

Skills Progression of Science Year 2 - Cornerstones

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Introduce: - Similarities and differences in relation to places, objects, materials and living things. - Discuss the features of their own immediate environment and how it might vary from others. - Make observations of animals and plants and explain why some things occur, and talk about changes. - Know the importance for good health of physical exercise, and a healthy diet, and talk about ways to keep healthy and safe.	Introduce: - Everyday materials - types and comparison - Seasonal changes - across 4 seasons - Animals inc humans - 5 animal groups (mammal etc) - Plants - basic structure (stem, leaf, root, flower)	Recap: - Animals inc humans - 5 groups - Everyday materials - types - Plants - basic structure - Seasonal changes	Recap: - Plants - seeds and bulbs grow healthy, what is needed - Animals inc humans - exercise and hygiene	Recap: - Animals including humans - skeleton types and muscles - Rocks and soils - types and formation	Recap: - Living things - grouping and classification; - Forces and Magnets - push and pull; magnetic poles; magnetic materials	Recap: - Animals inc humans - digestive system; life cycle - Light - shadow formation and changes - Electricity - simple series; switches
		Introduce: - Living things - alive/ not alive, suited to habitats - Plants - seeds and bulbs grow healthy, what is needed - Animals inc humans - exercise and hygiene - Materials - everyday uses suitability; bend, twist, stretch, squash	Introduce: - Rocks and soils - types and formation - Forces and Magnets - push and pull; magnetic poles; magnetic materials - Light and shadows - shadow formation and changes - Animals inc humans - skeleton and muscles - Plants - structure functions, flower structure	Introduce: - States of matter - changing state of solid, liquid, gas; water cycle - Electricity - simple series circuits; switches; conductors and insulators - Sound - vibrations; pitch; volume; distance - Living things - grouping and classification; changing environments - Animals inc humans - digestive system	Introduce: - Earth and space - orbit of Earth to sun; orbit of Moon; Earth's rotation - Materials - reversible and irreversible changes; dissolving; separation - Living things - life cycle and reproduction - Animals inc humans - changes in human development - Forces - gravity; resistance; mechanisms	Introduce: - Evolution and inheritance - adaptation; change over time; offspring - Light - straight lines; seeing things - Electricity - symbols; brightness/ volume changes - Living things - classification of plant/ animal kingdoms - Animals inc humans - circulatory system; diet, nutrients and exercise

Purposes for science:

It provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity. All children should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, children should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

We use Cornerstones as our planning base and science is taught within the topic if purposeful links can be made. If none are made, science is taught as a discrete subject.

Year 2

Term 1 Human survival

Objective (NC PoS)	Skill	Vocabulary	Key Scientists
- 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. • Ask simple questions and recognise that they can be answered in different ways. • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). • Gather and record data to help in answering questions. • Identify and classify. • Notice that animals, including humans, have offspring which grow into adults. • Observe closely, using simple equipment. • Perform simple tests. • Use their observations and ideas to suggest answers to questions.	• Ask and answer scientific questions about the world around them. • Begin to notice patterns and relationships in their data and explain what they have done and found out using simple scientific language. • Describe the importance of a healthy lifestyle, including exercise, a balanced diet, good quality sleep and personal hygiene. • Describe the stages of human development (baby, toddler, child, teenager, adult and elderly). • Describe what humans need to survive. • Follow a set of instructions to perform a range of simple tests, making simple predictions for what might happen and suggesting ways to answer their questions. • Observe objects, materials, living things and changes over time, sorting and grouping them based on their features and explaining their reasoning • Use a range of methods (tables, charts, diagrams and Venn diagrams) to gather and record simple data with some accuracy. • Use simple equipment to measure and make observations.	• <u>Being born and growing:</u> Young, offspring, live young, grow, develop, change, hatch, lay, fly, crawl, talk. • <u>Young and adult names:</u> e.g. lamb and sheep, kitten and cat, duckling and duck. • <u>Life cycle stages:</u> e.g. baby, toddler, child, teenager, adult; frogspawn, tadpole, froglet, frog. • <u>Survival and staying healthy:</u> basic needs, survive, food, air, exercise, diet, nutrition, healthy, balanced diet, hygiene, germs. • <u>Food groups:</u> fruit and vegetables, proteins, dairy and alternatives, carbohydrates, oil and spreads, fat, salt, sugar. Previously introduced vocabulary: water.	David Attenborough (1926 -) http://www.davidattenborough.co.uk/biography/
Knowledge (specific knowledge) • Questions can help us find out about the world. • Results from an investigation can be used to answer a question. • A healthy lifestyle includes exercise, a balanced diet, good quality sleep and personal hygiene. • Risks associated with an unhealthy lifestyle include illness, obesity, tooth decay and mental health problems. • Germs are microorganisms that can cause illness in humans. • Germs get into the body through the eyes, nose or mouth. • Washing hands with soap and clean running water helps humans avoid getting ill and spreading germs to others. • Humans grow from baby to toddler to child to teenager to adult to elderly. • Humans need water, food, air and shelter to survive. • Tests can be carried out by following a set of instructions. • A prediction is a best guess at what might happen in an investigation. • A timeline is a linear diagram. • A life cycle is a circular diagram.			

- Explore and compare the differences between things that are living, dead, and things that have never been alive
- Understand a simple food chain, and identify and name different sources of food.

- Ask simple questions and recognise that they can be answered in different ways.
- 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.
- Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).
- Gather and record data to help in answering questions.
- Identify and name a variety of plants and animals in their habitats, including microhabitats.
- Notice that animals, including humans, have offspring which grow into adults.
- Observe closely, using simple equipment.
- Perform simple tests.
- Use their observations and ideas to suggest answers to questions.

- Ask and answer scientific questions about the world around them
- Begin to notice patterns and relationships in their data and explain what they have done and found out using simple scientific language.
- Describe the basic life cycles of some familiar animals (egg, caterpillar, pupa, butterfly; egg, chick, chicken; spawn, tadpole, froglet, frog).
- Identify and name a variety of plants and animals in a range of habitats and microhabitats.
- Explain how animals, including humans, need water, food, air and shelter to survive.
- Follow a set of instructions to perform a range of simple tests, making simple predictions for what might happen and suggesting ways to answer their questions.
- Interpret and construct simple food chains to describe how living things depend on each other as a source of food.
- Use a range of methods (tables, charts, diagrams and Venn diagrams) to gather and record simple data with some accuracy.
- Use simple equipment to measure and make observations.

• Living or dead: **living, dead, never living**, not living, alive, never been alive, healthy.

• Habitats including microhabitats: **depend**, shelter, safety, **survive**, suited, space, minibeast, air.

• Life processes: movement, sensitivity, growth, reproduction, nutrition, excretion, respiration.

• Food chains: **food sources**, food, producer, consumer, predator, prey.

• Names of habitats and microhabitats: e.g. under leaves, woodland, rainforest, sea shore, ocean, urban, local habitat.

Previously introduced vocabulary: senses, **carnivore, herbivore, omnivore, seed, water**, names of materials.

Steve Backshall (1973 -) - naturalist and presenter on BBC of wildlife programs

Chris Packham (1961 -) - naturalist and presenter on BBC of wildlife programs

Knowledge (specific knowledge)

Term 3

Uses of materials

- 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

- Ask simple questions and recognise that they can be answered in different ways.
- Gather and record data to help in answering questions.
- Identify and classify.
- Observe closely, using simple equipment.
- Perform simple tests.
- Use their observations and ideas to suggest answers to questions.
- Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.

- Ask and answer scientific questions about the world around them.
- Begin to notice patterns and relationships in their data and explain what they have done and found out using simple scientific language.
- Compare the suitability of a range of everyday materials for particular uses, including wood, metal, plastic, glass, brick, rock, paper and cardboard.
- Describe how some objects and materials can be changed and how these changes can be desirable or undesirable.
- Follow a set of instructions to perform a range of simple tests, making simple predictions for what might happen and suggesting ways to answer their questions.
- Observe objects, materials, living things and changes over time, sorting and grouping them based on their features and explaining their reasoning.
- Use a range of methods (tables, charts, diagrams and Venn diagrams) to gather and record simple data with some accuracy.
- Use simple equipment to measure and make observations.

- Changing shape: squash, bend, twist, stretch.
- **Properties of materials:** e.g. strong, flexible, light, hard-wearing, elastic.
- Other: suitability, recycle, pollution.

Leo Hendrik Baekeland (1863 -1944) - <http://www.chemheritage.org/discover/online-resources/chemistry-in-history/themes/petrochemistry-and-synthetic-polymers/synthetic-polymers/baekeland.aspx>

Charles Goodyear (1800 - 1860) - <http://www.american-inventor.com/charles-goodyear.aspx>

Dr Alex King (contemporary materials scientist) - talks about materials and their properties - http://www.strangematterexhibit.com/popup.html?asset=whatis_panel&page=videoeveryone

Dr Frances Ross (contemporary materials scientist) - talks about what 'materials science is' http://www.strangematterexhibit.com/popup.html?asset=whatis_panel&page=videowhatis

Knowledge (specific knowledge)

- Questions can help us find out about the world.

Earth provides natural resources, and humans need to ensure that these resources do not run out. Sustainability is looking after Earth for the future. We can live more sustainably by reducing, reusing and recycling.

Recycling is making old, used materials into new objects. Symbols are printed on some packaging to tell us whether or not they can be recycled.

- The results are information that has been found out from an investigation and can be used to answer a question.

Paper is made from wood. There are many types of paper, such as printer paper, newsprint and cardboard. Different paper types have different properties that make them suitable for specific purposes.

- A material's physical properties make it suitable for particular purposes, such as glass for windows and brick for building walls. Many materials are used for more than one purpose, such as metal for cutlery and cars.

Objects can be made from one material, more than one material or different materials with similar properties.

- Some objects and materials can be changed by squashing, bending, twisting, stretching, heating, cooling, mixing and being left to decay.

Bending is pulling or pushing a material until it is no longer straight. Stretching is pulling or pushing a material to make it thinner, longer or wider. Twisting is turning a material until it makes a spiral shape. Squashing is pushing a material so that it becomes flatter.

- Tests can be carried out by following a set of instructions. A prediction is a guess at what might happen in an investigation.

Whether a material can be bent, stretched, twisted or squashed can determine its uses. For example, clay will bend, stretch, twist and squash, and it won't return to its original shape, making it ideal for sculpting.

- Objects, materials and living things can be looked at, compared and grouped according to their features.
- Data can be recorded and displayed in different ways, including tables, charts, pictograms and drawings.
- Simple equipment is used to take measurements and observations. Examples include timers, hand lenses, metre sticks and trundle wheels.

- 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

- Ask simple questions and recognise that they can be answered in different ways.
- Gather and record data to help in answering questions.
- Identify and classify.
- Identify and name a variety of plants and animals in their habitats, including microhabitats.
- 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.
- Observe and describe how seeds and bulbs grow into mature plants.
- Observe closely, using simple equipment.
- Perform simple tests.
- Use their observations and ideas to suggest answers to questions.

Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.

- Ask and answer scientific questions about the world around them.
- Begin to notice patterns and relationships in their data and explain what they have done and found out using simple scientific language.
- Describe a range of local habitats and habitats beyond their locality (beaches, rainforests, deserts, oceans and mountains) and what all habitats provide for the things that live there.
- Describe how plants need water, light and a suitable temperature to grow and stay healthy.
- Follow a set of instructions to perform a range of simple tests, making simple predictions for what might happen and suggesting ways to answer their questions.
- Identify and name a variety of plants and animals in a range of habitats and microhabitats. Observe and describe how seeds and bulbs change over time as they grow into mature plants.
- Observe objects, materials, living things and changes over time, sorting and grouping them based on their features and explaining their reasoning.
- Use a range of methods (tables, charts, diagrams and Venn diagrams) to gather and record simple data with some accuracy.
- Use simple equipment to measure and make observations.
- Describe typical UK seasonal weather patterns.

- Growth of plants: **germination, shoot, seed dispersal**, grow, food store, life cycle, die, wilt, seedling, sapling.
- Needs of plants: **sunlight, nutrition**, light, healthy, space, air.
- Name different types of plant: e.g. bean plant, cactus.
- Names of different habitats: e.g. rainforest, desert.

Previously introduced vocabulary: **water, temperature**, warm, hot, cold, habitat.

George Forrest (1873 – 1932)

Knowledge (specific knowledge)

- Questions can help us find out about the world.
- The results are information that has been found out from an investigation and can be used to answer a question.
- Local habitats include parks, woodland and gardens. Habitats beyond the locality include beaches, rainforests, deserts, oceans and mountains. All living things live in a habitat to which they are suited and it must provide everything they need to survive.
- Plants need water, light and a suitable temperature to grow and stay healthy. Without any one of these things, they will die.
- Tests can be carried out by following a set of instructions. A prediction is a guess at what might happen in an investigation.
- A habitat is a place where a living thing lives. A microhabitat is a very small habitat.

A bulb contains a tiny plant and all the food needed to grow. Spring bulbs can start to grow in winter when the ground is frozen.

- Plants grow from seeds and bulbs. Seeds and bulbs need water and warmth to start growing (germinate). As the plant grows bigger, it develops leaves and flowers.

The flowers of plants produce seeds. Seeds also form inside cones. The flowers on some plants develop into fruit that contains seeds.

- Objects, materials and living things can be looked at, compared and grouped according to their features

Many plants grow from seeds or bulbs. Different plants grow in different habitats and change with the seasons. Plants have roots, stems, leaves, flowers and fruit. Trees have roots, a trunk, bark, branches and leaves.

- Data can be recorded and displayed in different ways, including tables, charts, pictograms and drawings.

- Simple equipment is used to take measurements and observations. Examples include timers, hand lenses, metre sticks and trundle wheels.

The UK has typical weather in each of the seasons. For example, winter is cold and sometimes frosty, whereas summer is warm and sometimes sunny.

- 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.
- Identify that most living things live in habitats to which they are suited.
- 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 microhabitats.

- Ask simple questions and recognise that they can be answered in different ways.
- Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).
- Gather and record data to help in answering questions.
- Identify and classify.
- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.
- Notice that animals, including humans, have offspring which grow into adults.
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- Describe the basic life cycles of some familiar animals (egg, caterpillar, pupa, butterfly; egg, chick, chicken; spawn, tadpole, froglet, frog).
- Describe typical UK seasonal weather patterns.
- Explain how animals, including humans, need water, food, air and shelter to survive.
- Follow a set of instructions to perform a range of simple tests, making simple predictions for what might happen and suggesting ways to answer their questions.
- Identify and name a variety of plants and animals in a range of habitats and microhabitats.
- Interpret and construct simple food chains to describe how living things depend on each other as a source of food.
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- Habitats including microhabitats: **depend, shelter, safety, survive**, suited, space, minibeast, air.
- Life processes: movement, sensitivity, growth, reproduction, nutrition, excretion, respiration.
- Food chains: **food sources**, food, producer, consumer, predator, prey.
- Names of habitats and microhabitats: e.g. under leaves, woodland, rainforest, sea shore, ocean, urban, local habitat.

Previously introduced vocabulary: **senses, carnivore, herbivore, omnivore, seed, water**, names of materials.

Kate Humble (1968 -) - naturalist and presenter on BBC of wildlife programs

Chris Packham (1961 -) - naturalist and presenter on BBC of wildlife programs

Knowledge (specific knowledge)

- Questions can help us find out about the world.
- The results are information that has been found out from an investigation and can be used to answer a question.
- Local habitats include parks, woodland and gardens. Habitats beyond the locality include beaches, rainforests, deserts, oceans and mountains. All living things live in a habitat to which they are suited and it must provide everything they need to survive.

Habitats have non-living parts, such as air, water, soil and temperature, and living parts, including plants and animals. Each habitat varies in its living and non-living parts, and they are interdependent.

- Animals have offspring that grow into adults. Different animals have different stages of growth or life cycles.

All living things need space to grow and reproduce. Adult animals reproduce to have offspring. Some offspring look like smaller versions of their parents. Others look very different from their parents. The offspring of birds, reptiles, fish, amphibians and invertebrates hatch from eggs. Mammals, including humans, give birth to live young.

All animals have a life cycle, which is a series of changes that happens to a living thing during its life. Animals are born or hatch from eggs. The young grow and change until they become adults that can reproduce. When adult animals reproduce and have offspring, the life cycle starts again.

A life cycle can be drawn as a circular diagram.

- The UK has typical weather in each of the seasons. For example, winter is cold and sometimes frosty, whereas summer is warm and sometimes sunny.
- Animals need water, food, air and shelter to survive. Their habitat must provide all these things.

Many animals behave differently in different seasons in the United Kingdom. These different behaviours are linked to their life cycles, with spring often being the time for new offspring.

- Tests can be carried out by following a set of instructions. A prediction is a guess at what might happen in an investigation.
- A habitat is a place where a living thing lives. A microhabitat is a very small habitat.

Microhabitats are small habitats within a larger habitat. Examples of microhabitats are rock pools, ponds, hedgerows and under logs and stones. Microhabitats have different living and non-living parts compared with the larger habitat.

- Food chains show how living things depend on one another for food. All food chains start with a plant, followed by animals that either eat the plant or other animals.
- Objects, materials and living things can be looked at, compared and grouped according to their features.

Invertebrates are animals without a backbone. Invertebrates include worms, molluscs, crustaceans, insects, arachnids and myriapods.

- Data can be recorded and displayed in different ways, including tables, charts, pictograms and drawings.
- Simple equipment is used to take measurements and observations. Examples include timers, hand lenses, metre sticks and trundle wheels.

The life cycle stages of a darkling beetle include egg, mealworm (larva), pupa and adult darkling beetle. Mealworms undergo metamorphosis, completely changing from a larva to their adult form.