The Mall School

Year 4 Science

Scheme of Work 2023-24

Autumn Term				
Unit	Topic	Learning Objectives	Activities/Resources/Links	Assessment
1	*Autumn 1* Introduction and Safety in the laboratory	To introduce year's work For pupils to appreciate the dangers associated with practical science. To understand and follow laboratory rules.	Hand out exercise books and presentation of work rules, safety rules, and school marking guidelines. Create lab safety poster	
	Developing investigation skills Learning how to use the Bunsen Burner Selecting appropriate measuring equipment Recording results and	1 To learn how to use the Bunsen safely	Explain how Bunsen works; how to light and use safely; draw labelled diagram; list safety rules.	Starters and plenaries Marking in book Peer Self End of unit test
		2 To use the Bunsen to conduct an experiment and plot results on a graph To know the boiling and freezing points of water, and some other Centigrade temperatures	Heat water using Bunsen and find temperature water boils at using thermometer; predict boiling point; discuss whether water can get hotter than 100 degrees C, and why it cannot. Plot temperature as rises and then cools down by recording every minute; note the different graph shapes. Discuss how a thermometer works and a variety of everyday Centigrade temperatures.	

	plotting graphs	3 To investigate what happens when various substances are heated, and the safety implications/possible dangers	Experiment to heat various substances and observe what happens: wax, ice cube, sugar, egg, cheese, steel gauze (on its own) etc.	
		4 To measure length, weight and capacity/volume using appropriate instruments and units	Circus of objects in and out of classroom to estimate/measure length/weight/capacity; revise metric units and conversions. Discuss relationship between volume (space) and capacity (stuff); cubic cm and ml.	
		5 Pendulum experiments Galileo's Pisa experiment	Introduce the pendulum and terminology; tell story of Galileo's of how pendulum could be used to regulate clocks and keep time. Conduct experiments to determine whether weight of bob/amplitude/length of rod affect period of pendulum. Discuss history of time-keeping (video) Show examples of other pendulum oscillations and waves e.g. Newton's cradle (video) Tell story of, and re-enact, Galileo's Pisa experiment to find whether a heavy or light object reaches the ground first; relate to pendulum weight experiment; discuss pull of gravity.	

2	*Autumn 2* Electricity	1 To understanding what is electricity, the difference between static and current electricity, and where it comes from.	Discuss where you find electricity in the natural world (lightning/fish/touching charged objects). Discuss the role of electrons: static electricity is their build up, current electricity is their flow.	Starters and plenaries Marking in book Peer Self End of unit test
		2 To understand the nature of static electricity, and how its discharge produces sparks and shocks.	Discuss how electrons can build up producing positive/negative 'charge', and what happens when they 'discharge'. Experiment with balloons rubbed against hair, charged balloons attracting strips of foil, charged combs bending water etc. Van der Graaf generator demonstration. Consider lightning and how it is generated. Tell story of Franklin. Look at lightning conductors.	
		3 To know what is needed to build a simple circuit	Experiment making circuits with various components connected. Learn that electrons will only flow if there is a complete circuit. Use a switch to turn circuit on and off. Complete 'is it a circuit' worksheet.	

		4 To understand the difference between battery and mains sources of electrical power To understand the dangers of mains electricity	Consider the differences in voltage of battery and mains electricity. Discuss where mains electricity comes from and the role of overhead power cables (video). Explore the dangers of electricity in the home. Make an electrical safety poster.	
		5 To understand how electricity can be generated by batteries To make a fruit battery	Explain in simple terms how a battery produces electricity – acids inside 'react' to generate a flow of electrons. Make our own fruit battery using copper and zinc electrodes. Try oranges/lemons/apples/potatoes. Measure power with voltmeters. Power a buzzer. Challenge: To increase battery power by combining fruits. Look at video of electric eels.	
		6 To know which materials do and do not conduct electricity To understand the purpose of electrical insulators	Experiment to test which materials conduct electricity. Discuss the role of insulators, for example in coating wires conducting electricity.	
		7 To understand how electrical signals can be	Tell the story of the invention of the first system of telecommunications – the Morse code system. Transmit Morse code messages.	

		used in telecommunications		
		8 To understand how magnets work and how iron can be magnetised to produce a compass	Explore a range of magnets. See how poles attract/repel and how this can produce ‘magnetic levitation’. Experiment to see which materials are magnetic. Why are some coins magnetic and others not? Discus how the Earth’s magnetism explains compasses. Magnetise a needle to create a floating compass.	

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Spring Term				
Unit	Topic	Learning Objectives	Activities/Resources/Links	Assessment
3	*Spring 1* Eating and digestion	1 To be able to identify and classify carnivores, herbivores and omnivores	Discuss definitions; classify animals and investigate animal diets; discuss what is a vegetarian and vegan; discuss whether dogs and cats be fed vegetarian diets.	Starters and plenaries Marking in book Peer Self End of unit test
		2 To be able to construct and interpret a variety of food chains	Discuss definitions and roles of producers and consumers in food chains; discuss how plants produce their own food, and how all energy originates with the sun; explore different food chains; make up own; discuss how a chain differs from a web; ecosystems. Discuss non-producing plants (carnivorous plants etc.). Discuss the deep ocean ecosystem that does not depend on the sun's energy (video).	
		3 To identify the different types of teeth in humans and identify their functions	Discus types of teeth and purposes; two different sets of teeth; different animals' types of teeth and purpose of.	

		4 To explore different ways of keeping teeth healthy	Discuss causes of tooth decay, role of bacteria, plaque and acid, and how tooth decay can be prevented. Design healthy teeth poster.	
		5 To investigate how the digestive system works To be able to describe the functions of the basic parts of the digestive system	Discuss what happens to food once we eat it? Why do we need food? Pupils draw diagram of what they think happens to food inside the body. Show how the digestive system works, the stages of its journey through the body, and the functions of the key digestive organs – slideshow/diagram/video Interesting facts about your digestive system	

4	*Spring 2* States of matter	1 To understand the nature of matter To understand the properties of solids, liquids, and gases	Discuss nature of matter (versus space/vacuum) and its composition of atoms. Discuss differences between solids, liquids, and gases (1) in material characteristics (2) in atomic structure. Exercise to sort/classify materials by S/L/G; discuss problem cases of (1) solids in powder or granular form that flow – like sand and rice (2) viscous liquids like treacle.	Starters and plenaries Marking in book Peer Self End of unit test
		2 To understand that air is not empty space but made of gaseous elements To design a parachute and conduct a fair test	Demonstrate why air is not 'empty space' by blowing up a balloon, considering effect of putting an animal in a vacuum flask (show Joseph Wright air pump picture), and comparing descent of feather in air and vacuum (Brian Cox video). Discuss what causes 'air resistance' and why none in a vacuum. Tell story of how oxygen ('pure air') was discovered and other types of air. Demo 'heavy air' (CO_2) poured onto a flame. Show excerpt from Joseph Priestley video. Discuss composition of air. Discuss why parachutes work. Better on hot or cold day? Challenge to design the best parachute. Conduct fair tests to establish the best design features.	
		3 To understand that materials change state when they are heated or cooled	Can materials change their state? How? Conduct experiments on water/ice/wax/butter/jelly/sugar etc. to show effects of heat. Discuss whether changes reversible and scientific names for changes –	

		To know that different elements have different melting/boiling points	melting/boiling (evaporating) and condensing/solidifying (freezing). Will rocks and metals melt in a Bunsen flame? Why not? Note the temperature of a Bunsen flame. Discuss differing melting and boiling points of different elements. Discuss why tin should not be heated in a flame. Can metals be liquid? Note melting point of Mercury. Show Gallium in hand.	
		4 To understand the processes of evaporation and condensation	Discuss meaning of terms evaporation and condensation. Discuss examples of water evaporating (turning into water vapour or steam) and relation to temperature. Consider spilled water, puddles, drying washing, boiling water etc. Experiment to see how long water takes to evaporate in different temperatures. How long does boiling water take to evaporate? Discuss examples of water condensing – cold drinks cans. Why do car windows mist up when it is cold outside? Show steam from kettle condensing on a window or cold metal surface.	

		4 To understand the part played by evaporation and condensation in the water cycle	Discuss how evaporation and condensation of water are central to the water cycle. Complete a labelled flow diagram to illustrate the process.	

Summer Term				
Unit	Topic	Learning Objectives	Activities/Resources/Links	Assessment
5	*Summer 1* Sound	1 To know that sounds are made when objects and materials vibrate To know that sound can travel through solids, liquids and gases	Explore how sound ceases when a material cannot vibrate (e.g. cymbal is dampened, triangle is not held by string). Why is there no sound in space? Make a string telephone and test over varying distances, round corners, and from room to room. Do other materials make a difference – e.g. a wire telephone?	Starters and plenaries Marking in book Peer Self End of unit test
		2 To know that sound travels slower than light	Experiment to show sound travels slower than light, and to roughly measure the speed of sound by watching a drum struck from other end of playground. Discuss why we see lightning before we hear the thunder, and how the delay enable us to tell how far away the storm is.	

		3 To find out how the length, thickness and tightness of a string/hollow tube/bar affects its pitch	Consider how sounds are made (solids or air vibrations) and different pitched sounds made by various musical instruments.	
6	*Summer 2* Classifying animals Characteristics of animals Habitats and environments Biodiversity & habitat loss Project on endangered animal Conservation	To be able to classify animals into specific groups according to their characteristics To be able to use a classification key	Discuss how animals might be grouped and classified according to their characteristics. Define the terms vertebrate, invertebrate, mammal, reptile, amphibian, fish, bird, insect. Exercise to classify various animals according to these groups. Consider unusual examples: platypus, bat, dolphin etc. Use keys to classify animals. Discuss how easy/difficult they are to use.	Starters and plenaries Marking in book Peer Self End of unit test
		To know the basic characteristics that all animals have in common	Discuss animals need to eat, to move & possess senses, breathe oxygen, reproduce, usually possess a brain, communicate if more intelligent Complete fact file sheet for animal(s) of choice showing characteristics	
		To understand how animals & plants are adapted to their habitats	Discuss what is a habitat. How many different habitats can children think of? Discuss how animals and plants are adapted for life in their characteristic habitats.	

		To be able to identify a variety of habitats	Slide show of animals/plants in habitats round the world – discuss how they are adapted How many animals can pupils find in a sample of pond water – record/ draw/research using keys	
		To explore the human impact on habitats and environments To understand the importance of 'biodiversity'	Discuss how all the plants and animals of a habitat are linked together in food chains and webs, the whole comprising an 'eco-system'. Discuss how humans can have a negative effect on habitats and ecosystems: The effect of roads, housing, pollution etc. Example of Yellowstone wolves and effect on ecosystem – slideshow Slideshow of animals now extinct or endangered by habitat loss Do a mini project on an endangered animal Our Planet videos (Attenborough) on habitat loss What can children do to protect and conserve the environment? Design a poster.	