

Year 2 Science Curriculum

The National Curriculum for science intends that children's understanding of the nature, processes and methods of science is developed through different types of science enquiries that help them to answer scientific questions about the world around them. Within each year group, substantive (knowledge) content should be taught through practical opportunities that enable children to develop a range of 'Working Scientifically' skills. These skills, from the National Curriculum, are provided below and are then exemplified in relation to each science unit.

Year 1/2 Working Scientifically Skills			
Plan	Do	Record	Review
<ul style="list-style-type: none"> Ask simple questions and recognising that they can be answered in different ways. Make a simple prediction when appropriate. <i>Pupils in years 1 and 2 should explore the world around them and raise their own questions.</i> <i>They should experience different types of scientific enquiries, including practical activities, and begin to recognise ways in which they might answer scientific questions. They should use simple features to compare objects, materials and living things and, with help, decide how to sort and group them, observe changes over time, and, with guidance, they should begin to notice patterns and relationships. They should ask people questions and use simple secondary sources to find answers.</i> Non-statutory guidance from the National Curriculum in italics. 	<ul style="list-style-type: none"> Observe closely, using simple equipment Perform simple tests Identify and classify <i>They should use simple measurements and equipment (for example, hand lenses, egg timers) to gather data, carry out simple tests, record simple data, and talk about what they have found out and how they found it out.</i> 	<ul style="list-style-type: none"> Gather and record data to help in answering questions. Pupils may record in the following ways: <ul style="list-style-type: none"> Simple drawings/pictures Simple sentences and descriptions Photos Pictograms Simple charts and tables, e.g. tally charts Sorting circles or Venn diagrams Practical block graphs Drawn block graphs Making models 	<ul style="list-style-type: none"> Use their observations and ideas to suggest answers to questions <i>With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language.</i>

Statutory content is specified below and is supported by reference to non-statutory guidance. Non-statutory guidance is shown in *italics*

The six main types of enquiries are highlighted within each unit to ensure appropriate coverage across each year group.

Observing over time	Pattern Seeking	Identifying, Classifying and Grouping	Comparative and Fair testing	Researching using secondary sources	Exploring
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Unit and Vocabulary	Intent - statutory and non-statutory (<i>in italics</i>) content – Substantive (knowledge)	Intent –statutory and relevant non-statutory (<i>in italics</i>) content-Disciplinary (skills)
<p>Living things and their habitats</p> <p>New vocabulary Pond, garden, field, park, woodland, seashore, river, ocean, forest, rainforest, stones, rocks, logs, leaf litter, habitat, micro-habitat, living, dead, not living, alive, never been alive, healthy, food, food chain, depend, source of food, shelter, grow, growth, healthy, suited, suitable, basic needs, move, feed</p> <ul style="list-style-type: none"> Names of local habitats e.g. pond, woodland etc. Names of micro-habitats e.g. under logs, in bushes etc. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> 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. 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. <i>Pupils should be introduced to the idea that all living things have certain characteristics that are essential for keeping them alive and healthy.</i> <i>They should raise and answer questions that help them to become familiar with the life processes that are common to all living things.</i> 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> ask simple questions and recognise that they can be answered in different ways. make a simple prediction when appropriate. observe closely, using simple equipment. identify and classify. gather and record data to help in answering questions. Pupils may record in the following ways: <ul style="list-style-type: none"> Simple drawings/pictures Simple sentences and descriptions Photos Pictograms Simple charts and tables, e.g. tally charts Sorting circles or Venn diagrams Practical block graphs Drawn block graphs Making models use their observations and ideas to suggest answers to questions

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| | <ul style="list-style-type: none"> • <i>Pupils should be introduced to the terms 'habitat' (a natural environment or home of a variety of plants and animals) and 'micro-habitat' (a very small habitat, for example for woodlice under stones, logs or leaf litter).</i> • <i>They should raise and answer questions about the local environment that help them to identify and study a variety of plants and animals within their habitat and observe how living things depend on each other, for example, plants serving as a source of food and shelter for animals.</i> • <i>Pupils should compare animals in familiar habitats with animals found in less familiar habitats, for example, on the seashore, in woodland, in the ocean, in the rainforest.</i> | |
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Implementation-activity examples and cultural capital opportunities

***This topic should be taught throughout the academic year.**

Observing over time

- Pupils revisit familiar habitats throughout the year and make simple observations about changes e.g. the number of mini-beasts they find; how plants within the habitat change.

Key question

- **How do different habitats within the school grounds change over the year e.g. school pond, flowerbed, log pile, weed garden?**

Pattern Seeking

- Pupils identify patterns in where they find living things e.g. woodlice, spiders, moss, lichen, daisies.

Key questions

- **What conditions do woodlice prefer to live in?**
- **What conditions does moss/lichen grow in?**

Identifying and Classifying

- Explore the outside environment regularly to find objects that are living, dead and have never lived.
- Classify objects found in the local environment.
- Identify habitats/micro-habitats within the school grounds or local area.
- Within a habitat/micro-habitat identify what is living there (including plants) and, in simple terms, identify how they are suited to living there including what they eat.
- Compare two micro-habitats identifying similarities and differences.
- Sort pictures of plants/animals by the habitat they would be found in.

Key questions

- **How would you group these objects based on whether they are living, dead and have never lived?**
- **How many objects can you find/identify that are living, dead and have never lived?**
- **How would you group these plants and animals based on what habitat you would find them in?**
- **How many habitats/micro-habitats can you find in the school grounds or local area?**
- **What can you find living in this habitat/micro-habitat?**
- **How are two micro-habitats the same/different?**

Comparative and Fair Testing

- Measure the light levels in different habitats e.g. evergreen/deciduous woods.

Key questions

- **Is there the same level of light in the evergreen wood compared with the deciduous wood?**

Researching using secondary sources

- Create simple food chains for a familiar local habitat from first-hand observation and research.
- Research food chains in unfamiliar habitats e.g. a rainforest, savannah
- Compare two unfamiliar habitats. Use research to identify similarities and differences.

Key questions

- **How does the habitat of the Arctic compare with the habitat of the rainforest?**
- **What food chains can we identify in local habitats?**
- **How does the habitat of the rainforest compare with our wildlife area? Are there any similarities/differences?**

Exploring and Problem Solving

- Create simple food chains from information given e.g., in picture books (Gruffalo etc.).
- Pupils could make models of simple food chains using tin foil or plasticine. For more information about tin foil modelling see the PSTT Science for One 'Tinfoil' activity card, <https://pstt.org.uk/resources/curriculum-materials/Science-for-One>
- Design a new creature which could live in a real habitat. e.g. a new species of bird which lives in the artic/desert. How does it survive?
- Create food chains for alien life-forms living on a different planet.
- Explore the big question, 'how would you survive in the rainforest?'. See Explorify for more information, <https://explorify.uk/en/activities/the-big-question/how-would-you-survive-in-a-rainforest>

Key questions

- **What food chains can you identify in the Gruffalo?**
- **Can you design a new creature which could live in this habitat? How will it survive there?**
- **Can you create a food chain for alien life-forms on a different planet?**

Cultural capital opportunities:

Sustainable Development Goals: Number 13 Climate Action, Number 15 Life on land

Climate change links: Pupils could begin to learn about how climate change is affecting different habitats in the UK and around the world.

Visits/trips: A local park, nature reserve, animal sanctuary, wood, pond, stream/river, hedgerow or accessible field.

Visitors: A chef, nutritionist, personal trainer, sport scientist, vet, outreach officer from an animal/wildlife charity. See STEM Ambassadors, <https://www.stem.org.uk/stem-ambassadors> for support with finding visitors.

Scientists: Chris Packham (TV Presenter), Liz Bonnin (Conservationist).

***Make sure pupils are exposed to a diverse range of scientists including scientists who are working today. See,**

- **The PSTT** <https://pstt.org.uk/resources/curriculum-materials/ASJLM> & <https://pstt.org.uk/resources/curriculum-materials/Science-at-Work>
- **The Ogden Trust** <https://www.ogdentrust.com/resources/research-cards-women-in-physics>
- **STEM Sisters** <http://www.hmdt.org.uk/hmdtmusic/stemsisters/the-stem-sisters-2/>

	<ul style="list-style-type: none"> • Oxford Sparks https://www.oxfordsparks.ox.ac.uk/justaddimagination for resources to support this, Enrichment experiences: Visiting a local aquarium to observe aquatic habitats.
Subject Links	<p>English</p> <ul style="list-style-type: none"> • Pupils could write a comic strip or short story about the adventures of living things that they have found in a micro-habitat. Alternatively, this could be told verbally or performed as a short play. • Describe verbally or in writing living things that pupils have found in a micro-habitat. • Write short poems about different habitats. <p>Related texts</p> <ul style="list-style-type: none"> • The Gruffalo (Julia Donaldson) • Meerkat Mail (Emily Gravett) • No Place Like Home (Jonathon Emmett) • Lost and Found (Oliver Jeffers) <ul style="list-style-type: none"> ○ What animals live in a polar climate? ○ How do animals survive in very cold places? ○ Do all penguins live in cold places? How are those that don't adapted to their environment differently to those in very cold places? <p>Maths</p> <ul style="list-style-type: none"> • Pupils could record the number of living things they find in a 'micro-habitat' using a tally chart or simple table. • Pupils could represent data they have collected about 'micro-habitats' using pictograms. • Pupils ask and answer questions by counting the number of objects in a category (number of flowering plants in a garden, number of flying insects in an environment, etc.) and sorting the categories by quantity. • Pupils could use a Venn diagram to sort living and non-living objects and to use the results of sorting to discuss the difference between living, dead and have never lived. • Search for shapes and lines of symmetry in the living things found in different habitats (including plants). <p>DT</p> <ul style="list-style-type: none"> • Create models of different 'micro-habitats' and the living things that are found there. • Design and make a structure to encourage wildlife into an area of the school grounds e.g. bird boxes, bug hotels, butterfly homes or hedgehog houses. See 'Tree tools for Schools' for ideas to support this, https://www.treetoolsforschools.org.uk/activitymenu/?cat=outdoor_makes <p>PSHE</p> <ul style="list-style-type: none"> • Learn about the importance of caring for the local environment and not dropping litter.

Geography

- Create a simple map of the different habitats found in the school grounds.

Music

- Create simple pieces of music to evoke different habitats e.g. the sound of wind in trees or the ripple of water on a pond.

Art

- Draw/paint different habitats.
- Draw/paint different living things found in a variety of habitats.

PE

- Pupils could move like some of the living things that they have observed in different habitats.

Unit and Vocabulary:	Intent - statutory and non-statutory (<i>in italics</i>) content – Substantive (knowledge)	Intent –statutory and relevant non-statutory (<i>in italics</i>) content-Disciplinary (skills)
<p>Plants</p> <p>Vocabulary applicable to both KS1 plant topics Wild plants, garden plants evergreen trees, deciduous trees, common flowering plants, flowers, vegetables, leaf/leaves, flower, blossom petal, stem, trunk, branch root, seed, bulb, bud, growth grow, habitat, local, environment, leaf fall, water light, temperature healthy growth, survive, soil germinate, stages of growth</p>	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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 healthy. • <i>Pupils should use the local environment throughout the year to observe how different plants grow.</i> • <i>Pupils should be introduced to the requirements of plants for germination, growth and survival, as well as to the processes of reproduction and growth in plants.</i> • <i>Note: Seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them.</i> 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • ask simple questions and recognise that they can be answered in different ways. • make a simple prediction when appropriate. • observe closely, using simple equipment. • perform simple tests. • identify and classify. • gather and record data to help in answering questions. • Pupils may record in the following ways: <ul style="list-style-type: none"> ○ Simple drawings/pictures ○ Simple sentences and descriptions ○ Photos ○ Pictograms ○ Simple charts and tables, e.g. tally charts ○ Sorting circles or Venn diagrams ○ Practical block graphs ○ Drawn block graphs ○ Making models • use their observations and ideas to suggest answers to questions.

Implementation-activity
examples and cultural
capital opportunities

***This topic should be taught throughout the academic year.**

Observing over time

- Plant different seeds and observe what happens over a period of time. Planting seeds in clear containers allows pupils to observe the development of their roots.
- Make close observations and measurements of their plants growing from seeds and bulbs.

Key question

- **What happens to my bean after I have planted it?**

Pattern Seeking

- Provide a variety of different sized seeds. Plant them and observe patterns in their growth e.g. does the size of a seed effect how large it grows?

Key question

- **Do bigger seeds grow into bigger plants?**

Identifying and Classifying

- Observe seeds closely (at first-hand ideally) and identify what plants they will grow into using ID guides/photos.
- Identify similarities and differences between seeds and bulbs.

Key questions

- **What plants do these seeds grow into?**
- **How can we identify the trees that we observed on our tree hunt?**

Comparative and Fair Testing

- Grow seeds in different conditions and compare what effect this has on their growth rates e.g. without light/water, in different temperatures.
- Deprive fully grown plants of light/water and observe what effect this has on them.
- Place fully grown plants in very cold or warm conditions and observe what effect this has on them.
- Grow cress seeds inside and outside and compare growth rates.

Key question

- **Do cress seeds grow quicker inside or outside?**

Researching using secondary sources

- Research and plan when and how to plant a range of seeds and bulbs.
- Research unusual/exotic plants.

Key question

- **How does a cactus survive in a desert with no water?**

Exploring and Problem Solving

- Challenge pupils to make plant pots using a range of provided materials. See the Explorify ‘unusual plant pots’ problem solving activity for more information, <https://explorify.uk/en/activities/problem-solvers/unusual-plant-pots>

Key questions

- **How could you use these materials to make a plant pot?**
- **What properties does a material need to make a plant pot?**

Cultural capital opportunities:

Sustainable Development Goals: Number 13 Climate Action, Number 15 Life on land

Climate change links: Pupils can begin to learn about the impacts that pollution and climate change are having on plants in the UK and around the world. They could learn about some of the diseases that are affecting plants in the UK and beyond.

Visits/trips: A local garden centre, park, nature reserve, wood, pond, stream/river, hedgerow or accessible field.

Visitors: A gardener (professional or amateur), tree surgeon, botanist, agriculturalist. See STEM Ambassadors, <https://www.stem.org.uk/stem-ambassadors> for support with finding visitors.

Scientists: Agnes Arber (Botanist) Alan Titchmarsh (Botanist & Gardener)

Enrichment experiences: The class teacher could bring in unusual/exotic plants for the pupils to observe and care for e.g. venus fly traps, cacti.

Subject Links

English

- Write short poems about seeds/bulbs/plants.
- Describe seeds/plants verbally or in writing.
- Create a comic strip about the adventures of a seed (see Ten Seeds by Ruth Brown for inspiration). Alternatively tell or write a short story about the life of a seed. This could also be performed as a role play.

Related texts

- The Tin Forest (Helen Ward)
- Jack and the Beanstalk (Richard Walker)
- Ten Seeds (Ruth Brown)
- A Seed Is Sleepy (Dianna Aston)
 - **What is inside a seed/bulb?**
 - **Do smaller seeds germinate and grow more slowly?**
- Jasper’s Beanstalk (Nick Butterworth)
 - **How fast do plants grow?**
 - **Do all plants grow at the same speed?**
 - **What affects the speed at which plants grow?**

Maths

- Observing the growth of a plant will provide ample opportunities for pupils to use and apply their measuring skills (using either standard or non-standard units of measurement).
- Look for shapes/symmetry in plants growing in the classroom or school grounds.

DT

- Make models of different types of seeds/bulbs.

PSHE

- Learn about the importance of caring for plants growing in the local environment and beyond.

Geography

- Create simple maps showing the different plants that are growing in the school grounds.
- Learn about the different plants that are grown for food around the world.

History

- Learn about the different types of food that peoples from the past grew for food and how this has changed (or stayed the same) over time.

Art

- Draw/paint different plants growing in the school grounds or local area.
- Draw/paint different types of seeds/bulbs.
- Use seeds to make pictures.

Unit and Vocabulary	Intent - statutory and non-statutory (<i>in italics</i>) content – Substantive (knowledge)	Intent –statutory and relevant non-statutory (<i>in italics</i>) content-Disciplinary (skills)
<p>Animals, including humans</p> <p>Vocabulary applicable to both KS1 animals including humans topics</p> <p>names of common, animals: fish, amphibians, reptiles, birds, mammals, carnivores, herbivores, omnivores, human, body, senses, see, hear, feel, smell, taste, habitat, local environment, pet, wild animal, insect, minibeast, food, eat, head, neck, body, arms, legs, ears, eyes, nose, mouth, tongue, hands, feet, fingers, toes, elbows, knees, hair, teeth, grow, healthy, offspring, adults, young, water, air, survive, exercise, hygiene, egg, chick, chicken, caterpillar, pupa, moth, butterfly, tadpole, frog, frog spawn, lamb, sheep, calf, cow, foal, horse</p>	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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). • describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. • <i>Pupils should be introduced to the basic needs of animals for survival, as well as the importance of exercise and nutrition for humans.</i> • <i>They should also be introduced to the processes of reproduction and growth in animals. The focus at this stage should be on questions that help pupils to recognise growth; they should not be expected to understand how reproduction occurs.</i> • <i>The following examples might be used: egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. Growing into adults can include reference to baby, toddler, child, teenager, adult.</i> 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • ask simple questions and recognise that they can be answered in different ways. • observe closely, using simple equipment. • identify and classify. • gather and record data to help in answering questions. • Pupils may record in the following ways: <ul style="list-style-type: none"> ○ Simple drawings/pictures ○ Simple sentences and descriptions ○ Photos ○ Pictograms ○ Simple charts and tables, e.g. tally charts ○ Sorting circles or Venn diagrams ○ Practical block graphs ○ Drawn block graphs ○ Making models • use their observations and ideas to suggest answers to questions

Implementation-activity examples and cultural capital opportunities

Observing over time

- Observe how the offspring of different animals grow into adults (ideally first-hand) e.g. tadpoles, chicks, puppies, kittens, caterpillar. Pupils could observe webcams in birdboxes during the spring – see the RSPB, <https://www.rspb.org.uk/>
- Sequence photographs of the stages of development of different animals (including humans).
- Pupils record the types of food/drink and the amount of food/drink that they have over a day/week.
- Pupils could record the types of food/drink and the amount of food/drink that an animal kept at the school or a pet has over a day/week. They could then compare their diet to their own.

Key questions

- **How does a tadpole/chick/caterpillar change over time?**
- **How much food and drink do I have over a day/week?**
- **How much food and drink does the school hamster have over a day/week?**

Pattern Seeking

- Collect data on:
 - How often the pupils in the class wash their hands.
 - How often pupils in different year groups wash their hands.
 - How often adults in the school wash their hands.
- Look for simple patterns in the data collected above.

Key questions

- **Do girls wash their hands more than boys?**
- **Do adults wash their hands more than pupils?**
- **Do you wash your hands more/less the younger/older you are?**
- **Which age group of children wash their hands the most in a day?**

Identifying and Classifying

- Match pictures of animals with their offspring and vice versa.
- Explore the school grounds/local area and collect different objects. Classify them as living, dead or never been alive.
- Challenge pupils to collect as many things that have never been alive or that are living/dead.

Key questions

- **Which offspring belongs to which animal?**
- **How would you group things to show which are living, dead, or have never been alive?**

Comparative and Fair Testing

- Pupils could investigate whether eating different types of food enables them to run faster.
- Pupils could do different types of exercise and describe in simple terms what effects it has on their bodies.

Key questions

- **How does exercise make you feel? What effect does it have on your body?**
- **Do bananas make us run faster?**

Researching using secondary sources

- Research what you need to eat to stay healthy.
- Research why exercise is important for staying healthy.
- Research how to look after different pets and keep them healthy. See the RSPCA for resources to support this, <https://education.rspca.org.uk/education/teachers/primary/lessonplans/pets>

Key questions

- **What food do you need in a healthy diet and why?**
- **What do you need to do to look after a pet dog/cat/lizard and keep it healthy?**

Exploring and Problem Solving

- Explore the big question, 'how clean are your hands?'. See Explorify for more information, <https://explorify.uk/en/activities/the-big-question/how-clean-are-your-hands>

Key question

- **How can we find out how clean our hands are?**

Cultural capital opportunities:

Sustainable Development Goals: Number 13 Climate Action, Number 15 Life on land

Climate change links: Pupils could begin to learn how climate change is affecting different animals.

Visits/trips: A local farm, Zoo or animal sanctuary.

Visitors: A doctor, nurse, health visitor, zoologist or biologist. See STEM Ambassadors, <https://www.stem.org.uk/stem-ambassadors> for support with finding visitors.

Scientists: Steve Irwin (Crocodile Hunter), Robert Winston (Human Scientist) Joe Wicks (Personal Trainer)

Enrichment experiences: Pupils could visit a sheep farm at lambing time.

Subject Links

English

- Pupils could design/write posters to persuade people to eat healthily and exercise.
- Pupils could write their own simple version of Monkey Puzzle by Julia Donaldson.

Related texts

- The Gruffalo (Julia Donaldson)
 - **How could we classify the animals in the story?**
 - **How could we classify the Gruffalo?**
- Meerkat Mail (Emily Gravett)
- Tadpole's Promise (Jeanne Willis and Tony Ross)
 - **What are the similarities and differences in the life cycles of a frog and a butterfly?**
 - **What other insects go through metamorphosis?**
- Monkey Puzzle (Julia Donaldson)
 - **Do all baby animals look like their mothers?**
 - **How do different animals change as they grow?**

Maths

- Learn how many days/weeks/months it takes different animals to grow into an adult. Identify differences between animals.
 - Which animal takes the longest/shortest amount of time to grow into an adult?
- Pupils could apply their knowledge of capacity, l, ml by measuring how much water they drink in a day.

DT

- Make models of different types of animal using plasticine, playdoh, 'junk' modelling materials or modelling clay.

PSHE

- Learn about the importance of caring for animals in the local area both wild and domesticated. Learn about what to do if pupils find an animal that is hurt or in distress.
- Learn about the importance of exercise and staying healthy.

Geography

- Learn about animals around the world that are able to survive in extreme conditions e.g. The Fennec Fox, Camel or Polar Bear.

History

- Learn about what peoples from the past ate e.g. the Romans, Vikings, Tudors etc. Assess how healthy their diets were.

Music

- Learn about the 'Carnival of the Animals' classical piece of music by Saint-Saens.
- Create simple pieces of music to evoke different types of animal.

Art

- Draw/paint different animals.
- Create collages of different animals.

PE

- Explore the effects of exercise on the pupil's bodies during PE lessons.

Unit and Vocabulary	Intent - statutory and non-statutory (<i>in italics</i>) content – Substantive (knowledge)	Intent –statutory and relevant non-statutory (<i>in italics</i>) content-Disciplinary (skills)
<p>Uses of everyday materials</p> <p>everyday materials, wood, paper, plastic, metal, glass, water, rock, brick, stone, fabric, material, foil, elastic, dough, rubber, card, cardboard, clay, object, make/made, hard/soft, shiny/dull, stretchy/stiff, rough/smooth, bendy/not bendy, waterproof/not, waterproof, transparent/opaque, absorbent/not absorbent, squash, twist, bend, stretch</p>	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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. • <i>Pupils should identify and discuss the uses of different everyday materials so that they become familiar with how some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles) or different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass).</i> • <i>They should think about the properties of materials that make them suitable or unsuitable for particular purposes and they should be encouraged to think about unusual and creative uses for everyday materials.</i> • <i>Pupils might find out about people who have developed useful new materials, for example John Dunlop, Charles Macintosh or John McAdam.</i> 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • ask simple questions and recognise that they can be answered in different ways. • make a simple prediction when appropriate. • observe closely, using simple equipment. • perform simple tests. • gather and record data to help in answering questions. • Pupils may record in the following ways: <ul style="list-style-type: none"> ○ Simple drawings/pictures ○ Simple sentences and descriptions ○ Photos ○ Sorting circles or Venn diagrams • make models • use their observations and ideas to suggest answers to questions

Implementation-activity examples and cultural capital opportunities

Observing over time

- Bury different types of material (organic/human-made) in the ground. Dig-up after several weeks and observe how the materials have changed
- Leave materials outside, exposed to the elements (but secured so they don't blow away). After several weeks observe how they have changed.
- Leave materials in different levels of light/heat e.g. in a cupboard, on a sunny windowsill, near to a radiator. After several weeks observe how they have changed.
- Observe how long bubble bath bubbles or bubble mixture bubbles last for.

Key questions

- **How do materials change with heat? Leave outside in sunshine/windowsill/radiator**
- **How long do bubble bath bubbles or bubble mixture bubbles last for?**

Pattern Seeking

- Pupils could add increasing amounts of water to sheets of kitchen towel and then test their strength by hanging weights off of them.
- Pupils could investigate whether the thickness of paper/card affects how strong it is.

Key questions

- **How does the amount of water affect the strength of a kitchen towel?**
- **Does the thickness of paper/card affect how strong it is?**

Identifying and Classifying

- Pupils investigate which materials they think will sink/float. They could predict in advance which materials they think will sink/float and sort the materials accordingly. Ideally provide some materials that will challenge pupils' preconceived ideas e.g. pumice stone that will float and a very heavy type of wood that will sink.

Key questions

- **Which materials will float and which will sink?**
- **Which materials are shiny and which are dull?**

Comparative and Fair Testing

- Compare different types of bubble mixture (including getting pupils to make their own) and observe which mixture produces bubbles that last the longest/are the strongest.
- Carry out simple comparative tests to find out which materials (or shapes) are best to build a paper bridge or tall tower?
- Carry out simple comparative tests to test the properties of materials for particular uses e.g. compare the stretchiness of fabrics to select the most appropriate for Elastigirl's costume, test materials for waterproofness to select the most appropriate for a rain hat, test materials to select the most appropriate for a hamster's bed.

Key questions

- Which shapes make the strongest paper bridge?
- Which materials enable you to make the tallest tower?
- Which material would be best for the roof/walls of the little pig's house?
- Which bubble mixture produces the longest lasting or strongest bubbles?

Researching using secondary sources

- Research how the materials that we have used for different purposes have changed over time e.g. they could research how the materials that we use to build houses have changed.
- Research how different human-made materials have changed over time e.g. metals, plastic
- Research how bricks are made.

See <https://www.bbc.co.uk/teach/class-clips-video/primary-science-how-are-bricks-made/z4sygwx>

Key questions

- How have our use of materials changed over time?
- How have the materials we use changed over time?
- How are plastics made?
- How are bricks made?

Exploring and Problem Solving

- Explore the big question, 'how would you make a shelter for a human?'. See Explorify for more information, <https://explorify.uk/en/activities/the-big-question/how-would-you-make-a-shelter-for-a-human>
- Challenge pupils to think of creative ways to reuse plastic. See the Explorify, 'Plastic Fantastic' problem solvers activity, <https://explorify.uk/en/activities/problem-solvers/plastic-fantastic>
- Challenge pupils to design an outfit that will keep them warm during the winter. See the Explorify, 'Keep out of the cold' problem solvers activity, <https://explorify.uk/en/activities/problem-solvers/keep-out-the-cold>
- Use different materials to make a structure to protect an egg when it is dropped from a height.

Key questions

- How would you make a shelter for a human?
- How can we reuse plastic waste?
- How can we design an outfit to keep us warm in the winter?
- How can you use some or all of these materials to make an 'egg protector'?

	<p>Cultural capital opportunities:</p> <p>Sustainable Development Goals: Number 13 Climate Action, Number 15 Life on land</p> <p>Climate change links: Pupils could learn about how climate change will change what materials we use to make our clothes and buildings.</p> <p>Visits/trips: A factory where materials are produced. A recycling centre. A local science centre.</p> <p>Visitors: People who use materials as part of their job e.g. builders, architects, engineers, artists. Environmental campaigners against plastic waste.</p> <p>Scientists: William Addis (Toothbrush Inventor), Charles Mackintosh (Waterproof coat), John McAdam (roads)</p> <p>Enrichment experiences:</p> <ul style="list-style-type: none"> • Explore unusual materials like 'silly putty'. • Make mud bricks (using ice-cube trays) and use them to make walls and simple buildings. • Children could make their own playdough and then explore its properties.
<p>Subject Links</p>	<p>English</p> <ul style="list-style-type: none"> • Describe different materials verbally or in writing. • Write their own version of the Three Little Pigs using different materials for the houses (ideally based on their own investigations). <p>Related texts</p> <ul style="list-style-type: none"> • The Tin Forest (Helen Ward) • Traction Man (Mini Grey) • Three Little Pigs (Lesley Sims) • Little Lumpty (Miko Imai) <ul style="list-style-type: none"> ○ Which material will be best to catch a falling egg? ○ How far can an egg fall without breaking? ○ Is an egg more likely to break if it falls on its side or its head? • Santa is Coming to Leeds—Steve Smallman (other cities available) <ul style="list-style-type: none"> ○ It's very rainy in Leeds! Which material will be best to cover the presents on Santa's sleigh to stop them getting wet? • NoBot (Sue Hendra) <ul style="list-style-type: none"> ○ Which material will be the best to stick Bernard the robot's bottom back on? • Aliens Love Underpants (Claire Freedman) <ul style="list-style-type: none"> ○ Which underpants have the best pingy pants elastic for catapulting aliens around? • Lost & Found (Oliver Jeffers) <ul style="list-style-type: none"> ○ Which material(s) will be best to make a boat to transport a penguin back to the South Pole?

Maths

- Placing weights on materials to test their strength will provide opportunities for pupils to use and apply their knowledge of kg and g.
- Testing the absorbency/waterproofness of different materials will provide opportunities for pupils to use and apply their knowledge of l and ml.

DT

- Use materials to make boats, towers, bridges which they then test for buoyancy/strength.

History

- Learn about how our use of materials has changed over time e.g. for building houses, roads, bridges etc.
- Learn about the inventions of John Dunlop, Charles Macintosh and John McAdam.

Music

- Use recycled materials to make simple musical instruments.

Art

- Use different materials to make collages.

PE

- Explore what materials are used during PE lessons and how.

<p>Criteria to assess readiness for next year group</p>	<p>Working at the expected standard</p> <p>Working scientifically</p> <p>The pupil can, using appropriate scientific language from the national curriculum:</p> <ul style="list-style-type: none"> • ask their own questions about what they notice • use different types of scientific enquiry to gather and record data, using simple equipment where appropriate, to answer questions: <ul style="list-style-type: none"> ○ observing changes over time ○ noticing patterns ○ grouping and classifying things ○ carrying out simple comparative tests ○ finding things out using secondary sources of information ○ communicate their ideas, what they do and what they find out in a variety of ways <p>Science content</p> <p>The pupil can:</p> <ul style="list-style-type: none"> • name and locate parts of the human body, including those related to the senses [year 1], and describe the importance of exercise, a balanced diet and hygiene for humans [year 2] • describe the basic needs of animals for survival and the main changes as young animals, including humans, grow into adults [year 2] • describe the basic needs of plants for survival and the impact of changing these and the main changes as seeds and bulbs grow into mature plants [year 2] • identify whether things are alive, dead or have never lived [year 2] • describe and compare the observable features of animals from a range of groups [year 1] • group animals according to what they eat [year 1], describe how animals get their food from other animals and/or from plants, and use simple food chains to describe these relationships [year 2] • describe seasonal changes [year 1] • name different plants and animals and describe how they are suited to different habitats [year 2] • distinguish objects from materials, describe their properties, identify and group everyday materials [year 1] and compare their suitability for different uses [year 2].
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