



The Mall School

Year 5 Science

Scheme of Work 2023-24

Autumn term				
Unit	Topic	Learning Objectives	Activities/Resources/Links	Assessment
1	<i>Autumn 1</i> Introduction and Safety in the laboratory	To introduce year's work For pupils to appreciate the dangers assoc. with practical science. Understand and follow laboratory rules.	Hand out exercise books and presentation of work rules, safety rules, and school marking guidelines.	
	Matter and Measurement	1 To understand the concepts 'soluble' and 'insoluble', and associated terminology	Investigate what happens when mix salt/sugar/flour/sand with water. Introduce concepts 'dissolve', 'solution', 'soluble', 'insoluble'. [extension: 'residue', 'saturated'] Discuss in what sense a soluble substance does, and does not, vanish. How do you know it is there even though you cannot see it etc.? Cloze exercise for key word practice.	Starters and plenaries Marking in book Peer Self End of unit test
		2 To understand that soluble substances can be recovered through evaporation To understand concept of evaporation, and how heat facilitates the process	Discuss how the salt/sugar might be recovered from solution. Experiment to recover salt by evaporation. Show video of salt farming. Demonstration experiment to show what happens when boil off sugar solution to produce caramel. Discuss difference between hard and soft water – mineral water, limescale, spas etc. Which is better for you? Pros and cons. (Investigate for homework)	



		<p>3 To understand how mixtures can be separated by sieving, filtration, and evaporation</p>	<p>Explain the principles of sieving, filtration, and evaporation as separation procedures, and where they are appropriate. Challenge: to separate various mixtures (sand/rice/salt/dry peas etc.) using knowledge of separation procedures. Extension: to use multiple procedures.</p>	
		<p>4 To understand that when substances mixed together 'react' with each other, the change is irreversible To understand that whereas heating and cooling can produce reversible change, burning produces irreversible change To understand that in a chemical reaction, the elements are re-arranged</p>	<p>Conduct various experiments that produce chemical reactions:</p> <ul style="list-style-type: none">• Acid + chalk (demo) [extension: show the gas produced extinguishes a flame]• Vinegar + baking soda• Diet coke + Mentos• Candle burning <p>Discuss how we know a reaction is taking place, what gases might be given off, and how the gases are produced by elements re-arranging themselves (illustrate by showing the chemical formulae of these reactions) Discuss the reversible (heating) and irreversible (burning) elements of the candle flame. Discuss some other notable chemical reactions: rusting, all explosions & fires, photosynthesis, respiration.</p>	
		<p>5 To understand the nature of fire – a reaction with oxygen in air To understand the dangers of fire, and the principles of fire safety</p>	<p>Discuss what happens when things burn – paper, wood, natural gas, and candle wax. Conduct experiments and observe. Why smoke and ash at the end? Emphasise that chemical reactions are going on. Introduce term 'combustion'. Introduce the fire triangle. Discuss how to prevent and extinguish a fire (and when not to). Produce a fire safety poster. Fire safety videos.</p>	



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		<p>6 How to calculate density How to measure volume of irregular objects: Archimedes' principle To calculate density</p>	<p>Discuss how objects differ in density, why this is a useful concept (e.g. compare weight of 1 cubic unit of different materials/elements), and how it can be calculated. Tell story of Archimedes/show video. Use weight and volume measurements to calculate density of different substances.</p>	
		<p>7 To learn that substances with density of less than one float</p> <p>To incorporate scientific understanding (density) in a practical task</p>	<p>Conduct experiment to see which materials float and relate this to their densities/discuss why 'lower than 1' density materials do float – introduce idea of displacement/discuss how loaded tankers float/show videos of how ships float/video Challenge: Design the boat/tanker that float the best and can carry the most weight [card, lollipop sticks, sellotape, weights]</p>	
2	<p><i>Autumn 2</i></p> <p>Forces in action</p>	<p>1 To understand the force of gravity, its effects on earth, and Newton's contribution</p>	<p>Discuss why we don't float into space/tell the story of Newton – show video/measure force acting on different masses using forcemeter /explain difference between mass (kg) and weight (N)</p>	<p>Starters and plenaries Marking in book Peer Self End of unit test</p>



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		<p>2 To understand that gravity (weight) differs on the earth & the moon & in space</p>	<p>Show how weight depends on gravity and differs on the moon/learn the force of gravity on earth's surface/discuss where there might be (near) zero gravity/show videos of astronauts on moon and in space stations</p> <p>Discuss what a black hole is, and how this relates to gravity – show video/introduce Einstein & his revolutionary alternative to Newton's idea of gravity</p>	
		<p>3 To know about the first moon landing</p> <p>To understand that planets and satellites are kept in orbit by the earth's gravitational field</p>	<p>Learn story of Apollo 11 and first moon landing – show video/learn how a rocket needs to escape the earth's gravitational field/ learn how satellites are kept in orbit – show video</p>	
		<p>4 To understand the force of friction</p>	<p>Conduct experiments to measure which materials/surfaces exert produce greatest/least friction forces</p>	
		<p>5 To understand the force of air resistance</p>	<p>Discuss/recap why parachutes slow your descent – what causes air resistance</p> <p>Show video of dropping feather in a vacuum/tell story of Galileo's Tower of Pisa demonstration</p>	



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		6 To understand how levers can amplify a force	Show videos of large-scale catapults and trebuchets to demonstrate the lever principle in action Design catapults using the lever principle	

Spring Term

Unit	Topic	Learning Objectives	Activities/Resources/Links	Assessment
3	<i>Spring 1</i> Earth and space	1 To understand that the sun, earth & moon are (approximately) spherical bodies To understand how we know the earth is round	Discuss the relative sizes, shapes and movement of earth, moon and sun/discuss how we know if the moon is flat or round, and why it apparently changes shape/demonstrate shadows cast by light on flat and spherical objects/discuss the far side of the moon and first sighting by man Discuss whether earth is round or flat/why did people used to think it flat/'how do we know it is round?'/show video of the first circumnavigation (Magellan)/show videos of other evidence including the view from space Discuss the 'flat earthers'/show video of what would happen if the earth were flat	Starters and plenaries Marking in book Peer Self End of unit test



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		2 To know the sizes & relative distances of the sun, earth & moon	Show pictures, models and videos demonstrating relative sizes and distances of earth, moon and sun/do a scale drawing on A3 paper to show their relative sizes and distances	
		3 To understand how the earth's rotation explains (a) night & day (b) the apparent movement of the sun across sky	Discuss why the sun apparently moves across the sky – show video/ 'why do we have night and day?'/ discuss time zone maps & calculate times round world	
		4 To understand how earth's rotation round sun explains the seasons	'Why is the sun different heights in the sky at different times of year?'/ 'why do 'days' get longer and shorter?'/ discuss why we have seasons and why Britain and Australia have 'opposite' seasons/ show videos to explain why	
		5 To know the relative positions and orbit times of the planets of the solar system	Demonstrate movement of the planets round the sun using model and video/discuss role of gravity/discuss which planets are hottest and which have shortest 'years'/compare data of different planets	
		6 To understand the effects of the moon's orbiting the earth	Discuss the motion of the moon round the earth/why it changes shape in the sky (full moon, new moon etc)/why it is bright at night/show a lunar calendar	



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		7 To know the contribution of Galileo	'How do we know the earth orbits the sun?'/ tell the story of Galileo and his dispute with the church/enact a debate between the two sides	



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4	<i>Spring 2</i> Changes & reproduction	1 To understand the stages of human growth & development	Discuss how pupils think they have changed since school/slide show/discuss key changes and stages/put human life cycle stages in order/research needs of babies	Starters and plenaries Marking in book Peer Self End of unit test
		2 To understand the stages in human/animal gestation periods	Discuss pupils' ideas about pregnancy/slide show of sexual reproduction, fertilisation, embryo growth and childbirth/discuss length of pregnancy/match key words to definitions Compare gestation periods of different mammals on bar chart using data/discuss why the lengths are different	
		3 To understand the stages of child development & corresponding needs	Discuss the needs of babies, young children & older children/slide show/prepare daily timetables for children of different ages What do pupils think are the needs of teenagers	
		4 To understand how the body changes during puberty, and how these changes differ for boys & girls	Discuss what pupils know of the changes in puberty (10-13)/explain role of hormones and purpose of puberty/slide show/discuss difference in puberty for boys & girls/label factsheet	
		5 To understand how the body changes during adulthood & old age	Discuss later stages of human development: adolescence, adulthood, old age/ what changes do pupils think occur/slide show/what do pupils think their lives might be like as they get older/what are the characteristics and life needs of adults and older people	



Summer Term				
Unit	Topic	Learning Objectives	Activities/Resources/Links	Assessment
5	<i>Summer 1</i> Life cycles	To understand the process of sexual reproduction in plants	What is the purpose of a plant's flower and fruit/seed? Explain processes of pollination and fertilisation. Label parts of a flower (stamen, carpel etc.) and describe how plants reproduce.	Starters and plenaries Marking in book Peer Self End of unit test
		To use a microscope	Explain how the invention of the microscope (like the telescope) revolutionised our understanding of the natural world. Look at Hooke's <i>Micrographia</i> . Examine various sample slides under the microscope. Identify the parts of various flowers. Then examine them under a microscope, producing diagrams.	
		To understand the process of asexual reproduction in plants	Slide show on various forms of asexual reproduction. Plant some old potatoes, bulbs, cuttings, and seeds to compare how they grow.	
		To compare the life cycles and reproductive processes of different animals	Compare the life cycles of mammals, amphibians, reptiles, birds, and insects. What do they have in common (including with the human life cycle) and how do they differ? Discuss internal and external fertilisation. Research and produce posters of the life cycles of representative animals from the above groups.	



			Bar chart to compare the gestation periods of different mammals.	
		To find out about the work of naturalists	Discuss the lives and work of some eminent naturalists. Choose a naturalist of your own to research, and then produce and present a fact file or power point about them.	
6	<i>Summer 2</i> Light	To understand how light travels and shadows are created	Discuss sources of light, what happens when light is blocked (shadows), and how this shows that light travels in straight lines. Look at shadow pictures. Use torches to create shadows. Complete shadows on worksheet. Discuss why shadows change during the day and how this is used in sundials. Make a simple sundial with pencil and card. Slide show on silhouettes, shadow games and shadow art.	Starters and plenaries Marking in book Peer Self End of unit test
		To understand how lenses work To know that white light can be split into a spectrum	Explore how lenses (convex and concave) bend light using light machines, and how prisms can split white light into a spectrum.	
		To understand how the eye enables us to see	Slide show to explain how the eye works. Label the parts on a worksheet and describe their functions.	



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			<p>See how your neighbour's pupils contract/enlarge in response to change in lighting.</p> <p>Discuss how a camera differs from the human eye. Both produce images but we can see (visual perception) whereas a camera cannot.</p> <p>Discuss why people need glasses: short and long sightedness.</p>	
		To know that light can be reflected	<p>Discuss the difference between a shadow and a reflection.</p> <p>Explore how light can be reflected using light machines and mirrors.</p> <p>Complete angle of incidence/reflection worksheet.</p> <p>Slides how on periscopes and how to construct them.</p> <p>Challenge to make a home periscope.</p>	
		To understand how cameras work	<p>Slide show on how cameras work and the history of photography.</p> <p>See how pinhole cameras produce an upside-down image. Explain why.</p> <p>Make a pinhole camera. [Make a lens camera using a magnifying glass as a lens].</p>	