

PLAN

Planning for assessment

EYFS Matrices

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Opportunities for science in the common EYFS themes

Click on the links in the table below to be taken to the relevant matrix.

Theme	Nursery	Reception
Dinosaurs	Animals, excluding humans	Animals, excluding humans
Farms	Animals, excluding humans Plants	
Food	Materials, including changing materials Plants	
People who help us	Humans Plants	Humans
Pirates	Materials, including changing materials Forces	Materials, including changing materials Forces
Robots	Materials, including changing materials Electricity Light Sound	Materials, including changing materials Earth and space
Space and the planets	Materials, including changing materials	Materials, including changing materials Earth and space Forces
Superheroes	Materials, including changing materials Humans	Materials, including changing materials Earth and space
Vehicles	Materials, including changing materials Electricity Light	Materials, including changing materials Forces Earth and space

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	Forces Sound	
Building and construction	Materials, including changing material Electricity Forces Light	Forces Sound
All about me	Humans	Humans
The high street	Humans Materials, including changing materials Electricity Light	Humans
Holidays	Materials, including changing materials	Animals, excluding humans
Castles	Materials, including changing materials	
In the garden	Animals, excluding humans Living things and their habitats Plants	Living things and their habitats Animals, excluding humans
At the seaside	Animals, excluding humans	Animals, excluding humans Living things and their habitats
Under the sea	Animals, excluding humans	Animals, excluding humans
In the woods	Animals, excluding humans	Animals, excluding humans Living things and their habitats
Weather and seasons	Living things and their habitats	Seasonal changes Materials, including changing materials Living things and their habitats Sound Light
Animals	Animals, excluding humans	Animals, excluding humans Living things and their habitats Seasonal changes
Magic, witches and wizards	Materials, including changing materials Light	

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PLAN

Planning for assessment

Nursery

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Year	Nursery (3 & 4-year-olds)	Topic	Animals, excluding humans

Understanding the World

- 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.

Links with other areas of learning

Mathematics

- Talk about and identify the patterns around them. For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy', 'spotty', 'blobs' etc.

Expressive Arts and Design

- Create closed shapes with continuous lines, and begin to use these shapes to represent objects.
- Draw with increasing complexity and detail, such as representing a face with a circle and including details.

Prior learning	Future learning
• Explore natural materials, indoors and outside. (Birth to three)	• Recognise some environments that are different to the one in which they live. (Reception) • Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 – Animals, including humans) • Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 – Animals, including humans) • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 – Animals, including humans)

CREATING APPROPRIATE EXPERIENCES TO INITIATE LEARNING

What adults might provide	What adults might do
Opportunities to learn about the life cycles of animals • Caring for eggs and the young animals that emerge, such as chicks, caterpillars, frogs • Sharing books with information about animal life cycles (fiction and non-fiction) • Looking at and matching pictures of animals and their young • Watching videos of animals and their young and how they change over time	• Encourage children to observe young animals closely and talk about how they change over time. • Encourage children to name and describe animals and their young, including how they change over time, while reading books, watching videos, looking at pictures or playing matching games. • Encourage children to ask questions about different animals and their young.

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- Playing games involving matching or describing animals and their young
- Playing with small world animals, matching adults to their young
- Visiting a farm, zoo or pet shop, particularly to see young animals
- Talking about the sounds adult and young animals make and comparing them
- Drawing adult animals and their young

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- Encourage children to talk about similarities and differences between animals and their young, including patterns, spots or stripes.
- Encourage children to draw animals and their young.

Encouraging scientific enquiry

Observing over time
- How does the … change over time?

Researching using secondary sources
- Find out more about the life cycles of the animals observed.

Classification
- Match animals and their young.

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<tr>
<td>Vocabulary</td>
<td>Common misconceptions</td>
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Model and encourage children to use vocabulary such as:

- egg, chick, bird, caterpillar, cocoon, chrysalis, butterfly, frog spawn, tadpole, froglet, frog, grow, change, die, names of animals and their young, fur, feathers, scales, tail, wings, beak, claws, paws, hooves, swim, walk, run, jump, jump, fly, patterns, spots, stripes

Expose children to supplementary vocabulary such as:

- life cycle, mane, webbed feet

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Some children may think:

- all animals lay eggs
- the young animal is fully formed inside an egg and just waiting to hatch
- the young animal is fully formed inside an egg and just grows until it is big enough to hatch
- animals are assembled from body parts within the egg
- all animal young are just small versions of the adult and get bigger
- animals such as cows and hens “make” milk and lay eggs for us [humans]
- humans are not animals.

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<tr>
<td>Linked texts</td>
<td>Linked careers</td>
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Traditional stories and nursery rhymes
- The Ugly Duckling
- Old MacDonald had a Farm

Other texts
- The Very Hungry Caterpillar & The Mixed-Up Chameleon by Eric Carle
- Counting Creatures & Monkey Puzzle by Julia Donaldson
- Who is in the egg? by Alexandra Milton
- The Odd Egg & Monkey and Me by Emily Gravett
- Owl Babies by Martin Waddell
- Baby Goz by Steve Weatherill
- Cock-A-Doodle-Moo by Bernard Most

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Opportunities in the role-play corner to care for adult animals and their young

- Vet
- Zookeeper
- Farmer
- Pet shop
- Animal hospital
- Stable

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• Brown Bear, Brown Bear, What Do You See? & Polar Bear, Polar Bear, What Do You Hear? by Bill Martin Jr • Wibbly Pig Picks a Pet by Mick Inkpen • Farmyard Hullabaloo by Giles Andreae & David Wojtowycz • Rosie's Walk by Pat Hutchins • Little Chick's First Day by Paula McBride • Poo at the Zoo by Sarah Eason • Lucky Little Mouse by A H Benjamin • Dora's Egg by Julie Sykes • The Trouble with Tadpoles by Sam Godwin • Stellaluna by Janell Cannon • Moo, Baa, La La La! by Sandra Boynton	

HOW CHILDREN MIGHT SHOW THEIR LEARNING	
Characteristics of effective teaching and learning	
• Playing and exploring – children investigate and experience things, and 'have a go' • Active learning – children concentrate and keep on trying if they encounter difficulties, and enjoy achievements • Creating and thinking critically – children have and develop their own ideas, make links between ideas, and develop strategies for doing things	
Demonstrating skills and showing understanding	
What a child might be doing	**Possible evidence of learning**
Children ask questions, make observations and talk about what they are doing and have found out while carrying out a range of activities, such as: • learning about the life cycles of animals • comparing adult animals to their young • observing how young animals change over time. **Children sort:** • animals and their young. **Children record their observations when:** • comparing animals and their young • observing how young animals change over time.	• Can name and describe animals they have encountered. • Can talk about how they cared for the eggs/animals. • Can describe how the animals changed over time. • Can match animals to their young and name them.

Year	Nursery (3 & 4-year-olds)	Topic	Humans

Understanding the World

- Use all their senses in hands-on exploration of natural materials.
- Begin to make sense of their own life-story and family's history.
- Understand the key features of the life cycle of a plant and an animal.

Links with other areas of learning

Personal, Social and Emotional Development

- Be increasingly independent in meeting their own care needs, e.g. brushing teeth, using the toilet, washing and drying their hands thoroughly.
- Make healthy choices about food, drink, activity and toothbrushing.

Expressive Arts and Design

- Create closed shapes with continuous lines, and begin to use these shapes to represent objects.
- Draw with increasing complexity and detail, such as representing a face with a circle and including details.

Prior learning	Future learning
• Explore natural materials, indoors and outside. (Birth to three) • Make connections between the features of their family and other families. (Birth to three) • Notice differences between people. (Birth to three)	• Talk about members of their immediate family and community. (Reception) • Name and describe people who are familiar to them. (Reception) • Describe what they see, hear and feel whilst outside. (Reception) • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 – Animals, including humans)

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CREATING APPROPRIATE EXPERIENCES TO INITIATE LEARNING	
What adults might provide	**What adults might do**
Opportunities to learn about the life cycles of humans • Looking at photographs of the children as babies • Sharing books about how to look after a baby • Talking to an expectant mother, parent with a baby and elderly person • Talking to adults about photographs of the adults at different ages • Identifying pictures of babies, toddlers, children, adults and old people in magazines or other media • Drawing humans at different ages **Opportunities to learn about how to take care of themselves** • Talking about how they look after their own health and hygiene • Noticing when they feel hot and cold and how to respond to this • Choosing appropriate materials to protect themselves from the Sun **Opportunities to learn about their senses** • Exploring the natural environment with their senses • Exploring objects using their senses e.g. smelling pots, feely bags, listening pots etc. • Sorting collections of natural objects using their senses e.g. bark, pebbles, feathers, seeds, cones, leaves, sticks • Looking closely at natural objects using a magnifying glass or app on a tablet • Going on a sound walk • Playing guessing games where children pick an object and either describe it or are asked questions in order to identify it • Playing listening games • Sharing books about senses and sensory impairments • Tasting food	• Encourage children to describe how they have changed since they were babies. • Encourage children to talk about how to care for a baby. • Encourage children to ask questions of an expectant mother, parent with a baby and elderly person. • Encourage children to talk about what they can do now that they were not able to do when they were babies, including how to look after themselves. • Encourage children to talk about objects using their senses to describe them. **Encouraging scientific enquiry** *Classification* • Sort images of humans according to their age. • Sort using different senses. Which do you like/not like? *Observing over time* • How does a baby change over time? • *Research using secondary sources* • Find out about the human life-cycle from an expectant mother, parent with a baby and elderly person.

Vocabulary	Common misconceptions
Model and encourage children to use vocabulary such as: • grow, change, baby, toddler, child, adult, old person, smell, taste, touch, feel, hear, see, blind, deaf Expose children to supplementary vocabulary such as: • life cycle, senses, elderly, die (if appropriate)	Some children may think: • babies are in a mummy's stomach.
Linked texts	**Linked careers**
Traditional stories and nursery rhymes • Goldilocks and the Three Bears *Other texts* • Handa's Surprise by Eileen Brown • Za-za's Baby Brother by Lucy Cousins • My Mum and Dad Make Me Laugh by Nick Sharratt • My Grandpa by Marta Altés • I Want My Potty! by Tony Ross • How Do Your Senses Work? by Judy Tatchell • That's Not My Collection by Usborne • Once There Were Giants by Martin Waddell	**Opportunities in the role-play corner to learn about the lifecycle of humans** • Midwife • Hospital • Retirement home

HOW CHILDREN MIGHT SHOW THEIR LEARNING	
Characteristics of effective teaching and learning	
• Playing and exploring – children investigate and experience things, and 'have a go' • Active learning – children concentrate and keep on trying if they encounter difficulties, and enjoy achievements • Creating and thinking critically – children have and develop their own ideas, make links between ideas, and develop strategies for doing things	
Demonstrating skills and showing understanding	
What a child might be doing	**Possible evidence of learning**
Children ask questions, make observations using simple equipment and talk about what they are doing and have found out while carrying out a range of activities, such as: • learning about the life cycles of humans • learning about how to take care of themselves • learning about their senses. **Children sort:** • humans by age/life stage • objects using their senses. **Children record their observations when:** • observing humans at different ages/life stages.	• Can talk about how they have changed since they were babies. • Can describe humans at different ages/life stages. • Can talk about how they look after themselves and compare this to how a baby is looked after. • Can compare smells, sounds, tastes and textures. • Can talk about what they see when using a magnifying glass or an app on a tablet. • Can talk about how they use their senses when exploring the world around them and natural objects.

Year	Nursery (3 & 4-year-olds)	Topic	Living things and their habitats

Understanding the World

- Use all their senses in hands-on exploration of natural materials.
- Explore collections of materials with similar and/or different properties.
- Begin to understand the need to respect and care for the natural environment and all living things.

Links with other areas of learning

Mathematics

- Describe a familiar route.
- Discuss routes and locations, using words like 'in front of' and 'behind'.
- Talk about and identify the patterns around them. For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy', 'spotty', 'blobs' etc.
- Extend and create ABAB patterns – stick, leaf, stick, leaf.

Expressive Arts and Design

- Create closed shapes with continuous lines, and begin to use these shapes to represent objects.
- Draw with increasing complexity and detail, such as representing a face with a circle and including details.

Prior learning	Future learning
• Explore natural materials, indoors and outside. (Birth to three)	• Draw information from a simple map. (Reception) • Explore the natural world around them. (Reception) • Describe what they see, hear and feel whilst outside. (Reception) • Recognise some environments that are different to the one in which they live. (Reception)

CREATING APPROPRIATE EXPERIENCES TO INITIATE LEARNING

What adults might provide	What adults might do
Opportunities to explore the surrounding natural environment • Going on local nature walks • Identifying natural objects and things left by humans • Gathering natural objects from nature walks to include in a collection for the nature table e.g. stones, leaves, seeds, conkers, pinecones, acorns, twigs, bark, shells, feathers	• Encourage children to use all appropriate senses to explore the parts of plants on the walk, including the leaves, stems/trunks, flowers, seeds, berries and fruit. • Encourage children to identify things left by humans in the surrounding natural environment e.g. litter. • Remind children not to damage the plants in any way and only gather natural objects from the ground.

<table>
<tr><td>Opportunities to explore natural objects from the surrounding environment
Using a magnifying glass or a tablet with an app to observe the natural objects in a collection closely
Drawing natural objects in the collection
Grouping together natural objects that are similar in the collection
Using natural objects to make pictures and patterns</td><td>Encourage children to talk about the objects in the collection, including where they came from on the walk and whether they were part of a plant, animal or neither.
Encourage children to talk about the natural objects that they are observing closely, drawing and sorting.
Encourage children to look for patterns on the natural objects in the collection.
Encourage children to identify items in the collection that are the same or similar.
Encourage children to ask questions about the surrounding natural environment and the natural objects in the collection.
Encouraging scientific enquiry

Classification
Find and identify natural objects to include in the collection.
Which natural objects are from plants, animals or neither?</td></tr>
<tr><td>Vocabulary</td><td>Common misconceptions</td></tr>
<tr><td>Model and encourage children to use vocabulary such as:
natural, plant, animal, leaves, seeds, conkers, acorns, twigs, bark, shells, feathers, pebbles, stones, same, different, pattern
Expose children to supplementary vocabulary such as:
living, dead, similar</td><td>Some children may think:
shells are only found at the beach
feathers are from dead birds.</td></tr>
<tr><td>Linked texts</td><td>Linked careers</td></tr>
<tr><td>Other texts
Percy the Park Keeper by Nick Butterworth</td><td>Opportunities in the role-play corner to explore the surrounding natural environment
Tree surgeon
Park keeper
Farmer
Gardener</td></tr>
</table>

HOW CHILDREN MIGHT SHOW THEIR LEARNING	
Characteristics of effective teaching and learning	
• Playing and exploring – children investigate and experience things, and 'have a go' • Active learning – children concentrate and keep on trying if they encounter difficulties, and enjoy achievements • Creating and thinking critically – children have and develop their own ideas, make links between ideas, and develop strategies for doing things	
Demonstrating skills and showing understanding	
What a child might be doing	**Possible evidence of learning**
Children ask questions, make observations using simple equipment and talk about what they are doing and have found out while carrying out a range of activities, such as: • exploring the surrounding natural environment • exploring natural objects from the surrounding environment. **Children sort:** • natural objects. **Children record their observations when:** • drawing natural objects from the collection.	• Can name and describe objects in the collection, including patterns they notice on them. • Can group similar objects together. • Can draw natural objects, including some patterns observed on them. • Can identify natural objects that have come from plants and animals. • Children do not damage the living things they encounter in the natural environment. • Children show care and encourage others to care for things they encounter in the natural environment.

Year	Nursery (3 & 4-year-olds)	Topic	Plants

Understanding the World

- Use all their senses in hands-on exploration of natural materials.
- Explore collections of materials with similar and/or different properties.
- 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.

Links with other areas of learning

Mathematics

- Talk about and identify the patterns around them. For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy', 'spotty', 'blobs' etc.

Expressive Arts and Design

- Create closed shapes with continuous lines, and begin to use these shapes to represent objects.
- Draw with increasing complexity and detail, such as representing a face with a circle and including details.

Prior learning	Future learning
• Explore natural materials, indoors and outside. (Birth to three)	• Observe and describe how seeds and bulbs grow into mature plants. (Y2 – Plants) • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. (Y2 – Plants) • Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 – Plants)

CREATING APPROPRIATE EXPERIENCES TO INITIATE LEARNING

What adults might provide	What adults might do
Opportunities to grow plants • Visiting a garden centre • Gathering seeds from the surrounding natural environment • Gathering seeds from fruit • Observing collections of seeds and bulbs using a magnifying glass or an app on a tablet • Drawing seeds and bulbs • Planting and caring for seeds and bulbs • Growing vegetable tops	• Encourage children to talk about the range of seeds, bulbs, plants and gardening tools they saw on their trip to the garden centre. • Encourage children to talk about the seeds they gathered from the ground from the surrounding natural environment, from pieces of fruit and plants they have grown. • Remind children not to damage the plants in any way and only gather seeds from the ground. • Encourage children to describe and compare seeds and bulbs, including any patterns on them that they notice.

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- Observing and photographing/drawing how plants grow and die
- Observing and photographing/drawing what happens when fruit, vegetables and flowers are left to decay
- Gathering seeds and digging up bulbs of the plants they grow
- Designing seed packets
- Using what they grow to make food to eat
- Sharing books about plants and growing plants

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- Encourage children to separate seeds from bulbs.
- Encourage children to use non-standard measures, such as a spacing stick, to space seeds and bulbs appropriately to give them space to grow.
- Encourage children to talk about plants as they grow.
- Encourage children to talk about plants they have at home.
- Encourage children to talk about how fruit and vegetables decay and flowers die.
- Encourage children to use all their appropriate senses to explore the parts of plants, including the leaves, stems/trunks, flowers, seeds, berries and fruit, as they grow.
- Encourage children to ask questions about growing plants.

Encouraging scientific enquiry

Comparative testing

- Compare how quickly different seeds/bulbs germinate.
- Compare how different vegetable tops grow.

Observing over time

- How does a plant change as it grows?
- What happens to fruit, vegetables and flowers when left over time?

Researching using secondary sources

- Look at seed and bulb packets to learn how to plant and care for them.

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<td>Vocabulary</td>
<td>Common misconceptions</td>
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Model and encourage children to use vocabulary such as:

- plant, leaf, stem, trunk, branch, root, bark, flower, petal, seed, berry, fruit, vegetable, bulb, plant, hole, dig, water, weed, grow, shoot, die, dead, soil

Expose children to supplementary vocabulary such as:

- seedling, healthy, unhealthy, strong, sturdy, wilting, decay, mould, life cycle

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Some children may think:

- trees are not plants
- there is a young plant inside a seed or bulb
- bulbs are big seeds
- big plants grow from big seeds and big bulbs
- fruit and vegetables come from the supermarket
- plants grow at night or when we are not watching them.

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<td>Linked texts</td>
<td>Linked careers</td>
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Traditional stories and nursery rhymes

- Jack and the Beanstalk
- The Giant Turnip

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Opportunities in the role-play corner to explore growing plants

- Greengrocer/farm shop
- Gardener/allotment owner
- Farmer

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Other texts • Jim and the Beanstalk by Raymond Briggs • Titch by Pat Hutchins • Oliver's Vegetables by Alison Bartlett & Vivian French • We Planted a Pumpkin by Rob Ramsden	• Orchard worker • Market gardener • Garden centre manager

HOW CHILDREN MIGHT SHOW THEIR LEARNING	
Characteristics of effective teaching and learning	
• Playing and exploring – children investigate and experience things, and 'have a go' • Active learning – children concentrate and keep on trying if they encounter difficulties, and enjoy achievements • Creating and thinking critically – children have and develop their own ideas, make links between ideas, and develop strategies for doing things	
Demonstrating skills and showing understanding	
What a child might be doing	**Possible evidence of learning**
Children ask questions, make observations using simple equipment and talk about what they are doing and have found out while carrying out a range of activities, such as: • growing plants. **Children use equipment to measure when:** • planting seeds and bulbs. **Children sort:** • seeds and bulbs. **Children record their observations when:** • photographing/drawing seeds and bulbs • photographing/drawing seeds and bulbs as they grow over time • photographing/drawing vegetables and fruit as they decay and flowers as they die.	• Can describe some differences between seeds and bulbs. • Can identify seeds and bulbs. • Can talk about how they planted and cared for seeds and bulbs. • Can explain that a seed or bulb grew into a plant and then died. • Children do not damage the living things they encounter in the natural environment. • Children show care and encourage others to care for things they encounter in the natural environment.

	Year	Nursery (3 & 4-year-olds)	**Topic**	Materials, including changing materials

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 the differences between materials and changes they notice.

Links with other areas of learning

Expressive Arts and Design

- Explore different materials freely, in order to develop their ideas about how to use them and what to make.
- Develop their own ideas and then decide which materials to use to express them.
- Join different materials and explore different textures.

Prior learning	Future learning
• Explore materials with different properties. (Birth to three) • Explore natural materials, indoors and outside. (Birth to three)	• Explore the natural world around them. (Reception) • Describe what they see, hear and feel whilst outside. (Reception) • Distinguish between an object and the material from which it is made. (Y1 – Everyday materials) • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 – Everyday materials) • Describe the simple physical properties of a variety of everyday materials. (Y1 – Everyday materials) • Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 – Everyday materials)

CREATING APPROPRIATE EXPERIENCES TO INITIATE LEARNING

What adults might provide	What adults might do to support this
Opportunities to explore a range of materials in a sensory way especially through touch, including more unusual materials • Exploring oobleck (cornflour and water), gellibaff, shaving foam, foam burst shower gel etc.	• Encourage children to talk about the materials they explore, using their senses. • Encourage children to choose from a range of materials when making models. • Encourage children to join materials together to make something. • Support children to name the material they have used. • Encourage children to talk about why they have chosen a particular material, naming at least one property.

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<tr>
<td>Opportunities to shape and join materials
• Building junk models using a range of materials
• Shaping and joining materials using equipment e.g. scissors, hole punch, including when using wood e.g. a hammer and nail

Opportunities to change materials
• Making smoothies
• Mixing ingredients to make playdough, cakes, biscuits, bread, jelly etc.
• Melting chocolate for decorating bakes/biscuits or to combine with other ingredients e.g. refrigerator cake, chocolate crispy cakes
• Comparing cooked and uncooked pasta, noodles, rice or potatoes
• Cooking popcorn in a microwave
• Cooking cakes, biscuits, bread etc.
• Making ice lollies and ice-cream
• Using medical ice packs including self-activated cool pads
• Removing toys from ice
• Adding baking soda and fizzy bath bombs to water
• Adding coloured sweets to water
• Adding currants to fizzy water/lemonade
• Adding bicarbonate of soda to vinegar to make a bubbling potion</td>
<td>• Support children to measure out ingredients following a recipe.
• Encourage children to talk about ingredients.
• Encourage children to talk about the changes when ingredients are mixed, cooked, heated and cooled, frozen and blended.
• Encourage children to ask question about the materials they encounter.

Encouraging scientific enquiry

Classification
• Sort materials using simple properties.
Observing over time
• How does the cake mixture change?
• How does chocolate change when heated?
• How does fruit juice change when put in the freezer?
• How does fruit change when blended?</td>
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<tr>
<td>Vocabulary</td>
<td>Common misconceptions</td>
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<td>Model and encourage children to use vocabulary such as:

• mix, stir, cook, hot, oven, microwave, change, burn, melt, hard, runny, set, freeze, freezer, cold, blended, hard, soft, bendy, stiff, wobbly, wood, plastic, paper, card, fabric

Expose children to supplementary vocabulary such as:

• solid, liquid, rigid, stronger, weaker</td>
<td>Some children may think that:

• a material is better to use because it is ‘bigger’ not thicker, rigid etc.
• the material is ‘box’ not cardboard.</td>
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<tr>
<td>Linked texts</td>
<td>Linked careers</td>
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<tr>
<td>Traditional stories and nursery rhymes
• Gingerbread Man
• Pat a Cake
• Little Red Hen</td>
<td>Opportunities in the role-play corner to shape, join and change materials

• Baker
• Chocolatier
• Laboratory scientist
• Craftsperson in a workshop</td>
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HOW CHILDREN MIGHT SHOW THEIR LEARNING	
Characteristics of effective teaching and learning	
• Playing and exploring – children investigate and experience things, and 'have a go' • Active learning – children concentrate and keep on trying if they encounter difficulties, and enjoy achievements • Creating and thinking critically – children have and develop their own ideas, make links between ideas, and develop strategies for doing things	
Demonstrating skills and showing understanding	
What a child might be doing	**Possible evidence of learning**
Children ask questions, make observations and talk about what they are doing and have found out while carrying out a range of activities, such as: • exploring a range of materials • shaping and joining materials • change materials. **Children use equipment to measure when:** • combining and mixing ingredients. **Children sort:** • materials.	• Can name the material they are using. • Can talk about one property of a material. • Can talk about ingredients for recipes. • Can talk about how mixtures change when ingredients are added. • Can talk about how materials change when cooked. • Can talk about how materials change when heated. • Can talk about how materials change when frozen.

	Year	Nursery (3 & 4-year-olds)	Topic	Electricity
	Understanding the World			
	• Explore how things work.			

Prior learning	Future learning
• Repeat actions that have an effect. (Birth to three)	• Identify common appliances that run on electricity. (Y4 - Electricity)

CREATING APPROPRIATE EXPERIENCES TO INITIATE LEARNING	
What adults might provide	**What adults might do**
Opportunities to identify electrical devices • Spotting devices that are plugged into power sockets in the classroom • Spotting devices that use batteries in the classroom • Sorting objects/photographs of objects according to whether they use electricity or not • Sorting objects/photographs of objects according to whether they use batteries and/or mains electricity. • Looking at shopping catalogues that include electrical devices **Opportunities to use battery-powered devices** • Using Code-a-Pillars, Bee-Bots, shopping tills, torches, remote control cars, talk cards/recording devices, hand-held fans **Opportunities to talk about how electrical devices work** • Describing what the devices do e.g. make a sound, make light, move • Suggesting that batteries may need charging or replacing when a device does not work	• Encourage children to find devices that are plugged into sockets. • Tell them to never plug in or unplug devices without adult supervision. • Encourage children to take photographs of electrical devices at home. • Encourage children to switch devices on and off that use batteries. • Tell children to never open the battery compartment of electrical devices without adult supervision. • Encourage children to talk about what electrical devices do. • Encourage children to talk about recharging devices e.g. remote control cars, hearing aids, tablets. • Encourage children to ask questions about electrical devices and how they work. • Encourage children to remind adults to switch off electrical devices to conserve electricity. **Encouraging scientific enquiry** *Classification* • Identify objects that use electricity to work. • Identify devices that use batteries and/or mains electricity.

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Vocabulary	Common misconceptions
Model and encourage children to use vocabulary such as: • battery, plug, socket, electricity, wire, sound, light, move Expose children to supplementary vocabulary such as: • mains electricity, device, appliance, electrical	Some children may think: • all batteries can be recharged • rechargeable devices do not have batteries.
Linked texts	**Linked careers**
	Opportunities in the role-play corner to talk about objects that use electricity • Electrician • Electrical goods retailer

HOW CHILDREN MIGHT SHOW THEIR LEARNING	
Characteristics of effective teaching and learning	
• Playing and exploring – children investigate and experience things, and 'have a go' • Active learning – children concentrate and keep on trying if they encounter difficulties, and enjoy achievements • Creating and thinking critically – children have and develop their own ideas, make links between ideas, and develop strategies for doing things	
Demonstrating skills and showing understanding	
What a child might be doing	**Possible evidence of learning**
Children ask questions, make observations and talk about what they are doing and have found out while carrying out a range of activities, such as: • identifying electrical devices • using battery-powered devices. **Children sort:** • electrical devices.	• Can identify devices that use batteries. • Can identify devices that use mains electricity. • Can switch battery-powered devices on and off. • Can describe what electrical devices do.

	Year	Nursery (3 & 4-year-olds)	Topic	Light
	Understanding the World			
	• Explore how things work. • Talk about the differences in materials and changes they notice.			

Prior learning	Future learning
• Repeat actions that have an effect. (Birth to three)	• Describe what they see, hear and feel whilst outside. (Reception) • Recognise that they need light in order to see things and that dark is the absence of light. (Y3 – Light) • Notice that light is reflected from surfaces. (Y3 – Light) • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Y3 – Light) • Recognise that shadows are formed when the light from a light source is blocked by an opaque object. (Y3 – Light) • Find patterns in the way that the size of shadows change. (Y3 – Light)

CREATING APPROPRIATE EXPERIENCES TO INITIATE LEARNING	
What adults might provide	**What adults might do**
Opportunities to explore light sources • Switching light sources on and off • Comparing the brightness of light sources • Using different light sources in dark dens with reflective and fluorescent stickers	• Model asking questions about light sources. • Encourage children to compare the brightness of different light sources. • Encourage children to talk about what they see in the dark den and how it changes when a light source is on or off. • Encourage children to talk about what they see when they shine light onto or through different objects or materials. • Encourage children to talk about how their reflection changes in different mirrors. • Support children to notice that they see their reflection on shiny objects and encourage them to predict which objects they will see their reflection in. • Encourage children to draw what they see in different mirrors. • Encourage children to ask questions about light sources.

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<table>
<tr><td>Opportunities to shine light on or through different materials
• Shining light on or through different objects and materials e.g. reflective, non-reflective, transparent, translucent, opaque, coloured filters, holographic paper, glitter ball
• Looking at their reflection in different types of mirrors e.g. plane, convex, concave and wobbly
• Looking for their reflection in other objects
• Making glitter pictures or pictures with reflective materials</td><td>Encouraging scientific enquiry

Comparative testing
• Compare how bright different light sources are.
• Compare how reflective different materials are.
Classification
• Which materials are reflective to use for an outside mobile?
• Which fabrics are reflective to help us be seen at night?
• Which materials block light to help us protect ourselves from the Sun?</td></tr>
<tr><td>Vocabulary</td><td>Common misconceptions</td></tr>
<tr><td>Model and encourage children to use vocabulary such as:
• light, torch, bulb, lamp, spotlight, shiny, bright, brighter, brightest, Sun, shine, glow, mirror
Expose children to supplementary vocabulary such as:
• light source, reflective, non-reflective, dim, dimmer, dimmest</td><td>Some children may think:
• light is only found in bright places
• shiny objects are light sources
• the moon is a light source.</td></tr>
<tr><td>Linked texts</td><td>Linked careers</td></tr>
<tr><td>Other texts
• We’re Going on a Bear Hunt by Michael Rosen
• Alfie Goes Camping by Shirley Hughes
• Can’t You Sleep Little Bear by Martin Waddell
• The Rabbit, the Dark and the Biscuit Tin by Nicola O'Byrne</td><td>Opportunities in the role-play corner to explore light sources
• Lighthouse keeper
• Railway signal person
• Theatre lighting designer
• Night construction worker
• Miner
• Road crossing supervisor</td></tr>
</table>

HOW CHILDREN MIGHT SHOW THEIR LEARNING	
Characteristics of effective teaching and learning	
• Playing and exploring – children investigate and experience things, and 'have a go' • Active learning – children concentrate and keep on trying if they encounter difficulties, and enjoy achievements • Creating and thinking critically – children have and develop their own ideas, make links between ideas, and develop strategies for doing things	
Demonstrating skills and showing understanding	
What a child might be doing	**Possible evidence of learning**
Children ask questions, make observations using simple equipment and talk about what they are doing and have found out while carrying out a range of activities, such as: • exploring light sources • shining light on or through different materials. **Children sort:** • light sources • materials. **Children record their observations when:** • looking at their reflection in different mirrors.	• Can name different light sources. • Can describe and compare the brightness of light sources. • Can identify reflective and non-reflective materials. • Can identify materials that block light. • Can spot their own reflection in objects.

	Year	Nursery (3 & 4-year-olds)	**Topic**	Forces

Understanding the World

- Explore how things work.
- Explore and talk about different forces they can feel.
- Talk about the differences between materials and changes they notice.

Links with other areas of learning

Expressive Arts and Design

- Join different materials and explore different textures.

Prior learning	Future learning
• Repeat actions that have an effect. (Birth to three)	• Explore the natural world around them. (Reception) • Describe what they see, hear and feel whilst outside. (Reception) • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 – Uses of everyday materials) • Compare how things move on different surfaces. (Y3 – Forces and magnets) • Observe how magnets attract or repel each other and attract some materials and not others. (Y3 – Forces and magnets) • Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. (Y3 – Forces and magnets) • Describe magnets as having two poles. (Y3 – Forces and magnets) • Predict whether two magnets will attract or repel each other, depending on which poles are facing. (Y3 – Forces and magnets) • Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. (Y5 – Forces)

CREATING APPROPRIATE EXPERIENCES TO INITIATE LEARNING

What adults might provide	What adults might do
Opportunities to feel forces • Pushing floating objects under water e.g. balloons, table tennis balls etc. • Exploring magnets of different shapes and sizes	• Encourage children to push floating objects under water and talk about how it feels the further they push the object under the water. • Encourage children to talk about what happens when they release an object under the water.

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- Exploring springs of different sizes, both compression and extension springs
- Using bikes and scooters on different surfaces and ramps

Opportunities to explore how things work

- Testing a range of objects to find out if they float or sink
- Playing games that contain springs e.g. bagatelle
- Playing with wind-up toys
- Racing wind-up toys
- Playing with gears and pulleys e.g. sets of gears, large playground pulleys etc.
- Playing with magnetic toys e.g. train carriages joined by magnets, magnetic construction kits etc.

Opportunities to explore how objects/materials are affected by forces

- Pushing, pulling, twisting and bending malleable (e.g. modelling clay, playdough, springs, pipe cleaners, elastics, sponges etc.) and non-malleable objects/materials
- Cutting and joining objects/materials e.g. wood, building kits with nuts and bolts etc.

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- Encourage children to play with the magnets talking about how they push away or pull towards each other.
- Encourage children to use bikes and scooters on different surfaces.
- Encourage children to ride scooters and bikes up and down ramps.
- Encourage children to drop objects into water and observe what happens.
- Encourage children to predict whether objects will float or sink.
- Encourage children to talk about how they change the shape of objects.
- Encourage children to talk about how they join materials together using different forces.
- Encourage children to talk about what they feel when using the woodwork tools and building kits.
- Encourage children to talk about how toys containing springs and elastics work.
- Encourage children to talk about how wind-up toys, pulleys and gear toys work.
- Encourage children to ask questions about forces, such as “What happens if I …?”

Encouraging scientific enquiry

Comparative testing

- Compare the path of different wind-up toys.
- Compare how far different wind-up toys move.
- Compare the speed and direction of gears.
- Compare how easy or hard it is to lift an object with or without a pulley.
- Compare how easy it is to ride a scooter or bike on different surfaces.

Classification

- Sort objects according to whether they float or sink.
- Sort objects/materials according to whether their shape can be changed.

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<td>Vocabulary</td>
<td>Common misconceptions</td>
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Model and encourage children to use vocabulary such as:

- object, float, sink, water, up, down, top, bottom, push, pull, magnet, spring, squash, bend, twist, stretch, turn, spin, smooth, rough, fast, slow

Expose children to supplementary vocabulary such as:

- rising, falling, attract, repel, faster, slower, pulley, gear, elastic

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Some children may think:

- big objects sink
- heavy objects sink
- an object such as an ice cube which is partially submerged is floating and sinking at the same time.

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Linked texts	Linked careers
Traditional stories and nursery rhymes • Wind the Bobbin Up *Other texts* • And Everyone Shouted "Pull" by Claire Llewellyn • Oscar and the Cricket by Geoff Waring • Newton and Me by Lynne Mayer • Astrokittens: Cosmic Machines by Dominic Walliman & Ben Newman • The Little Red Train: The Runaway Train by Benedict Blathwayt • Dig Dig Digging by Margaret Mayo • It's Only Stanley by Jon Agee	**Opportunities in the role-play corner to use forces to cut and join materials and objects** • Builder • Plumber • Carpenter • Engineer

HOW CHILDREN MIGHT SHOW THEIR LEARNING	
Characteristics of effective teaching and learning	
• Playing and exploring – children investigate and experience things, and 'have a go' • Active learning – children concentrate and keep on trying if they encounter difficulties, and enjoy achievements • Creating and thinking critically – children have and develop their own ideas, make links between ideas, and develop strategies for doing things	
Demonstrating skills and showing understanding	
What a child might be doing	**Possible evidence of learning**
Children ask questions, make observations and talk about what they are doing and have found out while carrying out a range of activities, such as: • feeling forces • exploring how things work • exploring how objects/materials are affected by forces. **Children sort:** • objects that float and sink • malleable and non-malleable materials.	• Can identify objects that float and sink. • Can identify objects whose shape can be changed and talk about how they changed their shape. • Can describe what they feel when exploring magnets. • Can describe what they feel and see when pushing, pulling, bending and twisting objects e.g. springs, elastics, wind-up toys, gears, pulleys etc. • Can describe what they feel when riding bikes and scooters on different surfaces and ramps.

Year	Nursery (3 & 4-year-olds)	Topic	Sound

Understanding the World

- Explore how things work.

Links with other areas of learning

Expressive Arts and Design

- Use drawing to represent ideas like movement or loud noises.
- Listen with increased attention to sounds.
- Respond to what they have heard, expressing their thoughts and feelings.
- Explore different materials freely, in order to develop their ideas about how to use them and what to make.
- Develop their own ideas and then decide which materials to use to express them.
- Join different materials and explore different textures.

Prior learning	Future learning
• Repeat actions that have an effect. (Birth to three)	• Describe what they see, hear and feel whilst outside. (Reception) • Identify how sounds are made, associating some of them with something vibrating. (Y4 – Sound) • Recognise that vibrations from sounds travel through a medium to the ear. (Y4 – Sound) • Find patterns between the pitch of a sound and features of the object that produced it. (Y4 – Sound) • Find patterns between the volume of a sound and the strength of the vibrations that produced it. (Y4 – Sound) • Recognise that sounds get fainter as the distance from the sound source increases. (Y4 – Sound)

CREATING APPROPRIATE EXPERIENCES TO INITIATE LEARNING

What adults might provide	What adults might do
Opportunities to listen to sounds • Listening to the sounds around them at different times and in different places • Playing listening games • Listening to recordings of different sounds and identifying what they are • Listening to visiting musicians • Making artwork based on the sounds that they hear	• Encourage children to describe the sounds they hear. • Encourage children to talk about how they make sounds using their bodies and musical instruments. • Encourage children to adapt the instruments they make, e.g. changing elastic bands on guitars, using different materials for drum skins etc., and talk about how the sound changes. • Encourage children to talk about how sounds and music make them feel.

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- Recording sounds they hear

Opportunities to make sounds

- Making sounds using their bodies
- Singing songs and rhymes
- Exploring toys and other objects that make a noise
- Hitting different objects with beaters of different materials to notice the different sounds they make
- Playing musical instruments
- Making and playing musical instruments e.g. shakers drums, guitars, kazoos and rainmakers etc.
- Recording the sounds they make

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- Encourage children to ask questions about sounds and how they are made.

Encouraging scientific enquiry

Comparative testing

- Compare the sound produced by shakers made with different materials.
- Compare the sound produced by different drums.
- Compare the sound produced by different elastic bands on their ‘guitar’.

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<tr>
<td>Vocabulary</td>
<td>Common misconceptions</td>
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Model and encourage children to use vocabulary such as:

- sound, noise, loud, quiet, high, low, music, bang, blow, pluck, soft, hard, fast, slow, names of instruments

Expose children to supplementary vocabulary such as:

- musician, notes, vibrate, vibration, pitch, rhythm, pulse, volume

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Some children may think:

- for a sound to be heard the listener has to actively concentrate on it first
- sounds travel only to someone who is listening for them
- sounds cannot go through obstacles
- volume and pitch are the same thing
- not all sounds are caused by vibrations.

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<td>Linked texts</td>
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Traditional stories and nursery rhymes

- The Wheels on the Bus
- Old MacDonald had a Farm

Other texts

- Peace at Last by Jill Murphy
- All Join In by Quentin Blake
- Pip and Posy: The Friendly Snail by Camilla Reid
- The Flute by Ken Wilson Max
- Mr Brown can moo, can you? by Dr Seuss
- Dinosaurs Roar by Henrietta Strickland
- Barnyard Banter by Denise Fleming
- Cats go … by Annie Horwood
- Sheep in a Jeep by Nancy Shaw
- Dogs go… by Annie Horwood

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Opportunities in the role-play corner to make and listen to sounds

- Musician
- Conductor
- Recording studio technician

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Demonstrating skills and showing understanding	
What a child might be doing	**Possible evidence of learning**
Children ask questions, make observations and talk about what they are doing and have found out while carrying out a range of activities, such as: • listening to sounds • making sounds. **Children record their observations when:** • listening to and making sounds • making artwork about the sounds they hear.	• Can make sounds using a range of objects. • Can recognise and describe the sounds made by different objects.