

Science Skills and Knowledge Progression Map

Intent – What we are teaching in Science

At Hatfield Peverel Infant and Nursery School, we aim to inspire children to be inquisitive learners by providing opportunities for open ended learning exploration. We believe that scientific investigations are an integral part for children to develop a healthy curiosity and interest in the sciences enabling them to be equipped for life to ask and answer specific questions about their surroundings. Children are supported to develop their working scientifically skills to enable them to apply knowledge when using equipment, conducting experiments and investigations, building arguments, explaining concepts confidently using scientific terminology and most importantly, to continue to develop an enquiring mind about the world in which we live in.

Implementation – How we are teaching Science

Following the aims in the National Curriculum we have developed progressive and engaging lessons centred around a 'Big Question' approach. The acquisition of key skills and knowledge is an integral part of our science learning where children are given opportunities to answer these questions using the key enquiry skills that enable them to work scientifically. Lessons are planned and taught in units that are rich in knowledge, skills and vocabulary and open-ended opportunities inside and outdoors promotes the children's transferrable scientific skills.

Impact – What the children have learnt

By the end of KS1, children at Hatfield Peverel Infant and Nursery school will be equipped with the core scientific enquiry skills to ask and answer questions of their own. Children will have an understanding that science has changed our lives and that Science continues to shape the world we live in. We aim for all children to leave school with a wider variety of skills linked to both substantive and disciplinary knowledge, a richer vocabulary which will enable them to articulate their understanding of taught concepts and a confidence and a love of learning for all things science.

National Curriculum

Pupils should be taught:

Working Scientifically:

- to ask simple questions and recognise that they can be answered in different ways
- to observe closely, using simple equipment
- to perform simple tests
- to identify and classify
- to use their observations and ideas to suggest answers to questions
- to gather and record data to help in answering questions

Development Matters

(0-3)

- Repeat actions that have an effect.
- Explore materials with different properties.
- Explore natural materials, indoors and outside.

(3-4)

Communication and Language

- Understand 'why' questions, like: "Why do you think the caterpillar got so fat?"

Personal, Social and Emotional Development

- Make healthy choices about food, drink, activity and toothbrushing.

Understanding the World

- Use all their senses in hands-on exploration of natural materials.
- Explore collections of materials with similar and/or different properties.
- Talk about what they see, using a wide vocabulary.
- Begin to make sense of their own life-story and family's history.
- Explore how things work.
- Plant seeds and care for growing plants.
- Understand the key features of the life cycle of a plant and an animal.

- Begin to understand the need to respect and care for the natural environment and all living things. Explore and talk about different forces they can feel.

(Reception)

Communication and Language:

- Learn new vocabulary.
- Ask questions to find out more and to check what has been said to them.
- Articulate their ideas and thoughts in well-formed sentences.
- Describe events in some detail.
- Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen.
- Use new vocabulary in different contexts.
- Know and talk about the different factors that support their overall health and wellbeing: - regular physical activity - healthy eating - toothbrushing - sensible amounts of 'screen time' - having a good sleep routine - being a safe pedestrian.

Understanding the world

- Explore the natural world around them.
- Describe what they see, hear and feel while they are outside.
- Recognise some environments that are different to the one in which they live.
- Understand the effect of changing seasons on the natural world around them.

Physical development: Fine motor skills

- Hold a pencil effectively in preparation for fluent writing – using the tripod grip in almost all cases;
- Use a range of small tools, including scissors, paint brushes and cutlery;
- Begin to show accuracy and care when drawing.

Early Learning Goals

Communication and Language:

Make comments about what they have heard and ask questions to clarify their understanding.

Personal, Social and Emotional Development:

Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.

Understanding the World:

Explore the natural world around them, making observations and drawing pictures of animals and plants.

Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.

		Understand some important processes and changes in the natural world around them, including the seasons and changing states of matters.		
Inclusion including SEND		Assessment		Cultural Capital
All children will be given the same opportunities because we believe in teaching a mastery approach across all subject areas and equal access for all. Quality first teaching for all children. Teacher modelling and scaffolded practice for all children. Focus groups with adult support for children needed further support. Pre-teach sessions. Talk partners to build confidence. Now and next boards to support completion of tasks. Intervention. External advice sought to support inclusion.		Prior knowledge/retrieval opportunities are included at the beginning of units of work so that planning can be adapted/amended to support gaps or misconceptions. Clear sequence of lessons which identify the key knowledge and skills that children need to know at the end of a lesson/unit of work. In the moment questioning and verbal feedback is an integral part in all lessons that assesses children's knowledge and moves their learning on. Topic books, photos and videos provide evidence of children's knowledge and understanding which is used to inform future lessons or interventions.		Science Week Curriculum Enrichment: Science workshops, Eco Club Trips: Chelmsford Museum, Hedingham Castle Outdoor garden
	Nursery	Reception	Year 1	Year 2
Working Scientifically Skills	- To explore different resources and toys to see how they work. - To begin using new words to describe what they can see. - To ask simple who, what, when questions and begin to understand why questions. - To begin to understand that actions have effects and these	- To use senses to explore, notice detailed features of objects, and describe what they see, hear, and feel. - To ask "why," "how," or "what if" questions about their familiar world. - To make simple, sensible guesses about what might happen next. - To engage in hands-on, trial-and-error, and comparative activities. - To talk about findings, making comparisons, and describing similarities and differences.	- To ask simple questions and recognise that they can be answered in different ways. - To use simple equipment to observe closely. - To perform simple tests. - To identify and classify. - To use observations and ideas to suggest answers to questions. - To gather and record data to help in answering questions. (Year 1 focus)	- To ask simple questions and recognise that they can be answered in different ways including use of scientific language from the national curriculum. - To use simple equipment to observe closely including changes over time. - To perform simple comparative tests. - To identify, group and classify - To use observations and ideas to suggest answers to questions noticing similarities, differences and patterns. - To gather and record data to help in answering questions

	can be repeated and explored.			including from secondary sources of information.
Animals including Humans Skills	- To begin to explore the lifecycle of a chicken. - To begin to understand that every adult was once a baby and everyone grows and changes over time. - To develop an understanding of how healthy choices effect the body.	- To begin to recognise common animals, their names, and matching adults to their young. - To explore the lifecycle of a butterfly. - To name basic body parts, identifying their functions, and linking them to the five senses.	- To name and group a variety of animals. - To describe and compare the structure of common animals. - To group animals by diet. - To name, draw and label the basic body parts. - To explore which body part is associated with which sense.	- To discuss how animals, including humans have offspring that grow into adults. - To explore the basic needs of animals, including humans for survival. - To explore exercise, hygiene and diet.
Knowledge	- Describe different animals. - Clean teeth. - Warm up their muscles with exercise.	- Identify and name the basic parts of the human body and associate them with senses. - Understand that animals, including humans have offspring that grow into adults.	- Name common animals. - Know that animals are grouped according to different features. - Know that animals have different diets. - Identify and name the basic parts of the human body. - Name the 5 senses and the body part that it is associated.	- Know that animals, including humans have a life cycle. - Know the basic needs for animal survival. - Know what makes a healthy human.

Living Things and their habitats Skills	- To begin to develop respect for the environment around us. - To learn new ways to care for the world around us. - To develop an understanding of why we care for all living things.	- To identify different habitats - To understand that different animals live in different places suited to their needs.		- To discuss living things – alive, dead and never alive. - To identify where living things live and describe how their habitats are suited to their needs. - To describe simple food chains and sources of food. - To explore microhabitats.
Knowledge	- Match some animals to their habits. - Know that different animals come from different parts of the world.	- Understand the importance of taking care of animals and the environment. - Know names of some animals that are native to different countries. - Know some native British wildlife.		- Know and compare the difference between living, dead and things that have never been alive. - Know that animals have different habitats that are suited to their needs. - Identify food chains and how animals source their food. - Know about microhabitats.
Plants Skills	- To observe the lifecycle of cress. - To observe that different plants come out at different times of year.	- To identify and name basic parts of plants, including roots, stems, leaves, and flowers. - To actively plant seeds and care for growing plants, understanding how to keep them healthy.	- To investigate and describe the structure of variety of plants, including trees. - To investigate and describe the difference between fruit and vegetables - To compare plants and discuss their similarities and differences	- To observe and describe how seeds and bulbs grow into mature plants. - To investigate and describe how plants needs water, light and a suitable temperature to grow and stay healthy.

Knowledge	- Know that plants need water and sunlight to grow and thrive. - Know that plants grow and decay. - Know how to plant a seed.	- Know that seeds grow into plants and that plants are living things. - Know that plants need water and light to grow.	- Identify and name a variety of wild and garden plants, including deciduous and evergreen trees. - Know the terms used to describe the basic structure of plants, including trees. - Know the difference between fruits and vegetables. - Know that plants have common features and differences.	- Know the difference between and seed a bulb. - Know that plants need water, light and a suitable temperature to grow.
Materials Skills	- To discuss how different materials feel. - To identify similarities and differences between natural resources. - To understand that some materials sink and some float.	- To name everyday materials - To use senses to explore and describe simple physical properties (hard, soft, stretchy, shiny, dull, rough, smooth). - Explore materials through hands-on activities, such as testing for buoyancy - To explore and manipulate materials like sand, mud, and water to observe changes.	- To distinguish between an object and the material it is made. - To identify and name a variety of every day materials, including wood, plastic, glass, metal, water and rock. - To describe the physical properties of everyday materials. - To compare and group together a variety of everyday materials on the basis of their simple physical properties.	- To identify and compare the suitability of a variety of everyday materials for particular uses. - To find out how the solid objects of some materials can be changed.
Knowledge	- Know how to describe different properties of a material. - Know how to safely test if a material floats or sinks.	- Explore how materials can change, such as ice melting, water freezing, mixing materials for cooking. - Know and understand that an object is made from a material, such as a chair being made from plastic.	- Know that objects are made from different materials. - Name a variety of common materials. - Know that materials have different properties. - Know that materials can be grouped according to their simple physical properties.	- Know that particular materials are suited for different purposes. - Know that some solid objects can be changed.

Seasonal Changes Skills	- To talk about what they see, using a wide vocabulary. - To be able to name the seasons and understand a few properties of each.	- To observe changes across the four seasons, including changes in weather (rainy, snowy, sunny, windy) and temperature - To notice changes over time, such as in the natural world (e.g., leaves falling, buds appearing) and variations in day length. - To describe what they see, hear, and feel in their environment. - To recognise how clothing and activities change with the weather.	- To observe seasonal changes across the four seasons. - To investigate and describe weather associated with the seasons. - To observe and discuss how the day length varies.	
Knowledge	Know that the weather changes over the year	- Begin to know there are four seasons. - Know the weather changes over the seasons. - Know that clothing and activities change with the weather.	- Know that there are four seasons. - Know that weather changes according to the seasons. - Understand that the day length varies.	

Vocabulary				
	Nursery	Reception	Year 1	Year 2
	Working scientifically: See, hear, touch, smell, taste, what, why, big, small, same, different. Plants: Plant, tree, leaf, flower, soil, sun,	Working scientifically: Look, observe, watch, investigate, touch, feel, smell, hear, notice, explore, compare Plants: Plant, tree, leaf, flower, soil, sun, sky, rain, grow, cress, seed, stem, pollen, sun, temperature	Working scientifically: changes over time, comparing, contrasting, criteria, data/results, describing, equipment, grouping, identify, name, observations, patterns, record, sorting, test, predict.	Working scientifically: changes over time, comparing, contrasting, criteria, data/results, describing, equipment, grouping, identify, name, observations, patterns, record, sorting, test, predict.

	sky, rain, grow, cress, seed Animals, including humans/ Living things and their habitats: Animal, chicken, chick, egg, fish. Bird, insect, life, home, habitat Materials: Hard, soft, rough, smooth, heavy, light, push, pull, sink. Float, mix Seasonal changes: Hot, cold, wet, dry, wind, snow, frost, Spring, Summer, Autumn, Winter	Animals, including humans/ Living things and their habitats: Animal, butterfly, caterpillar, egg, chrysalis, life cycle, insect, life, home, habitat, native, wildlife Materials: Hard, soft, rough, smooth, heavy, light, push, pull, sink, float, mix, melt, cold, freeze, liquid, Seasonal changes: Hot, cold, wet, dry, wind, snow, frost, Spring, Summer, Autumn, Winter, season, weather, temperature, change	Plants: branches, bud, bulb, deciduous tree, evergreen tree, flowers, fruit, garden/flowering plants, leaves, petals, roots, seed, stem, trunk, wild plants, twig Animals, including humans: amphibians, arms, birds, body parts, carnivores, ears, elbows, environment, eyes, face, fish, habitat, hair, head, hearing, herbivores, knees, legs, mammals, mouth, neck, omnivores, pets, reptiles, teeth, senses, smell, sound, taste, sight and touch. Everyday materials: absorbent/not absorbent, bending, bendy/not bendy, gas, glass, hard/soft, liquid, metal, plastic, property, rock, rough/smooth, shiny/dull, solid, squashing, stretching, stretchy/stiff, twisting, water, waterproof/not waterproof, wood. opaque/see through. Metal, fabric, glass, wood, plastic Seasonal changes: autumn, dark, day length, days, hours, light, months, moon, movement, shadow, spring, summer, sun, winter	Plants (as for Year 1, plus): germination, insect pollination, nutrients, pollination, seed dispersal, wind pollination. Animals, including humans: adult, baby, bacteria, balanced diet, carbohydrates, child, circulation, dairy, exercise, fats, fibre, fitness, food groups, germs, growth, healthy, heart rate, infection, life cycle, minerals, nutrition, protein, teenager, toddler, unhealthy, vitamins Uses of everyday materials (as for Year 1, plus): characteristics, classification, manmade, natural, properties. Living things and their habitats: adaptation, alive, carnivore, characteristics, conditions, consumer, dead, excrete, feed, food chain, grow, habitat, heat, herbivore, life processes, light, living/non-living, micro-habitat, move, ocean, omnivore, pond, producer, rainforest, reproduce, respire, respond to stimuli, seashore, sound, touch, woodland.
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