Science Themes, Domains and Dimensions Lower KS2

Year	Theme	Domain	Scientific Dimensions			
	Core knowledge and skills	Biology Chemistry Physics	**Scientific knowledge** -conceptual understanding through the specific disciplines of biology, chemistry and physics	**Scientific enquiry** -understanding of the nature, processes and methods of science through different types of science enquiries	**Scientific application** understand the uses and implications of science, today and for the future.	Links to other knowledge and ideas
		Biology	The functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers The requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant The way in which water is transported within plants The part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. That animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat The simple functions of the basic parts of the digestive system in humans The different types of teeth in humans and their simple functions That humans and some other animals have skeletons and muscles for support, protection and movement. recognise that living things can be grouped in a variety of ways	Children should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including: • Observing changes over a period of time, • Noticing patterns, • Grouping and classifying things, • Carrying out simple comparative tests • Finding things out using secondary sources of information. Asking relevant questions and using different types of scientific enquiries to answer them	Apply their knowledge of plants to create the ideal growing conditions for a plant in the classroom, plant and grow observing the whole life cycle of the plant To be able to create a balanced diet including all the key nutrition they need to grow and be healthy To be able explain the differences between different forms of animals	Geography: The impact of Pollution Ecosystems Global warming PSHE Healthy living Diet and Exercise Care for the Environment RE Respect for our planet and living things

			That classification keys to help group, identify and name a variety of living things in their local and wider environment That environments can change and that this can sometimes pose dangers to living things. The nature and variety of food chains, identifying producers, predators and prey.	Setting up simple practical enquiries, comparative and fair tests Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions Recording findings using simple scientific language, drawings, labelled diagrams, bar charts and tables Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Identifying differences, similarities or changes related	To be able to explain how plants are the basis of all food chains including our own	
		Chemistry	**To compare and group materials together, according to whether they are solids, liquids or gases** **That some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)** **The part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.**		**To identify gasses liquids and solids in the home and describe where we would see evidence of evaporation and condensation**	Links to steam power – a simple steam engine

		Physics	Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties How fossils are formed when things that have lived are trapped within rock That soils are made from rocks and organic matter That human need light in order to see things and that dark is the absence of light That light is reflected from surfaces That light from the sun can be dangerous and that there are ways to protect their eyes That shadows are formed when the light from a light source is blocked by an opaque object There are patterns in the way that the size of shadows change How things move on different surfaces That some forces need contact between two objects, but magnetic forces can act at a distance How magnets attract or repel each other and attract some materials and not others That some materials are attracted to a magnet and some are not That magnets have two poles will attract or repel each other, depending on which poles are facing. How sounds are made, associating some of them with something vibrating That vibrations from sounds travel through a medium to the ear There is a pattern between the pitch of a sound and features of the object that produced it There is a pattern between the volume of a sound and the strength of the vibrations that produced it That sounds get fainter as the distance from the sound source increases	to simple scientific ideas and processes Using straightforward scientific evidence to answer questions or to support their findings Using results to draw simple conclusions, make predictions for new values, suggest improvements, and raise further questions	To compare and contrast different types of rock in terms of their suitability as building materials To imagine what it is like in complete darkness – how would we move around To create an assault course for a model vehicle using a range of different surfaces and explaining the challenge of each one To create a game that uses magnets to move the pieces round the board Design and make an instrument and explain the reasons for your choices	

			That common appliances that run on electricity Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers That in a simple series circuit, a lamp will only light if it is part of a complete loop with a battery That a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit That some materials are good conductors and some are not and associate metals with being good conductors.			
Interpretation						
Year 3						
3a Autumn	**Key Knowledge:** The composition of the Earth and its atmosphere and the processes occurring within them shape the Earth's surface and its climate **Key Skills:** Identify, group and classify things according to observable properties Finding things out using secondary sources of information.	Chemistry	**Rocks** EM3.1 Compare and group together different kinds of rocks on the basis of their simple physical properties EM3.2 Describe in simple terms how fossils are formed when things that have lived are trapped within rock EM3.3 Recognise that soils are made from rocks and organic matter	***Answer scientific questions using different types of scientific enquiry,*** *including* Noticing patterns, differences, similarities or changes Finding things out using secondary sources of information. Identify, group and classify things according to observable properties Make systematic and careful observations and take accurate measurements Recording findings using simple scientific language, drawings, labelled diagrams, bar charts and tables Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	To compare and contrast different types of rock in terms of their suitability as building materials	Links to: Geography- How the earth was formed The effects of weather Erosion Volcanos

3b **Autumn**	**Key Knowledge:** Organisms require a supply of energy and materials for which they are often dependent on or in competition **Key Skills:** Finding things out using secondary sources of information Recording findings using simple scientific language, drawings, labelled diagrams, bar charts and tables	**Biology**	**Animals, including humans** AH3.1 Identify that animals, including humans, need the right types and amounts of nutrition, and that they cannot make their own food, they get nutrition from what they eat AH3.2 Identify that humans and some animals have skeletons and muscles for support, protection and movement	***Answer scientific questions using different types of scientific enquiry,*** *including* Noticing patterns, differences, similarities Finding things out using secondary sources of information. Gather, record and present data in a variety of ways to help in answer questions Recording findings using simple scientific language, drawings, labelled diagrams, bar charts and tables Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	To keep a food diary for a week and then identify the different food types they have eaten To create a hinged model of a person with moveable shoulders elbows hips and knees to show how joints help us move	Links to: PSHE – healthy eating PE – movement – what happens when we bend our knees
3c **Spring**	**Key Knowledge:** Objects can affect other objects at a distance Changing the movement of an object requires a net force to be acting on it **Key Skills:** Setting up simple practical enquiries, Make systematic and careful	Physics	**Forces and magnets** FM3.1 Compare how things move on different surfaces FM3.2 Notice that some forces need contact between two objects and some forces act at a distance FM3.3 Observe how magnets attract or repel each other and attract some materials and not others FM3.4 Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials FM3.5 Describe magnets as having two poles FM3.6 Predict whether two magnets will attract or repel each other, depending on which poles are facing	***Answer scientific questions using different types of scientific enquiry,*** *including* Noticing patterns, differences, similarities or changes Finding things out using secondary sources of information. Setting up simple practical enquiries, Make systematic and careful observations and take accurate measurements Recording findings using simple scientific language, drawings, labelled diagrams, bar charts and tables	To create a game that uses magnets to move the pieces round the board Investigate different ground surfaces around the school and their properties to identify how the types of surface affects how we move across it	Links to:

	observations and take accurate measurements			Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Using results to draw simple conclusions, make predictions for new values, suggest improvements, and raise further questions		
3d Spring	**Key Knowledge:** The total amount of energy in the universe is always the same but the energy can be transformed when things change or are made to happen. **Key Skills:** Setting up simple practical enquiries, Make systematic and careful observations and take accurate measurements	**Physics**	**Light** **LT3.1** Recognise that they need light in order to see things and that dark is the absence of light **LT3.2** Notice that light is reflected from surfaces **LT3.3** Recognise that light from the Sun can be dangerous and that there are ways to protect their eyes **LT3.4** Recognise that shadows are formed when the light from a light source is blocked by a solid object **LT3.5** Find patterns in the way that the size of shadows change.	***Answer scientific questions using different types of scientific enquiry,*** *including* Observing changes Noticing patterns, differences and similarities Finding things out using secondary sources of information. Setting up simple practical enquiries, Make systematic and careful observations and take accurate measurements Recording findings using simple scientific language, drawings, labelled diagrams, bar charts and tables Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Using results to draw simple conclusions, make predictions for new values, suggest improvements, and raise further questions	To imagine what it is like in complete darkness – how would we move around Carry out a survey of the school identifying opaque and transparent surfaces and reflective and non-reflective surfaces Create a sundial on the playground	Links to: RE Festivals of light including Diwali, Hanukkah, Christmas Biology: How our eyes work
3e Summer	**Key Knowledge:**	Biology	**Plants**	***Answer scientific questions using different types of scientific enquiry,*** *including*	Apply their knowledge of plants to create the ideal	Links to:

	Organisms are organised on a cellular basis Genetic information is passed from one generation of organisms to another **Key Skills:** Setting up simple practical enquiries, Using results to draw simple conclusions, make predictions for new values, suggest improvements, and raise further questions		PL3.1 Identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers PL3.2 Explore the requirements of plants for life and growth (air, light, water, nutrients from the soil, and room to grow) and how they vary from plant to plant PL3.3 Investigate the way in which water is transported within plants PL3.4 Explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	Observing changes over a period of time, Noticing patterns, differences, similarities or changes Finding things out using secondary sources of information. Setting up simple practical enquiries, Make systematic and careful observations and take accurate measurements Recording findings using simple scientific language, drawings, labelled diagrams, bar charts and tables Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Using results to draw simple conclusions, make predictions for new values, suggest improvements, and raise further questions	growing conditions for a plant in the classroom, plant and grow observing the whole life cycle of the plant Create a vegetable plot and a rota to manage it – think about the location!	Art - observation drawings of plants and flowers PSHE-care for the environment
3f **Summer**		Chemistry	**States of matter – The water cycle**			
Year 4						
4a **Autumn**	**Key Knowledge:** Organisms require a supply of energy and materials for which they are often dependent on or in	Biology	**Animals, including humans** **AH4.1** Describe the simple functions of the basic parts of the digestive system in humans **AH4.2** Identify the different types of teeth in humans and their simple function **AH4.3** Construct and interpret a variety of food chains, identifying producers, predators and prey	***Answer scientific questions using different types of scientific enquiry,*** *including* Observing changes over a period of time, Noticing patterns, differences, similarities or changes Finding things out using secondary sources of information.	Create a balanced diet including all the key nutrition they need to grow and be healthy	Links to: PSHE- healthy eating Brushing our teeth

	competition with other organisms **Key Skills:** Finding things out using secondary sources of information. Gather, record and present data in a variety of ways to help in answer questions using simple scientific language			Gather, record and present data in a variety of ways to help in answer questions using simple scientific language, drawings, labelled diagrams, bar charts and tables Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions		
4b **Autumn**	**Key Knowledge:** All material in the universe is made of very small particles. **Key Skills:** Setting up simple practical enquiries, Make systematic and careful observations tables	Chemistry	**States of matter** EM4.1 Compare and group materials together, according to whether they are solids, liquids or gases EM4.2 Observe that some materials change state when they are heated or cooled, and measure the temperature at which this happens in degrees Celsius EM4.3 Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature	***Answer scientific questions using different types of scientific enquiry,*** *including* Observing changes over a period of time, Noticing patterns, differences, similarities or changes Finding things out using secondary sources of information. Setting up simple practical enquiries, Make systematic and careful observations Recording findings using simple scientific language, drawings, labelled diagrams, bar charts and tables Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	**To identify gasses liquids and solids in the home and describe where we would see evidence of evaporation and condensation**	Links to: DT – create a steam engine Food technology

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4c **Spring**	**Key Knowledge:** The diversity of organisms living and extinct, is the result of evolution **Key Skills:** Identify, group and classify things according to observable properties Noticing patterns, differences, similarities or changes	Biology	**Living things and their habitats** **ALT4.1** Recognise that living things can be grouped in a variety of ways **ALT4.2** Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment **ALT4.3** Recognise that environments can change and that this can sometimes pose dangers to living things	***Answer scientific questions using different types of scientific enquiry,*** *including* Observing changes over a period of time, Noticing patterns, differences, similarities or changes Identify, group and classify things according to observable properties Finding things out using secondary sources of information. Gather, record and present data in a variety of ways to help in answer questions using simple scientific language, drawings, labelled diagrams, bar charts and tables Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	Create an identification key for garden birds using the conventions of classification (set up a bird table outside the classroom or a feeder on the window and see which birds they can identify)	Links to: Caring for the environment
4d **Summer**	**Key Knowledge:** The total amount of energy in the universe is always the same but the energy can be transformed when things change or are made to happen. **Key Skills:**	Physics	**Sound** SND4.1 Identify how sounds are made, associating some of them with something vibrating SND4.2 Find patterns between the pitch of a sound and features of the object that produced it SND4.3 Find patterns between the volume of a sound and the strength of the vibrations that produced it SND 4.4 Recognise that sounds get fainter as the distance from the sound source increases	***Answer scientific questions using different types of scientific enquiry,*** *including* Noticing patterns, differences, similarities or changes Finding things out using secondary sources of information. Setting up simple practical enquiries, Make systematic and careful observations	Design and make an instrument and explain the reasons for your choices and explain how it makes its sound and how you can change the sound	Links to: Music – how instruments make sound and how the pitch and notes are changed

	Setting up simple practical enquiries, Make systematic and careful observations			Recording findings using simple scientific language, drawings, labelled diagrams, bar charts and tables Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions		
	https://www.bbc.co.uk/bitesize/topics/zgffr82					
4e **Summer**	**Key Knowledge:** The total amount of energy in the universe is always the same but the energy can be transformed when things change or are made to happen. **Key Skills:** Finding things out using secondary sources of information. Setting up simple practical enquiries,	Physics	**Electricity** ELEC4.1 Identify common appliances that run on electricity ELEC4.2 Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers ELEC4.3 Identify whether or not a lamp will light in simple series circuit based on whether or not the lamp is part of a complete loop with battery ELEC4.4 Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights is simple series circuit ELEC4.5 Recognise some common conductors and insulators and associate metal with being good conductors	***Answer scientific questions using different types of scientific enquiry,*** *including* Finding things out using secondary sources of information. Setting up simple practical enquiries, Make systematic and careful observations Recording findings using simple scientific language, drawings, labelled diagrams, bar charts and tables Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Using results to draw simple conclusions, make predictions, suggest improvements, and raise further questions	Carry out a survey of the school to identify all the things that use electricity Debate how we could save electricity in school to inform a poster campaign “Switch off to save the planet”	Links to: History – how the invention of electricity transformed people homes