concepts of electricity: circuit components, current versus static, battery versus mains, voltage etc. Remind of safety issues/Challenge to draw what happens inside a torch – who managed to show a circuit?  Show history of electricity video.	Starters and plenaries Marking in book Peer Self End of unit test
		2 To recognise & use circuit symbols, and know the basic terminology of electricity & circuit components	Learn standard circuit component symbols/complete glossary of terms.	
		3 To be able to construct various circuits	Challenge to make various circuits from diagrams.	
		4 To investigate how the brightness of a bulb and/or speed of a motor can be changed	Investigate how varying numbers of batteries and bulbs, putting into series and parallel, affects brightness of bulb/Investigate how length, thickness and composition of wire affects bulb brightness	
		5 To understand how electricity is generated	Learn different ways of generating electricity.  Consider the contribution of Volta in inventing the first battery. Make a battery.  Consider the contribution of Faraday in inventing the dynamo using the principle of electromagnetism. Show	



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			video of Faraday and invention of dynamo/electric motor. Show how turbines use this principle in electricity generators and power stations.	
		6 To understand the main issues relating to climate change and global warming	Explore the different ways of generating power – fossil fuels, nuclear and renewables/What are the pros and cons of each?  Explore how burning fossil fuels contributes to global warming and climate change/What can we do to ‘save the planet’?/Discuss the controversies surrounding the climate change debate/ ‘Is Greta Thunberg right?’	
4	<i>Spring 2</i>	1 To understand that the characteristics of living things can be inherited	Discuss concepts of inherited characteristics (physical and non-physical) in living things/What characteristics or traits do pupils think they might have inherited/’What is the purpose of breeding?’	Starters and plenaries Marking in book Peer Self



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Evolution, inheritance & genetics	2 To identify how animals & plants are adapted to their environments  To understand how adaptation leads to evolution  To know Darwin's contribution	Discuss how animals and plant are adapted to their environments or habitats/Explain that the best adapted offspring are most likely to survive and reproduce, and how this process of 'natural selection' drives evolution/Investigate how different living things (organisms) are adapted to their environments  Explain role of Darwin in devising the theory of evolution and the controversy/Video of Darwin's story/Discuss role of 'species' and 'mutations' in evolutionary theory, and the 'fossil record'/Investigate why the dinosaurs might have become extinct	End of unit test
	3 To understand how human beings have evolved over time	Discuss how humans have evolved over time, from hunter gatherers to farmers to city dwellers, and the evidence for these changes/'How does human evolution (especially of brain) differ from that of other animals?' – discuss how intelligence and language have enabled us to master our environment	
	4 To understand the role of genes in evolution, and 'genetic engineering'	'What is the science of genetics?'/ Explain how genes, chromosomes and DNA were discovered, and a person's 'genetic code' is transmitted to their offspring, the basis of heredity/Discuss the medical possibilities (eliminating birth defects) and dangers (designer children/monsters) of genetic engineering/Discuss the ethical issues	





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Summer Term				
Unit	Topic	Learning Objectives	Activities/Resources/Links	Assessment
5	<i>Summer 1</i> Classifying micro-organisms	1 To know how to group organisms according to their characteristics	Discuss/recap the standard ways of grouping animals according to their characteristics. What are the characteristics of mamma's, reptiles, insects, molluscs, crustaceans etc?  Use a key to classify various animals.	Starters and plenaries Marking in book Peer Self End of unit test
	Micro-organisms, germs & antibiotics	2 To know about Linnaeus & his contribution to creating a classification system	Slide show on the contribution of Linnaeus. Show how living things grouped into kingdoms, classes, species etc.  Discuss how the classificatory tree resembles the evolutionary tree.  Task to identify the Latin names of various mammals and their place in the classificatory tree.	



		<p>3 To explore what micro-organisms are</p> <p>To understand the role of bacteria and viruses in spreading disease, and we can protect against infection</p>	<p>Slide show on how micro-organisms are classified into bacteria, fungi etc.</p> <p>Learn about the positive and negative roles of various micro-organisms, and the role of bacteria and viruses in spreading disease – including the Covid virus.</p> <p>Learn about the difference between bacterial and viral infections – and how we can protect against infection and their spread.</p> <p>Discuss the difference between a bacterium (living organism) and a virus (non-living but replicates).</p> <p>Experiment to see which moulds grow on foods left out in warm damp conditions. Examine under microscope.</p>	
		<p>4 To understand the contributions to medical science of Edward Jenner (vaccination), Joseph Lister (antiseptics) and Florey, Chain and Fleming (penicillin)</p>	<p>Tell the stories of these scientists/medical practitioners and their contributions to medical science using slides and videos.</p>	



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	<i>Summer 2</i> Project on great scientists	1 To know something of the contribution to science of Einstein and Hawking	Learn about the life and work of Einstein and Stephen Hawking using slide shows and videos.	
		2 To research the life and work of a great scientist	Choose a scientist, past or present, who interests you, and prepare a power point presentation on their life and work.	