

Plants

Year 1: Plants

Classifying: Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting.

- Allow children to classify leaves, flowers, and seeds, choosing their own criteria.

Observing over time: Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations.

- Observe a tree through the year.
- Observe a trail/patch to identify how plants change through the year.

Pattern seeking: Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting.

- Based on observations, encourage children to identify patterns e.g. after comparing the size of leaves on different plants, children may suggest

Comparative/Fair testing

- Not relevant

Researching: Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made measurements they have taken or information they have gained from secondary sources.

Use secondary sources to name plants (including trees) based on observations of leaves, seeds, flowers, buds, and bark

Year 2: Plants

Classifying: Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting. They use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing.

- Based on the children's own criteria:
 - classify seeds
 - classify bulbs.

Observing over time: Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations. They begin to take measurements, initially by comparisons, then using non-standard units.

- Plant seeds and bulbs and observe how they grow.

Pattern seeking: While exploring the world, the children develop their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). Where appropriate, they answer these questions.

- Children generate questions for investigation such as:
 - Do big seeds germinate more quickly?
 - Does it matter which way round you plant a bulb or seed?
 - Which comes first, the root or the shoot?

Comparative/Fair testing

- Not relevant

Researching: Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources.

- Use secondary sources to name plants and animals seen in the local environment that they may not currently be able to name (Leafsnap UK on Apple App Store, SEEK INaturalist on google play and Apple App Store, textbooks, Woodland Trust resources).
- Research what animals they have first-hand experience of eat.

Year 3: Plants

Classifying: The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classifications e.g. using tables, Venn diagrams, Carroll diagrams.

- Classify flowers based on the children's own criteria. (This does not meet the curriculum objectives for this topic, but it is a good opening activity to assess prior knowledge.)

Observing over time: The children make systematic and careful observations.

- Observe celery (with roots and leaves) in coloured water.
- Observe white carnations (freshly cut) in coloured water.
- Gather seeds and photographic evidence of blossoms/flowers and berries on a particular trail throughout the year.

Pattern seeking: Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships

- Investigate what happens when conditions are changed e.g. more/less light/water, change in temperature, nutrients (Baby Bio vs other brands).

Comparative/Fair testing

- Not relevant

Researching: Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question.

- Research the functions of the parts of flowering plants.
- Research different methods of seed dispersal.
- Research different methods of pollination.

Living things and their habitats

Year 2: Living things and their habitats

Classifying: Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting.

- Find things that are living.
- Find things that are dead.
- Find things that have never been alive.
- Classify things found in the environment (choosing their own criteria to do so), leading to living, dead and never been alive.
- Classify minibeasts found in the environment based on physical structure.
- Classify plants found in the environment.

Observing over time: Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations. They begin to take measurements, initially by comparisons, then using non-standard units.

- Explore animals in micro-habitats throughout the year (under a rock, under a log, in a pond, in a bush, in the long grass).
- Explore plants in micro-habitats throughout the year (e.g. woodland area, ponds, meadows).

Pattern seeking: While exploring the world, the children develop their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). Where appropriate, they answer these questions.

- Children generate questions for investigation such as:
 - Are there more daisies in the meadow or on the field?
 - Where do you see more ivy?
 - Where do you see more butterflies?
 - Where do snails live?

Comparative/Fair testing

- Not relevant

Researching: Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources.

- Use secondary sources to name plants and animals seen in the local environment that they may not currently be able to name (Leafsnap UK on Apple App Store, SEEK INaturalist on google play and Apple App Store, textbooks, Woodland Trust resources).
Research what animals they have first-hand experience of eat.

Year 4: Living things and their habitats

Classifying

- Based on the children's own criteria:
 - classify a number of living things in their local environment (plants and animals)
 - classify a number of living things in the wider environment (plants and animals) after completing research
 - introduce branching databases/dichotomous keys.

Observing over time: The children make systematic and careful observations.

They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements.

- Observe living things in their local environment at different times of the year.

Pattern seeking: The children consider their prior knowledge when asking questions. They independently use a range of question stems. Where appropriate, they answer these questions.

- Do animals with have?
- Do plants with have?

Comparative/Fair testing

- Not relevant

Researching: Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question.

- Research and be able to name plants and animals in the wider environment e.g. polar, desert, jungle, etc.
- Research global environmental issues and their impact on living things.

Year 5: Living things and their habitats

Classifying: The children decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys.

Children present the same data in different ways in order to help with answering the question.

- Classify animals according to their life cycle

Observing over time: Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer.

They talk about how their scientific ideas change due to new evidence that they have gathered.

They talk about how new discoveries change scientific understanding.

- Grow from cuttings and observe whether they grow roots/stem/ leaf/flower.
- Grow from, and harvest, bulbs through the year. (Can be done in conjunction with Year 2.)
- Observe strawberry/spider plants through the year.

Pattern seeking: In their conclusions, children: identify causal relationships and patterns in the natural world from their evidence; identify results that do not fit the overall pattern; and explain their findings using their subject knowledge.

They evaluate, for example, the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used.

They identify any limitations that reduce the trust they have in their data.

They communicate their findings to an audience using relevant scientific language and illustrations.

- Children generate questions such as:
 - Do larger mammals have longer gestation periods?
 - Do larger animals live longer?
 - Do smaller animals lay more eggs?

Comparative/Fair testing

- Not relevant

- **Researching:** Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry.
 - Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work.
 - The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample.
- Generate questions to research the life cycle of a chosen animal: mammal, amphibian, insect, bird e.g. dragon fly, cuckoo, salmon, worm, owl. (Children present what they've learned in different ways: create a model, write a song, write a story, create a PPT, etc.)
 - Research how gardeners asexually reproduce plants.

Year 6: Living things and their habitats

Classifying: The children decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys.

Children present the same data in different ways in order to help with answering the question.

- Classify animals according to Carl Linnaeus' system.
- Classify plants into flowering, mosses, ferns and conifers, based on specific characteristics.
- Create a branching database/dichotomous key to classify a set of living things.

Observing over time

- Not relevant

Pattern seeking

- Not relevant

Comparative/Fair testing

- Not relevant

Researching: Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry.

- Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work.
- The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and

controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample.

- Research the characteristics of a vertebrate/invertebrate group. (Children present what they've learned in different ways: create a model, write a song, write a story, create a PPT, etc.)
- Research the characteristics of flowering plants, mosses, ferns and conifers.
- Research the difference between bacteria, virus and fungi to give reasons why these are not plants or animals.
- Research how micro-organisms can be helpful or harmful.
- Research unusual animals e.g. axolotl, platypus, kangaroos etc.

Animals including humans

Year 1: Animals including humans

Classifying Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting.

- Classify animals they have seen/have first-hand experience of, choosing their own criteria to do so.
- Classify animals based on physical structure.
- Classify animals they have first-hand experience of based on what they eat (plants, other animals, both). (Complete this after the research.)

Observing over time: Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations.

- Observe animals in the local environment throughout the year.

Pattern seeking: Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting.

- Children generate questions for investigation such as:
 - Do people with longer arms have longer legs?
 - Can more people identify prawn cocktail crisps than cheese and onion?
 - Do all animals with have?

Comparative/Fair testing: The children use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time.

- Can I taste the difference between different flavoured crisps/skittles/smarties?

Researching: Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources.

- Use secondary sources to name animals seen in the local environment that they may not currently be able to name (e.g. birds: magpie, blackbird).
- Research what animals they have first-hand experience of eat.

Year 2: Animals including humans

Classifying: Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting.

- Based on the children's own criteria:
 - classify food items
 - classify animals.

Observing over time Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations. They begin to take measurements, initially by comparisons, then using non-standard units.

- Observe a life cycle (e.g. caterpillars, chicks, farm animals).
- Observe how their body changes during/after exercise.

Pattern seeking

- Not relevant

Comparative/Fair testing

- Not relevant

Researching Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources.

- Research adult animals and their young e.g. googling pictures and names of animal babies – swan and cygnet.

Year 3: Animals including humans

Classifying: The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classifications e.g. using tables, Venn diagrams, Carroll diagrams.

- Based on the children's own criteria:
 - classify food items (leading to sorting by nutrients)
 - classify animals (leading to sorting by whether or not they have skeletons).

Observing over time

- Not relevant

Pattern seeking: Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question.

- Children generate questions for investigation into objective 1 such as:
 - Do 'healthy' drinks have less sugar?
 - Does brown bread have more fibre?
- Children generate questions for investigation into objective 2 such as:
 - Do people with long arms throw further?
 - Can people with short legs jump higher?
 - Can people with longer legs run faster?
 - Can people with bigger hands catch a ball more easily?

Comparative/Fair testing

- Not relevant

Researching: Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question.

- Look at food packaging to identify the amount of nutrients in different food items.
- Research which types of food contain which nutrients.
- Generate questions to research about the human skeleton.

Year 4 Animals including humans

Classifying: Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships.

- Compare and contrast different types of teeth (linking to simple functions).
- Classify jaw bones/teeth to aid with making food chains e.g. recognise what eats plants and what eats animals by looking at their teeth.

Observing over time

- Not relevant

Pattern seeking

- Not relevant

Comparative/Fair testing

- Not relevant

Researching: Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when

secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question.

- Research the different parts of the digestive system. (Children present what they've learned in different ways: create a model, write a song, write a story, create a PPT, etc.)
- Research what different animals eat within a specific environment, e.g. coral, polar, African grasslands, in order to construct food chains.

Year 5 Animals including humans

Classifying

- Not relevant

Observing over time

- Not relevant

Pattern seeking

- Not relevant

Comparative/Fair testing

- Not relevant

Researching: Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry.

Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work.

The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample.

- Develop questions to ask an expert e.g. a health visitor, doctor or nurse. (Questions will need to be filtered by the teacher.)

Year 6: Animals including humans

Classifying

- Not relevant

Observing over time: Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer.

They talk about how their scientific ideas change due to new evidence that they have gathered.

They talk about how new discoveries change scientific understanding.

- Observe pulse rates before, during and after exercise.

Pattern seeking: In their conclusions, children: identify causal relationships and patterns in the natural world from their evidence; identify results that do not fit the overall pattern; and explain their findings using their subject knowledge.

- They evaluate, for example, the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used.
- They identify any limitations that reduce the trust they have in their data.
- They communicate their findings to an audience using relevant scientific language and illustrations.

- Children generate questions for investigation such as:
 - Do older people have lower pulse rates?
 - Do boys have higher pulse rates?

Comparative/Fair testing: Children use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests.

- Complete different activities to compare the impact on their own heart rate.

Researching: Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry.

- Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work.
- The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample.
 - Generate questions to research about the human circulatory system. (Children present what they've learned in different ways: create a model, write a song, write a story, create a PPT, etc.)

Evolution and Inheritance

Year 6: Evolution and Inheritance

Classifying: The children decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys.

Children present the same data in different ways in order to help with answering the question.

- To show variation in a species:
 - Classify a species of animal e.g. cats, dogs

- classify a species of plant e.g. daffodils, tulips, lilies.

Observing over time

- Not relevant

Pattern seeking

- Use different pieces of equipment, e.g. chopsticks, toothpicks, cutlery, to look for patterns linking the suitability of bird beaks for the available food e.g. rice, grapes, raisins.

Comparative/Fair testing

- Not relevant

Researching: Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry.

- Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work.
- The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample.

- Research different types of a species and their characteristics making them suitable for different habitats e.g. penguins.

Seasonal Changes

Year 1: Seasonal Changes

Classifying

- Not relevant

Observing over time: Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations.

- Take weather measurements and make observations over time.
- Record/Photograph what children are wearing (jumper, coat, hats, scarves, etc.)
- Make observations of daylight hours e.g. send a diary and toy bear home with one child each day and ask the child to record their activities, but the bear needs to go to bed when it gets dark and the children must record the time this happens. (This gathers evidence, over time, that day length changes and so do activities.)

Pattern seeking: Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting.

- At the end of the year, look for patterns in evidence e.g. Does it rain more in spring? Do we have more sunny days in the summer? Which was

the coldest month?

Comparative/Fair testing

- Not relevant

Researching

- Not relevant

Materials

Year 1: Materials

Classifying: Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting.

- Classify objects made from the same material (e.g. lots of things made from plastic).
- Classify one object made from different materials (e.g. cups made of different materials).
- Classify different fabrics based on texture (e.g. to make a feely-book for a child).
- Classify paper/plastics/fabrics.

Observing over time

- Not relevant

Pattern seeking

- Not relevant

Comparative/Fair testing: The children use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time.

- Test objects made of different materials to see how effective they are e.g. umbrellas/hats/coats for waterproofness, cloths/nappies for absorbency, socks for elasticity, bounciness of balls, sunglasses for protection from the sun, picnic plates for stiffness, door mats for wiping your feet, different papers for writing on/painting etc.

Researching

- Not relevant

Year 2: Materials

Classifying Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting.

Based on the children's own criteria, classify materials e.g. samples of wood, metal, plastic, etc.

Observing over time

Not relevant
Pattern seeking
Not relevant
Comparative/Fair testing The children use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time.
Test materials for different uses (e.g. Which material can you use to make an aeroplane? Which fabric would you use for curtains? Which materials are best for Cinderella's mop? Which fabric would you choose for Elastigirl's costume? Which paper can be used for a book, fabrics for a child's dungarees, materials for aeroplanes etc?)
Researching
<ul style="list-style-type: none"> • Not relevant

Year 4: Materials
Classifying
<ul style="list-style-type: none"> • Based on the children's own criteria: <ul style="list-style-type: none"> ▪ classify solids (including grains, crystals, powders: physical properties) ▪ classify liquids.
Observing over time: The children make systematic and careful observations. They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements.
<ul style="list-style-type: none"> • Watch ice melt (ice hands). • Watch hand prints dry e.g. water hand prints on coloured paper towel. • Watch frozen liquids melt.
Pattern seeking
<ul style="list-style-type: none"> • Not relevant
Comparative/Fair testing: The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher.
<ul style="list-style-type: none"> • They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.
Explanatory note
A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome.
A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.
<ul style="list-style-type: none"> • What affects the melting rate of chocolate (size of pieces, temperature of water, type of chocolate)?

- What affects the rate an 'ice pole' melts?
- What affects the rate of evaporation?
- Test the 'runniness' of liquids.

Researching: Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. The answers are consistent with the evidence.

- Research the melting point of metals.
- Research the water cycle. (Children present what they've learned in different ways: create a model, write a song, write a story, create a PPT, etc.)

Year 5: Materials

Classifying: The children decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys.

- Children present the same data in different ways in order to help with answering the question.

- Based on the children's own criteria:
 - classify the materials themselves e.g. samples of wood, metal, plastic, etc.

based on the outcomes.

Observing over time: Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer.

- They talk about how their scientific ideas change due to new evidence that they have gathered.
- They talk about how new discoveries change scientific understanding.
- Observe rusting with uncoated nails in different liquids. (This can be achieved by removing coating with sandpaper.)

Pattern seeking

- Not relevant

Comparative/Fair testing: Children use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests.

- Which material would be good for a tent?
- Which material would be good to make a tea bag from?
- Which materials keep things warm/cold?
- Which material would be good for a bag for different purposes?
- Test solids for solubility.
- Compare rates of solubility.

- Burn different materials (not plastic or toxic substances).

Researching

- Not relevant

Rocks

Year 3: Rocks

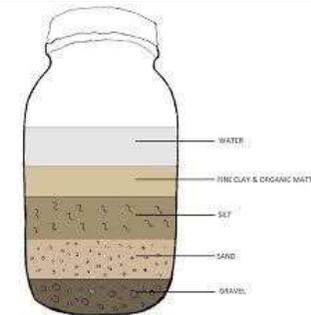
Classifying: The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classifications e.g. using tables, Venn diagrams, Carroll diagrams.

- Based on the children's own criteria, classify rocks. (At the beginning of the topic, this will most likely focus on appearance, leading to physical properties at the end of the unit.)
- Look at different soils and discuss how they are similar/different.

Observing over time: The children make systematic and careful observations.

They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements.

- Observe how soil separates into different layers in water – see diagram.



Pattern seeking

- Not relevant

Comparative/Fair testing: The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher.

- They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.

Explanatory note

A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome.

A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.

- Test the hardness of different rocks.
- Test what happens when rocks are put in water.
- Test how quickly water runs through different types of soil.

Researching: Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question.

- Research how fossils are formed.

Light

Year 3: Light

Classifying: The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classifications e.g. using tables, Venn diagrams, Carroll diagrams.

- Based on the children's own criteria:
 - classify light sources (leading to man-made/natural)
 - classify materials (leading to reflective/non-reflective, transparent/translucent/opaque).

Observing over time

- Not relevant (NB Do not look at how shadows in the playground change throughout the day.)

Pattern seeking

- Not relevant

Comparative/Fair testing: The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher.

- They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.

Explanatory note

A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome.

A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.

- Test materials for reflectiveness.
- Test materials for transparency.
- Investigate shadows (size of shadows, shape of shadows).

Researching

- Not relevant

Year 6: Light

Classifying

- Not relevant

Observing over time

- Not relevant

Pattern seeking

- Not relevant

Comparative/Fair testing: Children use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests.

- Investigate the shape of shadows and link this to light travelling in straight lines.

Researching

- Not relevant

Forces

Year 3: Forces

Classifying: The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classifications e.g. using tables, Venn diagrams, Carroll diagrams.

- Based on the children's own criteria:
 - sort materials (leading towards metal/non-metal and magnetic/not magnetic)
 - sort toys (leading to what makes them move e.g. push/pull).

Observing over time

- Not relevant

Pattern seeking

Not relevant

Comparative/Fair testing: The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher.

- They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.

Explanatory note

A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome.

A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.

- Test how objects move on different surfaces e.g. cars, spinning tops, wind-up/clockwork toys.
- Test the strength of different magnets.

Researching: Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question.

- Find out how magnets are used in everyday life.

Year 5: Forces

Classifying

- Not relevant

Observing over time

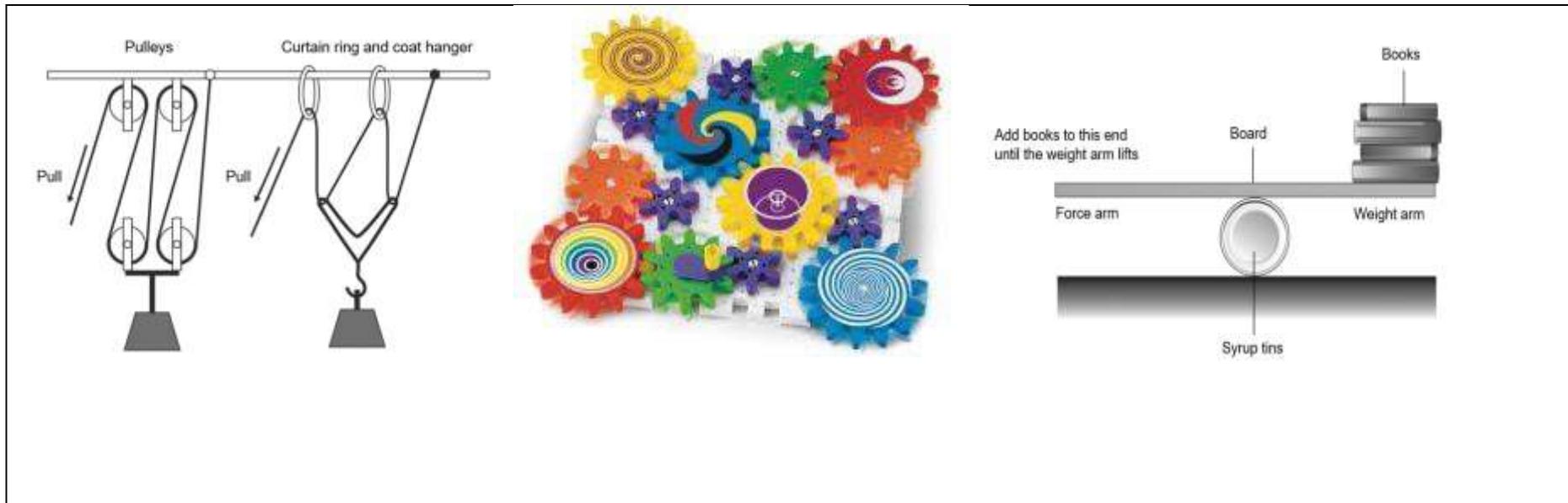
- Not relevant

Pattern seeking

- Not relevant

Comparative/Fair testing: Children use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests.

- Compare friction e.g. trainers or weighted match box pulled with forcemeter, balloon rockets, CD hovercraft, balloon cars.
- Compare water resistance e.g. boats in a gutter of water, plasticine in a cylinder of liquid (easier with a more viscous liquid e.g. bubble bath).
- Compare air resistance e.g. spinners, parachutes, sailing boats, straw rockets.
- Compare levers, pulleys and gears – see illustrations below.



Researching: Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry.

- Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work.

The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample.

- Research Heath Robinson and Rube Goldberg machines. (Children present what they've learned in different ways: create a model, write a song, write a story, create a PPT, etc. This could be cross-curricular with D&T and English biography writing.)

Sound

Year 4: Sound

Classifying: The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classifications e.g. using tables, Venn diagrams, Carroll diagrams.

Children are supported to present the same data in different ways in order to help with answering the question.

- Based on the children's own criteria, sort musical instruments.

Observing over time

- Not relevant

Pattern seeking

- Not relevant

Comparative/Fair testing: The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher.

- They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.

Explanatory note

A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome.

A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.

- Measure volume from different instruments.
- Measure how volume changes away from a source.
- Investigate string telephones.
- Explore pitch e.g. through a carousel of activities using milk bottles, straw pipes, rulers, elastic band guitars.

Researching: Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question.

They communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary.

- Research, make and play their own instruments based on what they learned about pitch and volume.

Electricity

Year 4: Electricity

Classifying: The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classifications e.g. using tables, Venn diagrams, Carroll diagrams.

- Children are supported to present the same data in different ways in order to help with answering the question.
- Based on the children's own criteria, classify household appliances and/or toys (leading to electrical/not electrical, batteries/mains).

<ul style="list-style-type: none"> • Test materials to classify into insulators and conductors.
Observing over time
<ul style="list-style-type: none"> • Not relevant
Pattern seeking
<ul style="list-style-type: none"> • Not relevant
Comparative/Fair testing
<ul style="list-style-type: none"> • Not relevant
Researching
<ul style="list-style-type: none"> • Not relevant

Year 6: Electricity
Classifying
<ul style="list-style-type: none"> • Not relevant
Observing over time
<ul style="list-style-type: none"> • Not relevant
Pattern seeking
<ul style="list-style-type: none"> • Not relevant
Comparative/Fair testing: Children use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests.
<ul style="list-style-type: none"> • Investigate the effect of adding more bulbs to a circuit. • Investigate the effect of adding more cells to a circuit. • Investigate the effect of adding more buzzers to a circuit. • Investigate the effect of adding more motors to a circuit.
Researching
<ul style="list-style-type: none"> • Not relevant

Earth and Space

Year 5: Earth and Space
Classifying
<ul style="list-style-type: none"> • Not relevant
Observing over time
<ul style="list-style-type: none"> • Measure shadows throughout the day.
Pattern seeking

- Not relevant

Comparative/Fair testing

- Not relevant

Researching: Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry.

- Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work.

The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample.

- Generate questions to research about the Earth and space. (Children present what they've learned in different ways: create a model, write a song, write a story, create a PPT, etc.)