**Year B – 2024-25 – Science overview**

**FS2 (Reception)**

This document shows how the Development Matters statements, that relate to the working scientifically skills in the National Curriculum in England: science programmes of study, build across Nursery and Reception and are linked to the working scientifically statements for Key Stage 1.

**Mapping the PLAN EYFS working scientifically skills definitions to their Key Stage 1 and 2 equivalents**

The table below shows how the PLAN EYFS working scientifically skills definitions, which are based on the relevant statements in Development Matters, map to the equivalent PLAN definitions for Key Stage 1 & 2.

* Show curiosity and ask questions
* Make observations using their senses and simple equipment
* Make direct comparisons
* Identify, sort and group
* Record their observations by drawing, taking photographs, using sorting rings or boxes and, in Reception, on simple tick sheets
* Talk about what they have done and found out
* Use their observations to help them to answer their questions

These are excellent documents that will help with ideas. I use the equivalent versions for KS2.

[**O:\CURRICULUM 2022\Subject Leads\Science - Subject Leader Folder\Planning\Year 0 (EYFS) - Progression of skill and Working Scientifically\PLAN EYFS Progression in Working Scientifically Skills FV.pdf**](file:///O%3A%5CCURRICULUM%202022%5CSubject%20Leads%5CScience%20-%20Subject%20Leader%20Folder%5CPlanning%5CYear%200%20%28EYFS%29%20-%20Progression%20of%20skill%20and%20Working%20Scientifically%5CPLAN%20EYFS%20Progression%20in%20Working%20Scientifically%20Skills%20FV.pdf)

[**..\Subject Leads\Science - Subject Leader Folder\Planning\Year 0 (EYFS) - Progression of skill and Working Scientifically\1 Science planning - model EYFS.pdf**](file:///%5C%5Cmilldata%5Call_staff%5CCURRICULUM%202022%5CSubject%20Leads%5CScience%20-%20Subject%20Leader%20Folder%5CPlanning%5CYear%200%20%28EYFS%29%20-%20Progression%20of%20skill%20and%20Working%20Scientifically%5C1%20Science%20planning%20-%20model%20EYFS.pdf)

[**..\Subject Leads\Science - Subject Leader Folder\Planning\Year 0 (EYFS) - Progression of skill and Working Scientifically\PLAN Summary of Science in EYFS.pdf**](file:///%5C%5Cmilldata%5Call_staff%5CCURRICULUM%202022%5CSubject%20Leads%5CScience%20-%20Subject%20Leader%20Folder%5CPlanning%5CYear%200%20%28EYFS%29%20-%20Progression%20of%20skill%20and%20Working%20Scientifically%5CPLAN%20Summary%20of%20Science%20in%20EYFS.pdf)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Term 1 | Term 2 | Term 3 | Term 4 | Term 5 | Term 6 |
| FS2 | Understand, observe and comment on the seasonal changes of autumn. Explore and ask questions about the natural world around them.*Activities:* | Understand and use the terms ‘same’ and ‘different’. Know that plants grow from a seed and that they need light, air and water to grown.Understand the basic needs of animas. | Talk about features of the environment they are in and learn about cold environments.Experiment and understand about the process of freezing and melting/thawing.Understand, observe and comment on the seasonal changes of winter. | Children will make observations about plants discussing similarities and differences.Understand, observe and comment on the seasonal changes of spring.Name, identify and sort healthy/unhealthy foods.Name, identify and group a range of fruits and vegetables.Talk about the life cycle of plants and animals and what they need to survive (butterflies). | Children will make observations about places discussing similarities and differences.Experiment and make observations linked to floating and sinking and changing from a liquid to solid – linked to The Gingerbread Man | Know some important processes including states of matter.Make observations about animals discussing similarities and differences.Understand, observe and comment on the seasonal changes of summer. |

**Year 1 - NB – seasonal changes in each term/ongoing.**

**Activities could be completed twice (similar activity, not identical) to reinforce knowledge and/or complete more detailed recording or expand ideas on the follow second lesson.**

**If you lack enough content in a particular term, have one term as a recap term where the learning is revisited and explored at a deeper level.**

**(From the National Curriculum) During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:**

* **asking simple questions and recognising that they can be answered in different ways**
* **observing closely, using simple equipment**
* **performing simple tests**
* **identifying and classifying**
* **using their observations and ideas to suggest answers to questions**
* **gathering and recording data to help in answering questions.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Everyday materials*****Identifying and classifying*** | **Everyday materials*****working scientifically*** | **Animals including humans 1/2** | **Animals including humans 2/2** | **Plants – naming** | **Plants – structures and scientifically** |
| National Curriculum Objectives |
| **• Observe changes across the four seasons.****• Observe and describe weather associated with the seasons and how day length varies.**1-2 lessons - Autumn?• **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.***Activities (over both terms):*How do we choose the best material? Making something that needs to have specific qualities TWICE. Repeat activity (similar to Cold write / warm write). Can label a picture or diagram of an object made from different materials.Can describe the properties of different materialsClassify objects made of one material in different ways e.g. a group of objects made of metal. Classify in different ways one type of object made from a range of materials e.g. a collection of spoons made of different materials. Classify / group materials based on their properties. Test the properties of objects e.g. absorbency of cloths, strength of party hats made of different papers, stiffness of paper plates, waterproofness of shelters.Can sort objects and materials using a range of properties Can choose an appropriate method for testing an object for a particular property Can use their test evidence to answer the questions about properties e.g. “Which cloth is the most absorbent?”Comparative: Which materials are the most flexible / absorbent etc?Identify/classify: We need to choose a material to make an umbrella. Which materials are waterproof?Observe over time: What happens to shaving foam etc over time?Research: Which materials can be recycled?What are the things I use made from? | **• Observe changes across the four seasons.****• Observe and describe weather associated with the seasons and how day length varies** 1-2 lessons - Winter?Focus on vocabulary as there is a HUGE amount of descriptive language many chn do not know.• **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.***Activities (over both terms):*How do we choose the best material? Making something that needs to have specific qualities TWICE. Repeat activity (similar to Cold write / warm write). Can label a picture or diagram of an object made from different materials.Can describe the properties of different materialsClassify objects made of one material in different ways e.g. a group of objects made of metal. Classify in different ways one type of object made from a range of materials e.g. a collection of spoons made of different materials. Classify / group materials based on their properties. Test the properties of objects e.g. absorbency of cloths, strength of party hats made of different papers, stiffness of paper plates, waterproofness of shelters.Can sort objects and materials using a range of properties Can choose an appropriate method for testing an object for a particular property Can use their test evidence to answer the questions about properties e.g. “Which cloth is the most absorbent?” | **• Observe changes across the four seasons.****• Observe and describe weather associated with the seasons and how day length varies** 1-2 lessons - Spring?• **Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.**• **Identify and name a variety of common animals that are carnivores, herbivores and omnivores.****• Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).****• Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.***Activities (over both terms):*Can name a range of animals which includes animals from each of the vertebrate groupsCan describe the key features of these named animals• Can label key features on a picture/diagram• Can complete/write a What am I? riddle about an animal• Can describe what a range of animals eat• Can play and lead ‘Simon says’• Can follow instructions involving parts of the bodyCan label parts of the body on pictures and diagramsCan explore objects using different sensesPattern seeking: Do you get better at smelling as you get older?Comparative testing: Is our sense of smell better when we can’t see? | • **Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.****• Identify and name a variety of common animals that are carnivores, herbivores and omnivores.****• Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds** **and mammals, including pets).****• Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.***Activities (over both terms):*Can name a range of animals which includes animals from each of the vertebrate groupsCan describe the key features of these named animals• Can label key features on a picture/diagram• Can complete/write a What am I? riddle about an animal• Can describe what a range of animals eat• Can play and lead ‘Simon says’• Can follow instructions involving parts of the bodyCan label parts of the body on pictures and diagramsCan explore objects using different sensesPattern seeking: Do you get better at smelling as you get older?Comparative testing: Is our sense of smell better when we can’t see? | **• Observe changes across the four seasons.****• Observe and describe weather associated with the seasons and how day length varies.**1-2 lessons - Summer?**Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.***Activities (over both terms):*Can name trees and other plants that they seeregularly• Can describe some of the key features of thesetrees and plants e.g. the shape of the leaves,the colour of the flower/blossom• Can point out trees which lost their leaves andthose that kept them the whole year• Can point to and name the parts of a plant, recognising that they are not always the same e.g. leaves and stems may not be greenMake close observations of leaves, seeds, flowers etc.• Compare two leaves, seeds, flowers etc.• Classify leaves, seeds, flowers etc. using a range of characteristics.• Identify plants by matching them to named images.• Make observations of how plants change over a period of time.• When further afield, spot plants that are the same as those in the local area studied regularly,describing the key features that helped them.Can sort and group parts of plants using similarities and differences• Can use simple charts etc. to identify plants• Can collect information on features that changeduring the year• Can use photographs to talk about how plantschange over time | • **Identify and describe the basic structure of a variety of common flowering plants, including trees.***Activities (over both terms):*Can name trees and other plants that they seeregularly• Can describe some of the key features of thesetrees and plants e.g. the shape of the leaves,the colour of the flower/blossom• Can point out trees which lost their leaves andthose that kept them the whole year• Can point to and name the parts of a plant, recognising that they are not always the same e.g. leaves and stems may not be greenMake close observations of leaves, seeds, flowers etc.• Compare two leaves, seeds, flowers etc.• Classify leaves, seeds, flowers etc. using a range of characteristics.• Identify plants by matching them to named images.• Make observations of how plants change over a period of time.• When further afield, spot plants that are the same as those in the local area studied regularly,describing the key features that helped them.Can sort and group parts of plants using similarities and differences• Can use simple charts etc. to identify plants• Can collect information on features that changeduring the year• Can use photographs to talk about how plantschange over time |
| **Everyday materials*****Identifying and classifying*** | **Everyday materials*****working scientifically*** | **Animals including humans 1/2** | **Animals including humans 2/2** | **Plants – naming** | **Plants – structures and scientifically** |
| Sticky knowledgeThere are many different materials that have different describable and measurable properties.Materials that have similar properties are grouped into metals, rocks, fabrics, wood, plastic and ceramics (including glass).The properties of a material determine whether they are suitable for a purpose.Common misconceptionsSome children may think: • only fabrics are materials • only building materials are materials • only writing materials are materials • the word ‘rock’ describes an object rather than a material • ‘solid’ is another word for hard | Sticky knowledgeThere are many different materials that have different describable and measurable properties.Materials that have similar properties are grouped into metals, rocks, fabrics, wood, plastic and ceramics (including glass).The properties of a material determine whether they are suitable for a purpose.Common misconceptionsSome children may think: • only fabrics are materials • only building materials are materials • only writing materials are materials • the word ‘rock’ describes an object rather than a material • ‘solid’ is another word for hard | Sticky knowledgeThere are many different animals with different characteristicsAnimals have senses to help individuals survive. When animals sense things they are able to respond.Animals need food to survive.Animals need a variety of food to help them grow, repair their bodies, be active and stay healthyCommon misconceptionsSome children may think:• only four-legged mammals, such as pets, are animals• humans are not animals• insects are not animals• all ‘bugs’ or ‘creepy crawlies’, such as spiders, are part of the insect group• amphibians and reptiles are the same. | Sticky knowledgeThere are many different animals with different characteristicsAnimals have senses to help individuals survive. When animals sense things they are able to respond.Animals need food to survive.Animals need a variety of food to help them grow, repair their bodies, be active and stay healthyCommon misconceptionsSome children may think:• only four-legged mammals, such as pets, are animals• humans are not animals• insects are not animals• all ‘bugs’ or ‘creepy crawlies’, such as spiders, are part of the insect group• amphibians and reptiles are the same. | Sticky knowledgeGrowing locally, there will be a vast array of plants which all have specific names. These can beidentified by looking at the key characteristics of the plant. Plants have common parts, but they vary between the different types of plants. Some trees keep their leaves all year while other trees drop theirleaves during autumn and grow them again during springCommon misconceptionsSome children may think:• plants are flowering plants grown in pots with coloured petals and leaves and a stem• trees are not plants• all leaves are green• all stems are green• a trunk is not a stem• blossom is not a flower | Sticky knowledgeGrowing locally, there will be a vast array of plants which all have specific names. These can beidentified by looking at the key characteristics of the plant. Plants have common parts, but they vary between the different types of plants. Some trees keep their leaves all year while other trees drop theirleaves during autumn and grow them again during springCommon misconceptionsSome children may think:• plants are flowering plants grown in pots with coloured petals and leaves and a stem• trees are not plants• all leaves are green• all stems are green• a trunk is not a stem• blossom is not a flower |

**Year 2**

**Activities could be completed twice (similar activity, not identical) to reinforce knowledge and/or complete more detailed recording or expand ideas on the follow second lesson.**

**(From the National Curriculum) During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:**

* **asking simple questions and recognising that they can be answered in different ways**
* **observing closely, using simple equipment**
* **performing simple tests**
* **identifying and classifying**
* **using their observations and ideas to suggest answers to questions**
* **gathering and recording data to help in answering questions.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Materials**  | **Living things and their habitats (Micro Habitats) (1/2)**  | **Animals including humans (1/2) (2/2)**  | **Exercise and Hygiene (part of Animals including humans) (2/2)**  | **Food chains (part of Living things and their habitats) (2/2)** | **Plants** |
| National Curriculum Objectives |
| **• Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.****• Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.***Activities:*• Whilst changing the shape of an object can describe the action used• Can use the words flexible and/or stretchy to describe materials that can be changed in shape and stiff and/or rigid for those that cannot• Can recognise that a material may come in different forms which have different properties• Can name an object, say what material it is made from, identify its properties and make a link between the properties and a particular use• Can label a picture or diagram of an object made from different materials• For a given object can identify what properties a suitable material needs to haveComparative: Which shapes make the strongest paper bridge? Which material would be best for the roof of the little pig’s house?Classify/identify: Which materials will float and which will sink? Which materials will let electricity go through them, and which will not? Which materials are shiny and which are dull?Obs over time: What will happen to our snowman /ice/ice cream?Pattern: How do materials change with heat? leave outside in sunshine /windowsill/radiator How does amount of water affect the strength of a kitchen towel?How do we choose the best material for \_\_\_? | **Explore and compare the differences between things that are living, dead, and things that have never been alive****• Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other****• Identify and name a variety of plants and animals in their habitats, including micro-habitats***Activities:*• Explore the outside environment regularly to find objects that are living, dead and have never lived.Can name a range of animals and plants that live in a habitat and micro-habitats that they have studied• Can talk about how the features of these animals and plants make them suitable to the habitat• Can talk about what the animals eat in a habitat and how the plants provide shelter for them• Observe animals and plants carefully, drawing and labelling diagrams.• Can classify/sort objects found in the local area into living, dead and never lived• Can give key features that mean the animal or plant is suited to its micro-habitat• Can explain in simple terms why an animal or plant is suited to a habitat e.g. the caterpillar cannot live under the soil like a worm as it needs fresh leaves to eat; the seaweed we found on the beach cannot live in our pond because it is not salty | **• Notice that animals, including humans, have offspring which grow into adults.****• Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).***Activities:*• Can describe how animals, including humans, haveoffspring which grow into adults, using the appropriatenames for the stages• Ask people questions and use secondary sources to find out about the life cycles of some animals.• Observe animals growing over a period of time e.g. chicks, caterpillars, a baby.• Ask questions of a parent about how they look after their baby.• Ask pet owners questions about how they look after their pet.• Can describe, including using diagrams, the life cycleof some animals, including humans, and their growth toadults e.g. by creating a life cycle book for a youngerchild• Can measure/observe how animals, including humans,grow.• Show what they know about looking after ababy/animal by creating a parenting/pet owners’ guide• Explain how development and health might be affected by differing conditions and needs being met/not met | **• Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.***Activities:*• Can state the importance for humans of exercise,eating the right amounts of different types of food, andhygiene• Can name foods in each section of the Eatwell Guide• Explore the effect of exercise on their bodies.• Classify food in a range of ways, including using the Eatwell Guide.Investigate washing hands, using glitter gel• Explain how development and health might be affected by differing conditions and needs being met/not met (repeated?) | **• Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food***Activities:*• Create simple food chains for a familiar local habitat from first-hand observation and research.• Create simple food chains from information given e.g. in picture books (Gruffalo etc.).• Using a food chain can explain what animals eatCan construct a food chain that starts with a plant and has the arrows pointing in the correct direction | **• Observe and describe how seeds and bulbs grow into mature plants.****• Find out and describe how plants need water, light and a suitable temperature to grow and stay health***Activities:*Can describe how plants that they have grown from seeds and bulbs have developed over time, identifying the different requirements of different plants• Can identify plants that grew well in different conditions• Make close observations (similarities / differences) of seeds and bulbs.• Classify seeds and bulbs.• Research and plan when and how to plant a range of seeds and bulbs.• Look after the plants as they grow – weeding, thinning, watering etc.• Make close observations and measurements of their plants growing from seeds and bulbs.• Make comparisons between plants as they grow.Comparative: Do cress seeds grow quicker inside or outside?Identify/classify: How can we identify the trees that we observed on our tree hunt?Patten: Do bigger seeds grow into bigger plants?Research: How does a cactus survive in a desert with no water? |
| **Materials**  | **Living things and their habitats (Micro Habitats) (1/2)**  | **Animals including humans (1/2) (2/2)**  | **Exercise and Hygiene (part of Animals including humans) (2/2)**  | **Food chains (part of Living things and their habitats) (2/2)** | **Plants** |
| Sticky knowledgeMaterials can be changed by physical force (twisting, bending, squashing and stretching)Common misconceptionsSome children may think:• only fabrics are materials• only building materials are materials• only writing materials are materials• the word rock describes an object rather than a material• solid is another word for hard. | Sticky knowledgeAnimals move in order to survive.Different animals move in different ways to help them survive.Exercise keeps animal’s bodies in goodcondition and increases survival chances.All animals eventually die.Animals reproduce new animals when theyreach maturity.Animals grow until maturity and then don’t growany larger.Common misconceptionsSome children may think:• an animal’s habitat is like its ‘home’• plants and seeds are not alive as they cannot be seen to move• fire is living | Sticky knowledgeThere are many different animals with different characteristicsAnimals have senses to help individuals survive. When animals sense things they are able to respond.Common misconceptionsSome children may think:• an animal’s habitat is like its ‘home’• all animals that live in the sea are fish• respiration is breathing• breathing is respiration | Sticky knowledgeAnimals need food to survive.Animals need a variety of food to help them grow, repair their bodies, be active and stay healthyCommon misconceptionsSome children may think:• only four-legged mammals, such as pets, are animals• humans are not animals• insects are not animals• all ‘bugs’ or ‘creepy crawlies’, such as spiders, are part of the insect group• amphibians and reptiles are the same. | Sticky knowledgeAnimals move in order to survive.Different animals move in different ways to help them survive.Exercise keeps animal’s bodies in goodcondition and increases survival chances.All animals eventually die.Animals reproduce new animals when theyreach maturity.Animals grow until maturity and then don’t growany larger.Common misconceptionsSome children may think:• arrows in a food chain mean ‘eats’ | Sticky knowledgePlants grow from seeds/bulbsPlants need light, water and warmth to growand surviveFlowers make seeds to make more plants(reproduce)Plants are importantWe need plants to survive (to clean air, to eat)We can eat different parts of the plants(leaves, stems, roots, seeds, fruit)Common misconceptionsSome children may think:• plants are not alive as they cannot be seen to move• seeds are not alive• all plants start out as seeds• seeds and bulbs need sunlight to germinate |

**Year 3/4**

**During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:**

* **asking relevant questions and using different types of scientific enquiries to answer them**
* **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, keys, 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**
* **identifying differences, similarities or changes related to simple scientific ideas and processes**
* **using straightforward scientific evidence to answer questions or to support their findings.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Animals including humans (Y3)** | **Living things and Habitats (Y4)** | **States of Matter** | **Electricity** | **Recap** | **Plants** |
| National Curriculum Objectives |
| **• Identify 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.****• Identify that humans and some other animals have skeletons and muscles for support, protection and movement.***Activities:*• Can name the nutrients found in food• Can state that to be healthy we need to eat the right types of food to give us the correct amount of these nutrients• Can name some bones that make up their skeleton, giving examples that support, help them move or provide protection• Can describe how muscles and joints help them to move• Can classify food into those that are high or low in particular nutrients• Can answer their questions about nutrients in food, based on their gathered evidence• Can talk about the nutrient content of their daily plan• Use their data to look for patterns (or lack of them) when answering their enquiry question• Can give similarities e.g. they all have joints to help the animal move, and differences between skeletonsPatterns: Can people with longer legs run faster? Can people with bigger hands catch a ball better? | **• Recognise that living things can be grouped in a variety of ways.****• Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.****• Recognise that environments can change and that this can sometimes pose dangers to living things.***Activities:*• Can name living things living in a range of habitats, giving the key features that helped them to identify them• Can give examples of how an environment may change both naturally and due to human impact• Can keep a careful record of living things found in different habitats throughout the year (diagrams, tally charts etc.)• Can use classification keys to identify unknown plants and animals• Can present their learning about changes to the environment in different ways e.g. campaign video, persuasive letter• Use classification keys to name unknown living things.• Classify living things found in different habitats based on their features.• Create a simple identification key based on observable features.• Use fieldwork to explore human impact on the local environment e.g. litter, tree planting.• Use secondary sources to find out about how environments may naturally change.• Use secondary sources to find out about human impact, both positive and negative, on environments. | **• Compare and group materials together, according to whether they are solids, liquids or gases.****• Observe 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).****• Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.***Activities:*• Can create a concept map, including arrows linking the key vocabulary• Can name properties of solids, liquids and gases• Can give everyday examples of melting and freezing• Can give everyday examples of evaporation and condensation• Can describe the water cycle• Can give reasons to justify why something is a solid liquid or gas• Can give examples of things that melt/freeze and how their melting points vary• From their observations, can give the melting points of some materials• Using their data, can explain what affects how quickly a solid melts• Can measure temperatures using a thermometer• Can explain why there is condensation on the inside the hot water cup but on the outside of the icy water cup• From their data, can explain how to speed up or slow down evaporation• Can present their learning about the water cycle in a range of ways e.g. diagrams, explanation text, story of a water droplet | **• Identify 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.****• Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery.****• Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.****• Recognise some common conductors and insulators, and associate metals with being good conductors.***Activities:*• Can name the components in a circuit• Can make electric circuits• Can control a circuit using a switch• Can name some metals that are conductors• Can name materials that are insulators• Can communicate structures of circuitsusing drawings which show how the components are connected• Use classification evidence to identify that metals are good conductors and non-metals are insulators• Can incorporate a switch into a circuit to turn it on and off• Can connect a range of different switches identifying the parts that are insulators and conductors• Can add a circuit with a switch to a DT project and can demonstrate how it works• Can give reasons for choice of materials for making different parts of a switch• Can describe how their switch works | **Take from existing subject knowledge.** | **• Identify and describe the functions of different parts of flowering plants: roots; stem/trunk; leaves; and flowers.****• Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they var****from plant to plant.****• Investigate the way in which water is transported within plants.****• Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.***Activities:*• Can explain the function of the parts of a flowering plant• Can describe the life cycle of flowering plants, including pollination, seedformation, seed dispersal, and germination• Can give different methods of pollination and seed dispersal, including examples• Observe what happens to plants over time when the leaves or roots areremoved.• Observe the effect of putting cut white carnations or celery in colouredwater.• Can explain observations made during investigations• Can look at the features of seeds to decide on their method of dispersal• Can draw and label a diagram of their created flowering plant to show itsparts, their role and the method of pollination and seed dispersal• Spot flowers, seeds, berries and fruits outside throughout the year.• Observe flowers carefully to identify the pollen.Research: Why do plants have flowers? |
| **Animals including humans (y3)** | **Living things and Habitats** | **States of Matter** | **Electricity** | **Recap** | **Plants** |
| Sticky knowledgeDifferent animals are adapted to eat different foods.Many animals have skeletons to support their bodies and protect vital organs.Muscles are connected to bones and move them when they contract.Movable joints connect bones.Common misconceptionsSome children may think:• certain whole food groups like fats are ‘bad’ for you• certain specific foods, like cheese are also ‘bad’ for you• diet and fruit drinks are ‘good’ for you• snakes are similar to worms, so they must also be invertebrates• invertebrates have no form of skeleton. | Sticky knowledgeLiving things can be divided into groups based upon their characteristicsEnvironmental change affects different habitats differentlyDifferent organisms are affected differently by environmental changeDifferent food chains occur in different habitatsHuman activity significantly affects the environmentCommon misconceptionsSome children may think:• the death of one of the parts of a food chain or web has no or limited consequences on the rest of the chain• there is always plenty of food for wild animals• animals are only land-living creatures• animals and plants can adapt to their habitats, however they change• all changes to habitats are negative. | Sticky knowledgeThere are many different animals with different characteristicsAnimals have senses to help individuals survive. When animals sense things they are able to respond.Common misconceptionsSome children may think:• ‘solid’ is another word for hard or opaque• solids are hard and cannot break or change shape easily and are often in one piece• substances made of very small particles like sugar or sand cannot be solids• particles in liquids are further apart than in solids and they take up more space• when air is pumped into balloons, they become lighter• water in different forms – steam, water, ice – are all different substances• all liquids boil at the same temperature as water (100 degrees)• melting, as a change of state, is the same as dissolving• steam is visible water vapour (only the condensing water droplets can be seen)• clouds are made of water vapour or steam• the substance on windows etc. is condensation rather than water• the changing states of water (illustrated by the water cycle) are irreversible• evaporating or boiling water makes it vanish• evaporation is when the Sun sucks up the water, or when water is absorbed into a surface/material. | Sticky knowledgeA source of electricity (mains of battery) isneeded for electrical devices to work.Electricity sources push electricity round a circuit.More batteries will push the electricity round the circuit faster.Devices work harder when more electricitygoes through them.A complete circuit is needed for electricityto flow and devices to work.Some materials allow electricity to floweasily and these are called conductors.Materials that don’t allow electricity to flow easily are called insulators.Common misconceptionsSome children may think:• electricity flows to bulbs, not through them• electricity flows out of both ends of a battery• electricity works by simply coming out of one end of a battery into the component. |  | Sticky knowledgePlants are producers, they make their own food.Their leaves absorb sunlight and carbon dioxidePlants have roots, which provide support and draw water from the soilFlowering plants have specific adaptations which help it to carry out pollination, fertilisation and seed productionSeed dispersal improves a plants chances of successful reproductionSeeds/bulbs require the right conditions to germinate and grow.Seeds contain enough food for the plant’s initial growthCommon misconceptionsSome children may think:• plants eat food• food comes from the soil via the roots• flowers are merely decorative rather than a vital part of the life cycle in reproduction• plants only need sunlight to keep them warm• roots suck in water which is then sucked up the stem |

**Year 5/6**

**During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:**

* **planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary**
* **taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate**
* **recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs**
* **using test results to make predictions to set up further comparative and fair tests**
* **reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations**
* **identifying scientific evidence that has been used to support or refute ideas or arguments.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **TERM 1****Animals Including Humans (Y6)** | **TERM 5****Animals Including Humans (Y5)** | **TERM 4****Electricity** | **TERM 2****Light** | **TERM 3****Earth & Space** | **TERM 6****Living Things and Habitats (Y5)** |
| National Curriculum Objectives |
| **identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood****recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function****describe the ways in which nutrients and water are transported within animals, including humans.***Activities:*• Can draw a diagram of the circulatory system and label the parts and annotate it to show what the parts do• Produces a piece of writing that demonstrate the key knowledge e.g. explanation text, job description of the heart • Use the role play model to explain the main parts of the circulatory system and their role• Can use subject knowledge about the heart whilst writing conclusions for investigations• Can explain both the positive and negative effects of diet, exercise, drugs and lifestyle on the body• Present information e.g. in a health leaflet describing impact of drugs and lifestyle on the body• Carry out a range of pulse rate investigations:▪ fair test – effect of different activities on my pulse rate▪ pattern seeking – exploring which groups of people may have higher or lower resting pulse rates▪ observation over time - how long does it take my pulse rate to return to my resting pulse rate (recovery rate)▪ pattern seeking – exploring recovery rate for different groups of people.• Research the negative effects of drugs (e.g. tobacco) and the benefits of a healthy diet and regular exercise by asking an expert or using carefully selected secondary sources.Compare: How does the length of time we exercise for affect our heart rate?Can exercising regularly affect your lung capacity?Which type of exercise has the greatest effect on our heart rate?Classify: Which organs of the body make up the circulation system, and where are they found?Research: How have our ideas about fitness / health changed over time? | **describe the changes as humans develop to old age.***Activities:*• Can explain the changes that takes place in boys and girls during puberty• Can explain how a baby changes physically as it grows, and also what it is able to doCan present information about the changes occurring during puberty as an information leaflet for other Y5 children or answers to ‘problem page questions’Research: Why do people get grey/white hair when they get older? | **associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the 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.***Activities:*• Can make electric circuits and demonstrate how variation in the working of particular components, such as the brightness of bulbs, can be changed by increasing or decreasing the number of cells or using cells of different voltages• Can draw circuit diagrams of a range of simple series circuits using recognised symbols• Explain how a circuit operates to achieve particular operations, such as to control the light from a torch with different brightnesses or make a motor go faster or slower.• Make circuits to solve particular problems, such as a quiet and a loud burglar alarm.• Carry out fair tests exploring changes in circuits. • Can incorporate a switch into a circuit to turn it on and off• Can change cells and components in a circuit to achieve a specific effect• Can communicate structures of circuits using circuit diagrams with recognised symbols• Can devise ways to measure brightness of bulbs, speed of motors, volume of a buzzer during a fair test• Can predict results and answer questions by drawing on evidence gatheredCompare: Which type of fruit makes the best fruity battery?Classify: How would you group electrical components and appliances based on what electricity makes them do?Research: How has our understanding of electricity changed over time? | **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.***Activities:*• Can describe, with diagrams or models as appropriate, how light travels in straight lines either from sources or reflected from other objects into our eyes• Can describe, with diagrams or models as appropriate, how light travels in straight lines past translucent or opaque objects to form a shadow of the same shape • Explore different ways to demonstrate that light travels in straight lines e.g. shining a torch down a bent and straight hose pipe, shining a torch through different shaped holes in card.• Explore the uses of the behaviour of light, reflection and shadows, such as in periscope design, rear view mirrors and shadow puppets.• Can explain how evidence from enquiries shows that light travels in straight lines• Can predict and explain, with diagrams or models as appropriate, how the path of light rays can be directed by reflection to be seen, e.g. the reflection in car rear view mirrors or in a periscope• Can predict and explain, with diagrams or models as appropriate, how the shape of shadows can be variedIdentify/classify: Can you identify all the colours of light that make white light when mixed together?What colours do you get if you mix different colours of light together?Research: Why do some people need to wear glasses to see clearly?How do our eyes adapt to different conditions?Pattern: Is there a pattern to how bright it is in school over the day? And, if there is a pattern, is it the same in every classroom? | **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.***Activities:*• Can create a voice over for a video clip or animation• Can show, using diagrams, the movement of the Earth and Moon• Can explain the movement of the Earth and Moon• Can show using diagrams the rotation of the Earth and how this causes day and night• Can explain what causes day and night• Can use the model to explain how the Earth moves in relation to the Sun and the Moon moves in relation to the Earth• Can demonstrate and explain verbally how day and night occur• Can explain evidence gathered about the position of shadows in term of the movement of the Earth and show this using a model• Can explain how a sundial works• Can explain verbally, using a model, why we have time zones• Can describe the arguments and evidence used by scientists in the pastResearch: How have our ideas about the solar system changed over time? | **• Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.****• Describe the life process of reproduction in some plants and animals.***Activities:*• Can draw the life cycle of a range of animals identifying similarities and differences between the life cycles• Can explain the difference between sexual and asexual reproduction and give examples of how plants reproduce in both ways• Can present their understanding of the life cycle ofa range of animals in different ways e.g. drama, pictorially, chronological reports, creating a game• Can identify patterns in life cycles• Can compare two or more animal life cycles they have studied• Can explain how a range of plants reproduce asexually• Use secondary sources and, where possible, first-hand observations to find out about the life cycle of a range of animals.• Compare the gestation times for mammals and look for patterns e.g. in relation to size of animalor length of dependency after birth.• Look for patterns between the size of an animal and its expected life span.• Grow and observe plants that reproduce asexually e.g. strawberries, spider plants, potatoes.• Take cuttings from a range of plants e.g. African violet, mint.• Plant bulbs and then harvest to see how they multiply.• Use secondary sources to find out about pollination.Pattern: Is there a relationship between a mammal’s size and its gestation period? |
| **Animals Including Humans** | **Animals Including Humans** | **Electricity** | **Light** | **Earth & Space** | **Living Things and Habitats** |
| Sticky knowledge• The heart pumps blood around the body.• Oxygen is breathed into the lungs where it isabsorbed by the blood.• Muscles need oxygen to release energy from foodto do work. (Oxygen is taken into the blood in the lungs; the heart pumps the blood through blood vessels to the muscles; the muscles take oxygen and nutrients from the blood.)Common misconceptionsSome children may think:• your heart is on the left side of your chest• the heart makes blood• the blood travels in one loop from the heart to the lungs and around the body• when we exercise, our heart beats faster to work the muscles more• some blood in our bodies is blue and some blood is red• we just eat food for energy• all fat is bad for you• all dairy is good for you• protein is good for you, so you can eat as much as you want• foods only contain fat if you can see it• all drugs are bad for you. | Sticky knowledgeDifferent animals mature at different rates and live to different agesCommon misconceptionsSome children may think:• a baby grows in a mother’s tummy • a baby is “made”. | Sticky knowledgeBatteries are a store of energy. This energy pushes electricity round the circuit.When the battery’s energy is gone it stops pushing. Voltage measures the ‘push.’The greater the current flowing through a device the harder it works.Current is how much electricity is flowing round a circuit.When current flows through wires heat is released. The greater the current, the more heat is released Common misconceptionsSome children may think:• larger-sized batteries make bulbs brighter• a complete circuit uses up electricity• components in a circuit that are closer to the battery get more electricity. | Sticky knowledgeAnimals see light sources when light travels from the source into their eyes.Animals see objects when light is reflected off that object and enters their eyes.Light reflects off all objects (unless they are black). Non shiny surfaces scatter the light so we don’t see the beam.Light travels in straight lines.Common misconceptionsSome children may think:• we see objects because light travels from our eyes to the object | Sticky knowledgeStars, planets and moons have so much mass they attract other things, including each other due to a force called gravity. Gravity works over distance.Objects with larger masses exert bigger gravitational forces.Objects like planets, moons and stars spin.Smaller mass objects like planets orbit large mass objects like stars.Stars produce vast amounts of heat and light.All other objects are lumps of rock, metal or ice and can be seen because they reflect the light of stars.Common misconceptionsSome children may think:• the Earth is flat• the Sun is a planet• the Sun rotates around the Earth• the Sun moves across the sky during the day• the Sun rises in the morning and sets in the evening• the Moon appears only at night• night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth. | Sticky knowledgeDifferent animals mature at different rates and live to different ages.Puberty is something we all go through, a process which prepares our bodies for being adults, and reproductionHormones control these changes; which can be physical and/or emotional.Some organisms reproduce sexually where offspring inherit information from both parents.Some organisms reproduce asexually by making a copy of a single parent.Environmental change can affect how well an organism is suited to its environment.Different types of organisms have different lifecyclesCommon misconceptionsSome children may think:• all plants start out as seeds• all plants have flowers• plants that grow from bulbs do not have seeds• only birds lay eggs. |