Science overview for the Primary Department Key Stage 1 and Key Stage 2

Key Stage 1 and 2

Science

We want our pupils to develop a curiosity and knowledge about the world they live in and to learn skills that will help them with employment and in living fulfilling lives. We follow a Stage not Age approach in Science.
Where we can, we adapt the curriculum topics to ensure maximum accessibility and opportunities for 'first-hand' learning for our students with VI.

Science topics are differentiated to meet the individual learning needs and are taught sequentially, building on previous learning and ensuring concepts are embedded, with time for experiential and tactile learning.

	Autumn Term 1	**Spring Term 1**	**Summer Term 1**
Key Stage 1	Plants – identify and name Seasonal Changes	Animals –identify and name Seasonal Changes	Everyday materials – identify and name, properties, compare and group. Seasonal changes
Key Stage 2: Lower Juniors	Rocks and fossils, Materials	Sound and Electricity	All living things – classifying Light and shadows
Key Stage 2: Upper Juniors	Living things and us	Life cycle of animals, changes and food chains	States of Matter
	Autumn Term 2	**Spring Term 2**	**Summer Term 2**
Key Stage 1	Plants- seeds and bulbs Use of Everyday materials – uses / changing shape	Living things and their habitats	Animals- offspring, basic needs, exercise, food, hygiene
Key Stage 2: Lower Juniors	Forces Magnets	Plants Skeletons	Teeth and Eating The digestive system
Key Stage 2: Upper Juniors	Forces and Gravity	Electricity	Sun, light and shadows Electricity, conductors, insulators, switches.

Key Stage 1

What are we learning?	What knowledge, understanding and skills will we gain?	What impact will our learning have?	What do the adaptations/resources look like for VI/additional needs?
Key skills in working scientifically	• Can gather and record data. • Make relevant observations - e.g. Can communicate the most waterproof material. • Ask simple questions when prompted. • Recognise findings - accurately say what they have found out.	ALL - when prompted can collect data. When prompted can examine objects. Can understand that a question can be answered by testing. Identify and group outcomes from an enquiry. MOST - can collect data e.g. to compare and contrast plants. Examine objects to note key features e.g observe plants that they have planted. With prompting can ask simple questions that can be tested e.g. plants growing on their habitat. With prompting identify key findings from an enquiry. SOME - can collect data that is relevant to the answering of questions. Examines with care and detail. Asks simple questions that can be tested. Identifies key findings from an enquiry e.g. how a plant has changed over time.	Tactile resources for the experiments Real life objects Variety of ways to record suitable for the child's needs (German film/writing slope/CCTV, discussion etc)

Plants 1	• **To examine real plants. Use vocabulary of the different parts of a plant.** • **Name all of the parts of a plant. Create a plant using the different parts**	**ALL** **identify and name different parts of a flowering plant - root / stem/trunk / leaves and flowers.** **MOST** **Describe what each part of flowering plant does.** **SOME** **Suggest why parts may vary in size and shape from one species of flowering plant to another (how it is pollinated /habitat/speed dispersal)**.	**Provide a range of real plants for children to handle and explore.** **Straws to show how roots suck up water.** **The job of a leaf is to make food. Children will take part in cooking to show that the job of leaves is to make food.** **Experiment with different colours and smells to see which ones the bees/birds like the most.** **Name all of the parts of a plant. Broccoli for the flower, celery stem, carrot roots, spinach leaves, fruits.**

Seasonal Changes 1 AUTUMN and WINTER	• To understand what is a season, name them. • To name key facts re Autumn. • To name key facts about Winter. • To know day, night, month, seasonal change & year are caused by the position and movement of the Earth • Observe and describe weather associated with the seasons and how day length varies.	**ALL** Recognise that there are seasonal changes. **MOST** Describe seasonal changes. **SOME** Recognise changes within seasons as well as between seasons. **ALL** Recognise that day length alters in different seasons. **MOST** Relate weather patterns and day length to seasons. **SOME** Make and test predictions relating to changing day length and weather patterns.	Create a tactile calendar to split the months into a season i.e. hot for summer, ice for winter etc Autumn walk – feel the fallen leaves, bare branches, colours etc Use of suitable clothes for the various seasons. Ice play – to experience the cold and frozen state. Fake snow play/snow dough. Explore winter clothes.
Animals-Identify and Name	• To identify and name basic external body parts. • Find body parts on themselves and can name body parts • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. • Compare key features of familiar and unfamiliar animals. • • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).	**ALL** Describe each of the human senses. **MOST** Relate each of the human sense to organs (ears - hearing) **SOME** Suggest how the sense are used in an activity such as eating. **ALL** Identify key features of one or two common animals. **MOST** Identify key features of a range (up to 10) common animals. **SOME**	Own bodies Dolls Real life animals Model animals

	• **Identify and name a variety of common animals that are carnivores, herbivores and omnivores.** • **Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.**	**ALL** **Recognise the dietary differences between carnivores, herbivores and omnivores.** **MOST** **Identify and group a range of familiar animals (C/H/O) using physical features.** **SOME** **Suggest whether an unfamiliar animal might be C/H/O?** **ALL** **Identify and name a limited range of animals (5-6 animals)** **MOST** **Name a variety of approx. 10 common animals, and which vertebrate group they belong to.** **SOME** **Identify and name common features of the main groups of vertebrates.**	
Seasonal Changes 2 - SPRING	• **Know that day, night, month, seasonal change & year are caused by the position and movement of the Earth Observe changes across the four seasons.** • **Name the key facts about spring.**	**ALL** **Recognise that there are seasonal changes.** **MOST** **Describe seasonal changes.** **SOME** **Recognise changes within seasons as well as between seasons.**	**Spring walk – to experience flowers growing and leaves on trees** **Flying kites (wind)** **Farm visit to see baby animals** **Experience April showers – real or created**

	• **To name the different seasons.**		
Use of everyday materials 1 **Identify and name, properties, compare and group.**	• **Identify a range of common materials and knows about some of their properties.** • **Explore what common known objects are made of** • **Sort materials using simple criteria and communicates observations of materials in terms of properties - it is rough / smooth / hard / soft / warm / cold** • **Distinguish between an object and the material from which it is made.** • **Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock.** • **Describe the simple physical properties of a variety of everyday materials.** • **Compare and group together a variety of everyday materials on the basis of their simple physical properties**.	**ALL** **Identify the material from which an object has been made.** **MOST** **Correctly identify both object and material.** **SOME** **Compare the same object made from different materials in terms of its effectiveness.** **ALL** **Identify and name a limited range of 5-6 different materials.** **MOST** **Identify and name a range of 5-6 different materials.** **SOME** **Identify typical uses of a range of materials.** **ALL** **Recognise that a material has properties.** **MOST** **Describe a range of properties of a variety of materials.**	**Range of materials – plastics, metals, glass, wood, fabric** **Material hunt** **Label materials that can be found in the school playground** **Material sorting** **Identify materials of common objects.**

		SOME **Compare the physical properties of different everyday materials.** **ALL** **Compare and contrast two everyday materials.** **MOST** **Classify a variety of materials into groups based on physical properties.** **SOME** **Use simple physical properties to suggest classification of materials.**	
Seasonal Changes 3	• **What is a season?** • **Name the different seasons.** • **Explain how and when they change.** • **Name key facts about Summer.**	**ALL** **Recognise that there are seasonal changes.** **MOST** **Describe seasonal changes.** **SOME** **Recognise changes within seasons as well as between seasons.**	**Create a classroom beach** **Summer clothes** **Experience heat** **Make a sun**

Plants 2 **Seeds and Bulbs**	• **Identify and describe the basic structure of a variety of common flowering plants, including trees.**	**ALL** **Identify and describe the basic structure of a common flowing plant. MOST** **Name parts of a range of flowering plants.** **SOME** **Identify and notice similarities in the structure of various local plants.**	**Real plants** **Outdoor visits to experience real plants and trees** **Visit to a garden centre**
Use of everyday materials 2	• **Describe the simple physical properties of a variety of everyday materials.** • **Compare and group together a variety of everyday materials on the basis of their simple physical properties.**	**ALL** **Recognise that a material has properties.** **MOST** **Describe a range of properties of a variety of materials.** **SOME** **Compare the physical properties of different everyday materials.** **ALL** **Compare and contrast two everyday materials**. **MOST**	**Range of materials.** **Experiments to show change of shape and suitability.** **Ice melting salt, muffling sound using materials, solids that dissolve in water**

		Classify a variety of materials into groups based on physical properties. **SOME** **Use simple physical properties to suggest classification of materials**.	
Living things and their habitats	• **Identify living and non-living things…. sort and classify** • **Explore and compare the differences between things that are living, dead, and things that have never been alive.**	**ALL** **Sort items into 'once living' and 'never lived'.** **MOST** **Compare and contrast a collection of items, sorting into categories: living / dead / and never been alive.** **SOME** **Research further examples to add to the categories 'living' / 'dead' / 'never been alive' (paper oil etc**)	**Real objects; animals, plants, man -made objects etc.** **Magnifying glasses.** **Visits.**

Animals 2 **- offspring, basic needs, exercise, food, hygiene**	• **Describe the basic needs of animals, including humans, for survival (water, food and air).** • **Know that animals, including humans, have offspring which grow into adults.** • **Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.**	**ALL** **Identify the basic needs for survival for animals (Water food and air).** **MOST** **Identify human's basic biological needs.** **SOME** **Suggest how the basic needs of different animal's influences their choice of habitat.** **ALL** **Recognise that all animals including humans have offspring.** **MOST** **Describe the relationships between adult animals and their offspring (caring period).** **SOME** **Compare and contrast adults and their offspring for different animals (Monkey Puzzle Julia Donaldson)** **ALL** **Recognise the importance of diet exercise and hygiene.** **MOST** **Describe the importance of a healthy diet and exercise.** **SOME** **Suggest the effects of poor health and hygiene.**	**Real animals, baby humans.** **Visit to a farm to see young animals.** **Different types of food.** **Exercises.**

Lower Juniors

Key Skills in working scientifically	• To plan simple investigations. • To carry out investigations. • To make observations and record results. • To draw conclusions from results.	**ALL** Can carry out simple investigations and communicate findings in a variety of ways. **MOST** Can carry out investigations, gather and record data. Use their observations to answer simple questions. **SOME** Make predictions. Suggest the best way to record findings. Discuss their observations and use to ask simple questions. Suggest ways of making a test fair.	Tactile resources for the experiments Variety of ways to record suitable for the child's needs (German film/writing slope/CCTV etc)
Rocks and Fossils	• Understand that rocks are used for a variety of different purposes • Observe and compare rocks • Note similarities and differences • Understand what the term permeability means • To test rocks to see how permeable they are and how hard they are • Understand that different rocks have different purposes	**ALL** Identify that rocks vary in terms of appearance and physical properties **MOST** Examine and test rocks grouping them according to results.	Variety of rocks to handle of different shapes and sizes Tactile sorting diagrams – Zychem paper Museum trip Real fossils to handle and observe

		SOME **Suggest uses for different types of rocks based on their properties. Use geographical vocabulary to describe various rocks.**	**Hoops for sorting**
Materials	• **Recognise a range of common materials** • **Compare and group objects based on their properties.** • **Collect information from around school of the materials used for certain objects.** • **Test a variety of materials for certain properties – waterproof, transparent, flexible, strong, absorbent, stretchiness**	**ALL** **Identify the material that an object is made from. Name 5 – 6 different materials. Recognise that a material has properties.** **MOST** **Distinguish between an object and the material from which it is made. Describe and sort a variety of materials into groups based on their properties.** **SOME** **Identify typical uses of a range of materials. Use simple physical properties to suggest classification. Compare the physical properties of everyday materials.**	**Range of objects made from different materials.** **Metal pans** **Wooden spoons** **Material items of clothing** **Tactile data collecting chart** **Cubes in sticks**

Sound and Electricity	• **To identify common appliances that use electricity.** • **Describe the dangers associated with electricity.** • **Construct and make a simple circuit.** • **Recognise that a switch opens and closes a circuit.** • **Identify conductors and non-conductors.** • **Recognise static electricity.**	**ALL** **Identify uses of electricity.** **MOST** **To be able to construct a simple circuit** **SOME** **Construct a circuit with a switch and explain what is happening.**	**Access to everyday objects to handle** **Television** **Kettle** **Toaster** **Circuits – bulbs, wires. Clips, buzzer, switches** **List things in the home which use electricity** **Balloons**
All living things – Classifying animals	• **Identify and name a variety of common animals.** • **Group animals into birds, fish, amphibians, reptiles, mammals and invertebrates.** • **Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).**	**ALL** **Identify and name 5 animals** **SOME** **Name approximately 10 animals and describe what group they belong to.** **MOST** **Identify and name common features of familiar and unfamiliar animals**	**Model animals** **Habitat boxes** **Make clay animals** **Visit to Dudley Zoo**

Lights and Shadows	• **Recognise that they need light in order to see things and that dark is the absence of light** • **Notice that light is reflected from surfaces** • **Recognise that light from the sun can be dangerous and that there are ways to protect their eyes** • **Recognise that shadows are formed when the light from a light source is blocked by a solid object** • **Find patterns in the way that the size of shadows change**	**ALL** **Will know at least 2 light sources** **Will know dark is the absence of light** **Will know shadows are formed when the sun is blocked out.** **Will be able to explain what shade feels like** **Will know that looking directly at the sun is dangerous** **MOST** **Will be able to use transparent and opaque to describe materials** **SOME** **Will observe how the shadow changes.**	**Torches** **Selection of different lights** **Light boxes** **Light sensors for blind pupils to detect light** **Shadow puppets** **Screen** **Bulbs** **Selection of different objects** **Sunglasses**

Forces and magnets	• **To recognise and explain pushes and pulls.** • **Compare how things move on different surfaces.** • **Observe how magnets attract or repel each other.** • **Observe how magnets attract or repel different materials.** • **Describe magnets as having 2 poles.**	**ALL** **Recognise that things may move or not move on different surfaces.** **MOST** **Compare how objects move on different surfaces.** **SOME** **Suggest why objects move differently on different surfaces.**	**Range of magnets of different sizes** **Magnetic hunt around school** **Everyday objects of various materials to test and sort according to if they attract or repel.**
Plants	• **Understand why plants are important and how they are affected by environmental issues.** • **Identify plants in the local environment.** • **Label the different parts of plants.** • **Understand the purpose of the flower, roots, stems and leaves.** • **Investigate to establish that plants need light, soil & water to survive.**	**ALL** **Identify and name 5-6 common plants. Name the different parts of a flowering plant. Identify that seeds and bulbs grow into plants. Identify living and non-living things.** **MOST** **Identify and name a range of common plants including deciduous and evergreen. Explain the job of the leaves, flower and roots.** **SOME** **Explain the process of pollination and seed dispersal.**	**Tactile resources** **Bean diary – record growth** **Access to investigate the outside environment.** **Range of parts of plants that we eat.** **Celery, cauliflower, potatoes** **Recipes using different fruits and vegetables.** **Scented plants including herbs** **Visit to the Garden Centre** **Visit to Elford Gardens**

			Visit to the supermarket to shop for vegetables.
Skeletons	• **Learn the names of bones of the skeleton.** • **Understand the purpose of the skeleton.** • **Know what muscles are and why we have them.** • **Identify animal skeletons.** • **Know the difference between vertebrates and invertebrates.**	**ALL** **Recognise that humans and some other animals have skeletons.** **Explain the purpose of a skeleton.** **MOST** **Identify a range of animals and recognise and describe their skeletons. Understand the job of muscles.** **SOME** **Name and describe a range of vertebrates and invertebrates.**	**Large human skeleton model** **Range of bones and animal skeletons to handle** **Funny bones story** **Trip to Nature Centre to handle skeletons of different birds.** **Skeleton movable models**

Teeth and Eating	• **Name different types of teeth.** • **Understand the job of different types of teeth.** • **Understand the importance of cleaning our teeth.** • **Investigate the effect of sugar on teeth.** • **Understand what makes up a healthy diet.**	**ALL** **Explain the importance of cleaning our teeth. Recognise that we have different types of teeth. Understand that some foods are healthy while others aren't.** **MOST** **Describe the effect of sugar on teeth. Explain the job of different types of teeth. Name a range of healthy and unhealthy foods.** **SOME** **Name the different types of teeth and their functions. Explain why a varied diet is important. Group foods into different food groups.**	**Large models of teeth** **Experiments with egg shells** **Visit to supermarket to find healthy/unhealthy foods** **Sorting Healthy /unhealthy foods** **'Eat well' plate** **Healthy diets** **Making healthy breakfast etc**
The digestive system	• **Identify that animals, including humans, need the right types and amount of nutrition, and they get nutrition from what they eat.** • **Describe the purpose of the digestive system.** • **Name different organs in the digestive system.**	**ALL** **Describe the purpose of the digestive system.** **MOST** **Identify what each of the organs do in the digestive system.** **SOME** **Explain why the different parts of the digestive system are necessary.**	**Tactile model of the organs**

Upper Juniors

What are we learning?	What knowledge, understanding and skills will we gain?	What impact will our learning have?	What do the adaptations/resources look like for VI/additional needs?
Key skills in working scientifically	• Planning investigations by asking questions • Carry out simple tests • Gather data and observe their findings • Record findings in differed ways	All – complete an experiment to find out the answer to a question, with adult support MOST – complete an experiment with little adult prompting SOME – complete an experiment independently	• Tactile resources for the experiments • Variety of ways to record suitable for the child's needs (German film/writing slope/CCTV etc)
Living Things Classification	• Grouping living things in different ways (classifying plants and animals) • Making and using classification keys to group and identify living things • Investigating living things in the local/wider environment • Describing and giving reasons for classifications	ALL – name 2 or more of the broad groups into which living things are classified, e.g. mammals. MOST – group living things by looking at their similarities and differences e.g. a cat is a mammal because it is warm blooded and gives birth to live young SOME – devise their own classification key to use	• Tactile animals and plants • Real life living things where possible (leaves/sticks etc) • Wikki stix • Venn diagram circles
The Circulatory System	• The circulatory system • The function of the heart • Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function	ALL – know where the heart is located in our body MOST – explain what the heart does (pumps blood/beats) SOME – use key vocabulary to discuss what blood is made up of and	• Model of the heart • Stethoscopes • Food items to make blood – • food colouring (yellow for plasma), cheerios (with red food colouring for red blood cells), large white marshmallows (white blood

		what is does, describe how the body functions when changes are made to diet, exercise is carried out and if drugs are taken	**cells) and small purple marshmallows (platelets**
Lifecycle of animals	• **The differences in the life cycles of a mammal, an amphibian, an insect and a bird** • **The life process of reproduction in some plants and animals** • **Describe the life process of reproduction in some plants and animals** • **Construct and interpret a variety of food chains, identifying producers, predators and prey**	**ALL – know that animals change as they grow know animals must eat to survive** **MOST – name 2 stages in the life cycle of an animal/a plant name predators and prey** **SOME – give more detail about the life cycle of several animals and plants, show an understanding of producers and construct a food chain**	• **Tactile life cycle models (e.g. butterfly and frog)** • **Nature story books including cd** • **Tactile collage material to make diagrams** • **Real life chicks** • **Wikki stix** • **String (to connect animals in food chain)** • **Tactile animal and plants for food chains**
Changes and evolution	• **The changes as humans develop to old age** • **Recognise that living things produce offspring of the same kind** • **Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution**	**ALL – know that babies grow into adults.** **Know that adults grow older.** **MOST – talk about how offspring are similar to their parents for at least one kind of animal** **SOME – know why some animals evolve to have certain features (e.g. giraffes with long necks)**	• **Model animals** • **Real life plants** • **Tactile diagrams / enlarged photos** • **artefacts for different stages in a human's life**
States of Matter (mixtures, solutions, reversible etc)	• **Compare and group together everyday materials on the basis of their properties** • **Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution** • **Use knowledge of solids, liquids and gases to decide how mixtures might be separated,**	**ALL – identify examples of liquids/solids/gases.** **MOST – will know that some materials dissolve and that some**	• **Experiments using practical equipment (measuring jugs, talking scales, funnels, spoons)** • **Filters** • **Sieves**

	including through filtering, sieving and evaporating • **Demonstrate that dissolving, mixing and changes of state are reversible changes** • **Explain that some changes result in the formation of new materials and that this kind of change is not usually reversible**	**materials change when heated or cooled.** **SOME – say which method could be used to separate different materials and talk about which changes are reversible and which are not**	• **Example solids, liquids and gases** • **Cheerios** • **Scents** • **Food colouring**
Forces and gravity	• **Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object** • **Identify the effects of air resistance, water resistance and friction, that act between moving surfaces** • **Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect**	**ALL – know that items fall towards the ground when dropped because of the force of gravity.** **MOST – name at least one other force, describing what it does in a real-life situation** **SOME – name several forces, talking about them in real-life situations**	• **Variety of objects of different weights** • **An apple** • **Variety of bags to make parachutes** • **Dyson fan** • **Ramp, various ramp surfaces and cars** • **Oil/washing up liquid** • **Levers, pulleys and gears** • **Sink or float activity set** • **Ramp activity set**
Sun, light and shadows (Earth and Moon)	• **Recognise that light appears to travel in straight lines** • **Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye** • **Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes** • **Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them**	**ALL – name a light source, talk about day and night, and understand why shadows are formed.** **MOST – know that light travels in straight lines and can be blocked, name some planets in the solar system; know that we see with our eyes** **SOME –to be able to explain that we see things because light travels from light sources to our eyes or from light sources to objects to our eyes** **To be able to discuss the movements/rotations of the moon**	• **Torches** • **Model of the eye** • **Mirrors** • **Models of the planets** • **Paper mache** • **Dark boxes** • **Large ball**

	• **Describe the movement of the Earth, and other planets, relative to the Sun in the solar system** • **Describe the movement of the Moon relative to the Earth** • **Describe the Sun, Earth and Moon as approximately spherical bodies** • **Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky**	**and Earth and know that they are spheres**	
Electricity	• **Making circuits using lamps, buzzers and on/off switches** • **Knowing the components of a circuit and their functions** • **Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in a circuit** • **Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches** • **Use recognised symbols when representing a simple circuit in a diagram** • **Compare and group together everyday materials on the basis of their properties**	ALL – name at least 2 components in a circuit and make a circuit with adult support MOST – make a functioning circuit with growing independence and name all components in a circuit SOME – make the buzzer louder/bulb brighter independently and explain why, understanding the symbols for the components	• **Circuit components (battery cells, lamps, buzzers, wires)** • **Tactile symbols for components** • **Wikki stix** • **Venn diagram circles**