



# Knowledge Progression



## Year 1/2 Science Cycle 2

	Everyday Materials TERM: Aut 1	Uses of Everyday Materials TERM: Aut 2	Plants (Y2) TERM: Spr 1 & 2	Living things and their Habitats (Y2) TERM: Sum 1 & 2
Key Vocabulary	Materials – wood, plastic, glass, metal, rock, brick, paper, card, water, rubber, wool Properties – soft, hard, bendy, floppy, stiff, waterproof, dull, absorbent, stretchy, floppy, shiny, rough, smooth, flat, bumpy, sharp, blunt, strong, magnet, magnetic, non-magnetic, breaks/tears, see-through, transparent, not see-through	Names of materials – wood, metal, plastic, glass, brick, rock, paper, cardboard Properties of materials – as for Year 1 plus opaque, transparent and translucent, reflective, nonreflective, flexible, rigid Shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching	As for Cycle 1: Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud, deciduous, evergreen, botanist. Names of trees in the local area – e.g. sycamore, horse chestnut, beech, oak, silver birch Names of garden and wild flowering plants in the local area – e.g. daisy, buttercup, dandelion, forget-me-not, bluebell, daffodil, lily of the valley, cow parsley, foxglove, rose. Plus: light, shade, sun, warm, cool, water, grow, healthy, germination, bulb.	Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, zoologist. Names of local habitats e.g. pond, woodland etc. Names of micro-habitats e.g. under logs, in bushes etc
Previous knowledge/ Learning	In EYFS, children will have explored different materials in the provision areas, including constructing with them, exploring them in the water area, and using them in the other areas of provision. They may have a basic understanding of what objects are made from and some simple physical properties.	In the previous unit, children will have learned to: 1. Distinguish between an object and the material from which it is made 2. Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock 3. Describe the simple physical properties of a variety of everyday materials 4. Compare and group together a variety of everyday materials on the basis of their simple physical properties	In the Cycle 1 unit (if already undertaken), children will have: 1. Learnt to Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees 2. Learnt to Identify and describe the basic structure of a variety of common flowering plants, including trees	<ul style="list-style-type: none"> <li>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1 - Plants)</li> <li>Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1 - Plants)</li> <li>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 - Animals including humans)</li> <li>Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals including humans)</li> <li>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 – Animals, including humans)</li> <li>Observe changes across the four seasons. (Y1 - Seasonal changes)</li> </ul>
N.C. Objectives	<ol style="list-style-type: none"> <li>Distinguish between an object and the material from which it is made</li> <li>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</li> <li>Describe the simple physical properties of a variety of everyday materials</li> <li>Compare and group together a variety of everyday materials based on their simple physical properties</li> </ol>	<ol style="list-style-type: none"> <li>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</li> <li>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</li> </ol>	<ol style="list-style-type: none"> <li>Observe and describe how seeds and bulbs grow into mature plants</li> <li>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</li> </ol>	<ol style="list-style-type: none"> <li>Explore and compare the differences between things that are living, dead, and things that have never been alive</li> <li>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</li> <li>Identify and name a variety of plants and animals in their habitats, including microhabitats</li> <li>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</li> </ol>
Resources/ Assessment	<u>LOCATIONS OF PLANNING/RESOURCE</u> Materials Hunt and Transparency Investigations – TAPS focused assessments	<u>LOCATIONS OF PLANNING/RESOURCE</u> Bridge Testers Investigation – TAPS focused assessments Rosie Revere, Engineer by Andrea Beaty - Rhyming story about budding engineer Rosie who discovers that failures are an important step on the way to success. Wood, Wire, Wings by Kirsten W. Larsen - The story of self-taught engineer Emma Lillian Todd and her endeavours to build an aeroplane in the early 1900s	<u>LOCATIONS OF PLANNING/RESOURCE</u> Plant Growth Investigation – TAPS focused assessments Seeds of Change by Jen Cullerton Johnson - Picture book biography of Wangari Maathai, the first African woman – and environmentalist – to win a Nobel Peace Prize.	<u>LOCATIONS OF PLANNING/RESOURCE</u> Living and Non-Living, and Woodlice Habitat Investigation – TAPS focused assessments Evelyn the Adventurous Entomologist by Christine Evans - The story of Evelyn Cheesman, who travelled the world searching for bugs at a time when women were expected to stay at home.
Enquiry and Working Scientifically	<b>GROUPING, IDENTIFYING AND CLASSIFYING</b>  Working Scientifically Skills: Identifying and classifying Gathering and recording data to help in answering questions	<b>COMPARATIVE TESTING</b>  Working Scientifically Skills: Asking simple questions and recognising that they can be answered in different ways. Performing simple tests Gathering and recording data to help in answering questions	<b>RESEARCH USING SECONDARY SOURCES/ FAIR TESTING</b>  Working Scientifically Skills: Identifying and classifying Observing closely using simple equipment Asking simple questions and recognising that they can be answered in different ways. Performing simple tests Gathering and recording data to help in answering questions	<b>GROUPING, IDENTIFYING AND CLASSIFYING/ PATTERN SEEKING</b>  Working Scientifically Skills: Gathering and recording data to help in answering questions Identifying and classifying



# Knowledge Progression

## Year 1/2 Science Cycle 2



### Everyday Materials

TERM: Aut 1

### Uses of Everyday Materials

TERM: Aut 2

### Plants (Y2)

TERM: Spr 1 & 2

### Living things and their Habitats (Y2)

TERM: Sum 1 & 2

Key Knowledge – what do we want our children to know before they leave our year group? How will we get them there? How is that personalised to Tranmere?

**POWERFUL KNOWLEDGE:**

**OUR CHILDREN WILL KNOW THAT:**

- S1 - All objects are made of one or more materials.
- S2 - Some objects can be made from different materials e.g. plastic, metal or wooden spoons.
- S3 - Materials can be described by their properties (e.g. hard/soft, shiny/dull, stretchy/stiff, rough/smooth, solid/runny, bendy/not bendy, waterproof/not waterproof, absorbent/not absorbent, heavy/light, see through (transparent/not see through (opaque), etc.)
- S4 - Some materials e.g. plastic can be in different forms with very different properties and that we match a materials property to its purposes.

**COMMON MISCONCEPTIONS**

- Some children may think:
- only fabrics are materials
  - only building materials are materials
  - only writing materials are materials
  - the word 'rock' describes an object rather than a material
  - 'solid' is another word for hard.

**HOW DOES THIS LOOK AT TRANMERE?**

1. Children will classify objects made of one material in different ways e.g. a group of objects made of metal. They will classify in different ways one type of object made from a range of materials e.g. a collection of spoons made of different materials and will classify materials based on their properties (see above).
2. **Today we are materials scientists.** Children will go on a materials hunt. Recap prior learning with the children by identifying and naming a variety of everyday materials in the classroom, e.g. wood, plastic, glass, metal, and rock. Consider how to classify objects which are made from more than one material e.g. record most important part or make a 'mixed materials' row on recording table. Ask groups of children to go on a material hunt around a designated section of the school/grounds, collecting their findings for different areas on a pre-prepared table and/or using a camera. Collate class results, noting with the children different ways to record data clearly.
3. Children will test the properties of objects. Explore a range of materials e.g. foil, shiny fabric, glossy acetate, shiny paper, brightly coloured paper, netting... list words to describe their properties on a whiteboard (see above). Explain that a material is transparent if we can see details through it and opaque if we cannot see anything at all. Ask children to look through a translucent material (e.g. bubble wrap) and explain that this is translucent because we can see light but not details. Discuss how to test which are the most transparent, e.g. look through the material at a window or at a lamp or shine torchlight through or take a photo through it. What can you see? Groups test and sort a range of materials (for a purpose, e.g. to find the best material for making a windscreen for a car?). Children return to sit in a circle and consider one group's sorting / ordering – do you agree? Would you move any? Why? Adult collect children's ideas to gather the data.

**POWERFUL KNOWLEDGE:**

**OUR CHILDREN WILL KNOW THAT:**

- S5 - All objects are made of one or more materials that are chosen specifically because they have suitable properties for the task. For example, a water bottle is made of plastic because it is transparent allowing you to see the drink inside and waterproof so that it holds the water.
- S6 - When choosing what to make an object from, the properties needed are compared with the properties of the possible materials. The children will identify these through simple tests and classifying activities.
- S7 - A material can be suitable for different purposes and an object can be made of different materials. e.g. wood = floors, matches and spoons. But spoons can also be made of plastic and metal.
- S8 - Objects made of some materials can be changed in shape by bending, stretching, squashing, and twisting. For example, clay can be shaped by squashing, stretching, rolling, pressing etc. This can be a property of the material or depend on how the material has been processed e.g. thickness.

**COMMON MISCONCEPTIONS**

- Some children may still think:
- only fabrics are materials
  - only building materials are materials
  - only writing materials are materials
  - the word rock describes an object rather than a material
  - solid is another word for hard.

**HOW DOES THIS LOOK AT TRANMERE?**

1. Children will explore how materials can change shape using clay, plastic and rubber (bands). They will look at how the materials change shape (see above).
2. Children will classify materials by their properties. They will explore what objects around them are made of by extending the investigation from the previous unit on the materials hunt to discuss why particular materials were used for those particular uses. They will make suggestions about alternative materials for the purpose (e.g. chairs made from wood instead of plastic) and will discuss why these alternate materials are suitable and/or unsuitable.
3. Children will test the properties of materials for particular uses. They will investigate (including brick, paper, wood, fabric, foil, elastic) to find the 'best' material for a house, raincoat and bookshelf. It is important that you define the word 'best' for each purpose before starting. What properties does the object need to have?
4. **Today we will be engineers** (DT link). Show pictures of different types of bridges (local if possible). Discuss similarities and differences between e.g. Flat or beam bridge, Arch bridge, Beam bridge and Concertina bridge. How do we find out which bridge shape is the strongest? Children will test different materials before discussing and selecting suitable materials for the bridge. The bridge needs to be strong, but what other properties are important? Discuss success criteria for a fair comparison which groups will need to decide upon: same number of books on each side, same gap, same test objects (pennies/blocks etc). What should we record? E.g. number of pennies before the bridge falls. Children to record results in a table. After testing ask children to identify the strongest and weakest bridge shape. Then, compare results from different groups and discuss reasons for differences.

**POWERFUL KNOWLEDGE:**

**OUR CHILDREN WILL KNOW THAT:**

- S9 - Plants may grow from either seeds or bulbs. These then germinate and grow into seedlings which then continue to grow into mature plants. These mature plants may have flowers which then develop into seeds, berries, fruits etc.
- S10 - Seeds and bulbs need to be planted outside at particular times of the year and they will germinate and grow at different rates.
- S11 - Some plants are better suited to growing in full sun and some grow better in partial or full shade.
- S12 - Plants also need different amounts of water and space to grow well and stay healthy.
- S13 - Know that all living things grow, consume nutrients and reproduce.

**COMMON MISCONCEPTIONS**

- Some children may think:
- plants are not alive as they cannot be seen to move
  - seeds are not alive
  - all plants start out as seeds
  - seeds and bulbs need sunlight to germinate.

**HOW DOES THIS LOOK AT TRANMERE?**

1. Children will make close observations of seeds and bulbs, classifying them based on their characteristics and noting their role in reproduction. Children are given a selection of seeds and bulbs on their table and asked to have a look at them and talk about what they notice. They were not told what they were. The children were then asked to think about how they could sort the objects. E.g. size, colour, texture. They will also then sort them into seeds and bulbs. These will include narcissus bulb, alliums sunflower seeds, pinto beans, lima beans, watermelon and spinach seeds, marigolds, poppy, nasturtium, radish and beans. (These can also be used to plant – see below).
2. They will research and plan when and how to plant a range of seeds and bulbs, planting them and looking after the plants as they grow – weeding, thinning, watering etc.
3. Children will make close observations and measurements of their plants growing from seeds and bulbs, making comparisons between plants as they grow.
4. They will discuss that plants reproduce, and how seeds are part of this process.
4. Children investigate what plants need to keep healthy. Raise questions they would like to investigate, e.g. How long can plants last without water / light? Does it matter if the plant is inside or outside? How will less light affect the plant? Use pre-grown plants to explore conditions for growth, e.g. Compare NORMAL CONDITIONS (on window sill + water + light + warm + nutrients) with: No/less/more WATER or No/less/more LIGHT or No/less/more WARMTH. Discuss what they think will happen to plants without water/sun/warmth and how to record observations e.g. labelled drawings every few days to make plant diaries. Children need to observe and measure the plants over time using simple equipment e.g. cameras, rulers, measuring tape, magnifiers. Discuss what the class results show about what a plant needs to grow and to stay healthy. In addition, notice whether plants grow at the same rate.

**POWERFUL KNOWLEDGE:**

**OUR CHILDREN WILL KNOW THAT:**

- S14 - All objects are either living, dead or have never been alive. Living things are plants (including seeds) and animals. Dead things include dead animals and plants and parts of plants and animals that are no longer attached e.g. leaves and twigs, shells, fur, hair and feathers (this is a simplification but appropriate for year 2 children).
- S15 - An object made of wood is classed as dead. Objects made of rock, metal and plastic have never been alive (again ignoring that plastics are made of fossil fuels).
- S16 - Animals and plants live in a habitat to which they are suited which means that animals have suitable features that help them move and find food and plants have suitable features that help them to grow well. The habitat provides the basic needs of the animals and plants – shelter, food and water. Within a habitat, there are different micro-habitats e.g. in a woodland – in the leaf litter, on the bark of trees, on the leaves. These micro-habitats have different conditions e.g. light or dark, damp or dry. These conditions affect what plants and animals live there. The plants and animals in a habitat depend on each other for food and shelter etc. The way that animals obtain their food from plants and other animals can be shown in a food chain.

**COMMON MISCONCEPTIONS**

- Some children may think:
- an animal's habitat is like its 'home'
  - plants and seeds are not alive as they cannot be seen to move
  - fire is living
  - arrows in a food chain mean 'eats'. It shows the flow of energy through the food chain
  - a deciduous tree is dead in the winter.

**HOW DOES THIS LOOK AT TRANMERE?**

1. Elicitation - **Today we are zoologists.** Using a range of objects and pictures to explore, including some plants, use sorting hoops or similar to explore ideas about which are alive now, which used to be alive and which have never been alive. Ask the children to explain how they decide, drawing out characteristics of living things. Ask them to continue sorting and add their own ideas. Explore any new ideas and address any misconceptions.
2. Explore the outside environment regularly to find objects that are living, dead and have never lived, and classify objects found in the local environment.
3. Children will observe animals and plants carefully, drawing and labelling diagrams. This will include minibeasts such as woodlice and plants such as daisies and buttercups. They will label the features they observe (e.g. leaf or legs) and will note down where the living thing was found.
4. Children will learn about habitats and micro habitats (see S16) and using their annotated drawings, will discuss how the living things are suited to their environment. Children will also compare these to polar bears and cacti and the habitats they live in.
5. **Today we are zoologists** and we are going on a woodlice hunt. Children will discuss what a habitat is and different habitats e.g. use pictures of plants/animals and consider where they live. What about this creature? Show picture of a woodlouse (or substitute for another animal which is common in your context at the time of year). What kinds of habitats do woodlice live in? Consider places in the locality where we could look for woodlice. Decide whether to tally woodlice in different places or broaden to any invertebrates. Support children to set up a tally chart or map ready to record their results.
6. Children will create simple food chains for a familiar local habitat (this could include the British countryside – e.g. grass, rabbit, fox, or their gardens – e.g. dead leaf, earthworm, blackbird, sparrow hawk) from first-hand observation and research, and create simple food chains from information given e.g. in picture books (Gruffalo etc.).