Autumn
Scheme of learning
Year 2

White Rose SCIENCE

The **White Rose Science** schemes of learning

Schemes of learning

Our research-based schemes of learning are designed to teach the aims and objectives of the National Curriculum.

Content over time

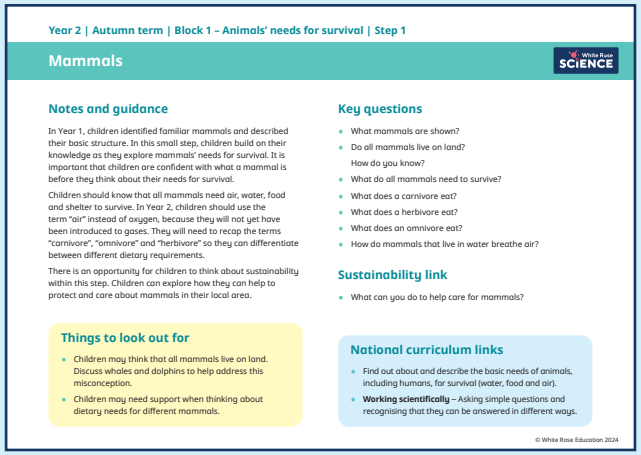
Our schemes are written for content rather than time. This ensures that children are developing a solid understanding of scientific processes and concepts.

Substantive knowledge

Our schemes of learning ensure full coverage of the scientific content as stated within the National Curriculum.

Disciplinary knowledge (Working scientifically)

Each step has a working scientifically skill focus. Working scientifically skills are developed across years and year groups.



Year 2 | Autumn term | Block 1 – Animals' needs for survival | Step 1

Mammals

Notes and guidance

In Year 1, children identified familiar mammals and described their basic structure. In this small step, children build on their knowledge as they explore mammals' needs for survival. It is important that children are confident with what a mammal is before they think about their needs for survival.

Children should know that all mammals need air, water, food and shelter to survive. In Year 2, children should use the term "air" instead of oxygen, because they will not yet have been introduced to gases. They will need to recap the terms "carnivore", "omnivore" and "herbivore" so they can differentiate between different dietary requirements.

There is an opportunity for children to think about sustainability within this step. Children can explore how they can help to protect and care about mammals in their local area.

Key questions

- What mammals are shown?
- Do all mammals live on land? How do you know?
- What do all mammals need to survive?
- What does a carnivore eat?
- What does a herbivore eat?
- What does an omnivore eat?
- How do mammals that live in water breathe air?

Sustainability link

- What can you do to help care for mammals?

Things to look out for

- Children may think that all mammals live on land. Discuss whales and dolphins to help address this misconception.
- Children may need support when thinking about dietary needs for different mammals.

National curriculum links

- Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).
- **Working scientifically** – Asking simple questions and recognising that they can be answered in different ways.

Working practically

Research shows that children learn best from a 'hands on and heads on' approach whereby practical activities are engaging and relevant. This features throughout our schemes of learning.

Experiments

Children carry out experiments following a plan, investigate and evaluate (KS2) model. Children plan their investigations, carry out their experiments and conclude and provide evaluations.

Modelling

Modelling is used wherever possible to explain abstract scientific ideas and concepts. This makes it easier for children to apply their knowledge and improve their understanding. In Upper KS2, children are introduced to the limitations of models.

Outdoor learning

Children are encouraged to work outside the classroom wherever possible to help provide relevancy to scientific concepts.

Scientific enquiry

There is one enquiry question per block covering the five enquiry types. This allows children to develop answers to a range of relevant scientific questions.

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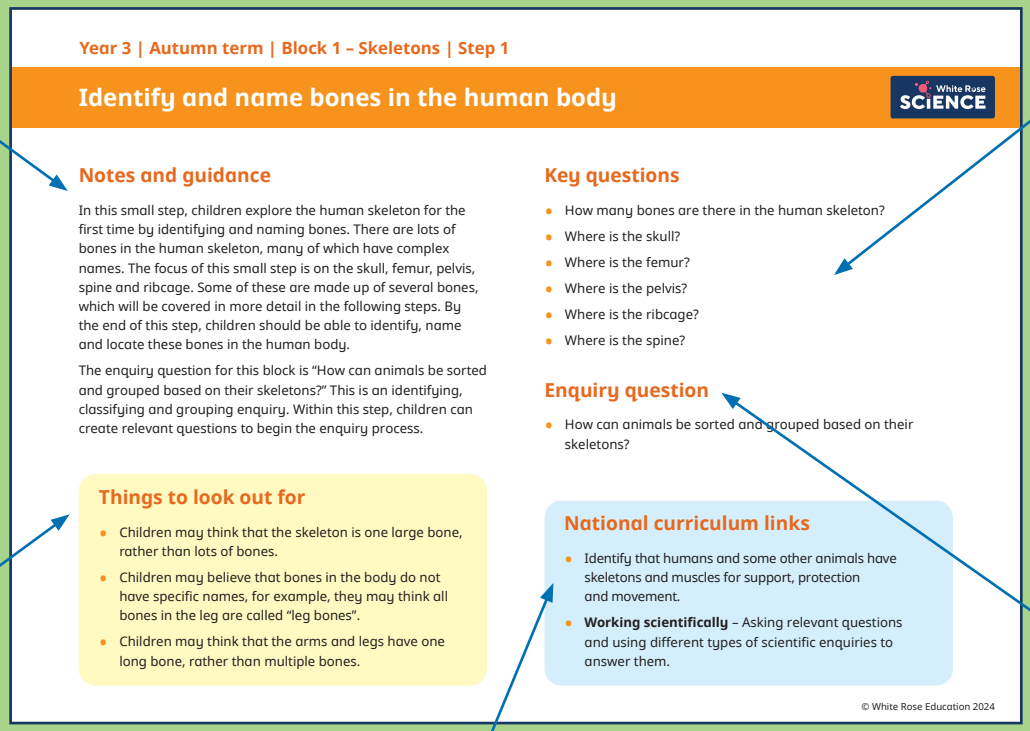
Teacher guidance

Every block in our schemes of learning is broken down into manageable small steps, and we provide comprehensive teacher guidance for each one. Here are the features included in each step.

Notes and guidance that provide an overview of the content of the step and ideas for teaching, along with advice on progression and where a topic fits within the curriculum.

Things to look out for, which highlights common mistakes, misconceptions and areas that may require additional support.



Year 3 | Autumn term | Block 1 – Skeletons | Step 1

Identify and name bones in the human body

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Notes and guidance

In this small step, children explore the human skeleton for the first time by identifying and naming bones. There are lots of bones in the human skeleton, many of which have complex names. The focus of this small step is on the skull, femur, pelvis, spine and ribcage. Some of these are made up of several bones, which will be covered in more detail in the following steps. By the end of this step, children should be able to identify, name and locate these bones in the human body.

The enquiry question for this block is "How can animals be sorted and grouped based on their skeletons?" This is an identifying, classifying and grouping enquiry. Within this step, children can create relevant questions to begin the enquiry process.

Key questions

- How many bones are there in the human skeleton?
- Where is the skull?
- Where is the femur?
- Where is the pelvis?
- Where is the ribcage?
- Where is the spine?

Enquiry question

- How can animals be sorted and grouped based on their skeletons?

Things to look out for

- Children may think that the skeleton is one large bone, rather than lots of bones.
- Children may believe that bones in the body do not have specific names, for example, they may think all bones in the leg are called "leg bones".
- Children may think that the arms and legs have one long bone, rather than multiple bones.

National curriculum links

- Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
- **Working scientifically** – Asking relevant questions and using different types of scientific enquiries to answer them.

National Curriculum links to indicate the objective(s) being addressed by the step.

Key questions that can be posed to children to develop their scientific understanding and reasoning skills.

Enquiry questions are highlighted when children are undertaking the scientific enquiry process. Each block has one enquiry question and there is coverage of the five enquiry types across a year.

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Teacher guidance

During **experiment steps**, experiment variables and **equipment** are clearly identified.

The **key vocabulary** section highlights essential vocabulary and definitions.

Relevant and purposeful **practical ideas** to encourage a 'hands on and heads on' approach.

Year 5 | Autumn term | Block 1 – Forces | Step 3

Plan – parachute experiment

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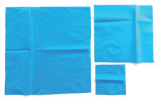
Experiment variables

- **independent variable** (what is changed) – the size of the parachute



- **dependent variable** (what is measured) – the time it takes for the parachute to fall to the ground

- **controlled variables** (what is kept the same) – the material that the three parachutes are made from, the object that is attached to both parachutes, and the height that the parachutes are dropped from

Equipment needed

- plastic bags
- scissors
- 12 pieces of string 30 cm each
- ruler
- 12 paper clips
- stopwatch
- scales
- modelling clay to attach to the strings

Practical activity

- Put children in small groups.

  Give each group the equipment needed for the experiment.

  Children should identify what the equipment is and why it is used within the experiment.

Planning sentence stems

- I predict that ...

  I think this will happen because ...
- The independent/dependent variable is ...
- The controlled variables are ...

Year 3 | Autumn term | Block 1 – Skeletons | Step 2

Functions of the skeleton

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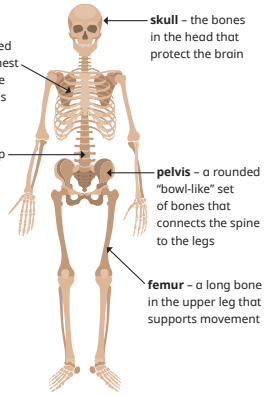
Key vocabulary

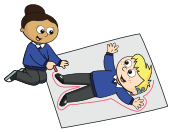
- **skeleton** – a collection of bones that provides protection and supports movement



Practical ideas

- Children work in pairs to draw around the outline of their partner's body on a large sheet of paper.

  Children then correctly identify and label the locations of the bones learnt in Step 1



skull	ribcage	femur	pelvis	spine

Children should add labels to describe the functions of each of the bones.
(Note: If drawing around a partner's body is not appropriate, a printed outline could be used.)

Factual knowledge

- Bones have specific functions.
- The skull protects the brain.
- The femur helps humans to stand and move.
- The pelvis helps to support the spine.
- The spine helps humans to twist and stay upright.
- The ribcage protects the heart and lungs.

Sentence stems to help promote the use of scientific talk in the classroom.

Factual knowledge written in clear, child-friendly language.

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Symbols

Key Stage 1 and 2 symbols

The following symbols are used to indicate:

Children are answering an enquiry question.

Highlights when and how health and safety measures need adhering to.

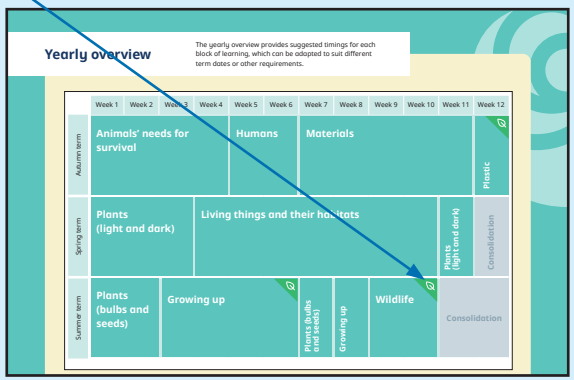
An outside activity or one that uses resources from nature.

Children talk about and compare their answers and reasoning.

A question that should really make children think. The question may be structured differently or require a different approach from others and/or tease out common misconceptions.

Sustainability

Sustainability blocks are highlighted with a leaf symbol.



Each year group has two blocks dedicated to sustainability.
We want to help children to:

- Understand the current issues around sustainability and climate change.
- Identify that they have a role to play in creating a more sustainable future for themselves and others.
- Think of ways to make a positive impact on their local and wider environments.
- Have a positive and proactive mindset when it comes to making sustainable changes.

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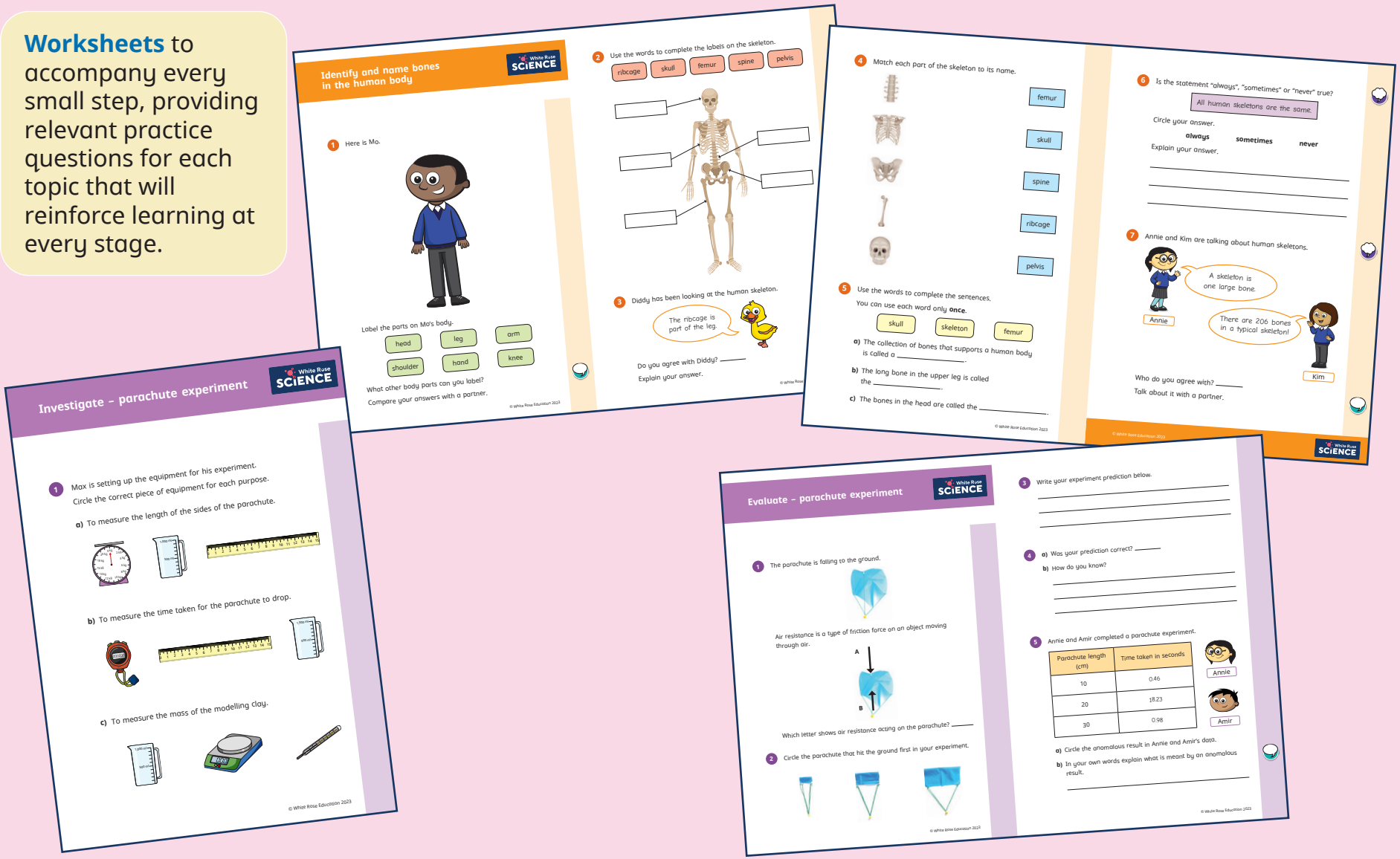
Premium supporting materials

Worksheets to accompany every small step, providing relevant practice questions for each topic that will reinforce learning at every stage.



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Meet the characters

Our class of characters brings the schemes to life and will be sure to engage learners of all ages and prior attainments. Follow the children and their class pet, Diddy the duck, as they explore new scientific concepts and ideas.

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Yearly overview

The yearly overview provides suggested timings for each block of learning, which can be adapted to suit different term dates or other requirements.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Animals' needs for survival				Humans		Materials					Plastic
Spring term	Plants (light and dark)				Living things and their habitats						Plants (light and dark)	Consolidation
Summer term	Plants (bulbs and seeds)			Growing up			Plants (bulbs and seeds)	Growing up	Wildlife		Consolidation	

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Autumn Block 1

Animals' needs for survival

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Small steps

Step 1	Mammals
Step 2	Birds
Step 3	Fish
Step 4	Amphibians
Step 5	Reptiles
Step 6	Humans

Key resources

Step 1 – Mammals

- images or small figures of mammals
- food for mammals – (vegetables, seeds, nuts)
- water container

Step 2 – Birds

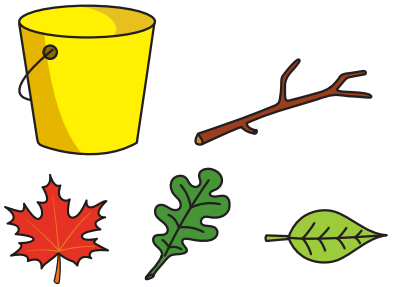
- binoculars (optional)
- plastic bottles
- seeds
- sticks

Step 3 – Fish

- whole fish
- disposable gloves
- hand lenses or magnifying glass
- large hoops
- images or small figures of mammals, birds and fish

Step 4 – Amphibians

- large container
- rocks
- leaves
- pebbles
- water



Step 5 – Reptiles

- large hoops
- images or small figures of animals

Step 6 – Humans

- large hoops
- images or small figures of animals
- vet/doctor area in the classroom

Mammals

Notes and guidance

In Year 1, children identified familiar mammals and described their basic structure. In this small step, children build on their knowledge as they explore mammals' needs for survival. It is important that children are confident with what a mammal is before they think about their needs for survival.

Children should know that all mammals need air, water, food and shelter to survive. In Year 2, children should use the term "air" instead of oxygen, because they will not yet have been introduced to gases. They will need to recap the terms "carnivore", "omnivore" and "herbivore" so they can differentiate between different dietary requirements.

There is an opportunity for children to think about sustainability within this step. Children can explore how they can help to protect and care about mammals in their local area.

Things to look out for

- Children may think that all mammals live on land. Discuss whales and dolphins to help address this misconception.
- Children may need support when thinking about dietary needs for different mammals.

Key questions

- What mammals are shown?
- Do all mammals live on land?

  How do you know?
- What do all mammals need to survive?
- What does a carnivore eat?
- What does a herbivore eat?
- What does an omnivore eat?
- How do mammals that live in water breathe air?

Sustainability link

- What can you do to help care for mammals?

National curriculum links

- Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).
- **Working scientifically** – Asking simple questions and recognising that they can be answered in different ways.

Mammals

Key vocabulary

- **mammal** – an animal with fur or hair on its body

- **fur** – the fine, soft hair found on different animals

- **carnivore** – an animal that eats other animals

- **herbivore** – an animal that eats plants

- **omnivore** – an animal that eats plants and other animals

Practical ideas

- Ask children to put images or small figures of mammals into groups, based on different categories, such as dietary requirements, whether they inhabit land or sea, or where they would find shelter.
- Create an area within the school grounds to provide food and water for a range of mammals. Whilst creating this area, children should explain why and how this area helps local mammals meet their needs for survival.

- Invite a local vet into class, or arrange an online meeting, to discuss a range of mammals' needs for survival and identify whether their needs are similar or different.

Factual knowledge

- Mammals have fur or hair on their body.
- All mammals need air, water, food and shelter to survive.
- Mammals are carnivores, herbivores or omnivores.

Birds

Notes and guidance

In this small step, children look at birds and explore their needs for survival. Children should understand that birds have the same needs as mammals. It is important that they are shown a wide range of examples of birds, including flightless and swimming birds. Children are introduced to the term "insectivore" within this step. This can be linked to the use of the terms "carnivore", "herbivore" and "omnivore" in the previous step.

Within this step, children could gather and record data by completing a bird watch in the local area. This could be repeated later in the year to compare data in different seasons. Children have not yet used tally charts so should record the data in numerals.

Key questions

- What birds are shown?
- What features do all birds have?
- What are the differences between these two birds?
- What does an insectivore eat?
- Is a _____ a carnivore, herbivore or omnivore?
- What do birds need to survive?
- How are the needs of birds similar to the needs of mammals?

Sustainability link

- What can we do to help care for birds?

Things to look out for

- When talking about the dietary requirements of birds, children may use the word "insect" to describe all minibeasts. Worms, slugs and spiders are not classified as insects. Children do not need to know this factual knowledge until Year 4, but "insect" should not be used as a general term to describe all minibeasts.

National curriculum links

- Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).
- **Working scientifically** – Gathering and recording data to help in answering questions.

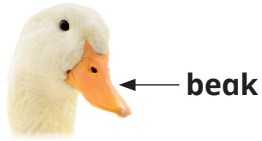
Birds

Key vocabulary

- **bird** – an animal with feathers, wings and a beak


- **feathers** – the soft covering on the outside of birds

- **beak** – a bird's mouth and nose



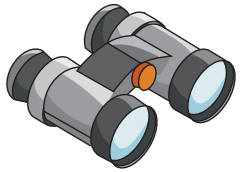
- **insect** – an animal with six legs



- **wing** – a part of a bird's body which some use to fly

Practical ideas

- Carry out a bird spotting survey in the local area.



  Children can identify and count the number of birds they spot.

  This could be repeated in different seasons to see if there are any patterns or trends in data.

- Create bird feeders to hang in the school grounds
to help birds to survive in colder months.

  Encourage children to discuss why the bird feeder will help birds meet their needs for survival.

Factual knowledge

- Birds have feathers, wings and a beak.
- Some birds can fly.
- Some birds cannot fly.
- Birds need air, water, food and shelter to survive.

Fish

Notes and guidance

In this small step, children look at fish and their specific needs for survival. They recap the basic features of fish before learning that fish need air, water, food and shelter to survive. By the end of this step, children need to be able to identify that fish have the same needs for survival as birds and mammals.

This step introduces the enquiry question for this block. Children carry out an identifying, grouping and classifying enquiry.

Children record their initial ideas and think of ways to group animals based on their needs for survival. It is important that children use examples of mammals, birds and fish to identify any similarities and differences.

Things to look out for

- Children may use the term "fish" to describe all animals that live in water.
- Children may think that fish do not breathe because they live underwater.
- When grouping, children may sort animals into mammals, fish and birds rather than on their needs for survival.

Key questions

- Is a _____ a fish?

  How do you know?
- What features do fish have?
- What do fish need to survive?
- What do other animal groups need to survive?
- How are these animals' needs similar?

  How are they different?

Enquiry question

- How can animals be grouped based on their needs for survival?

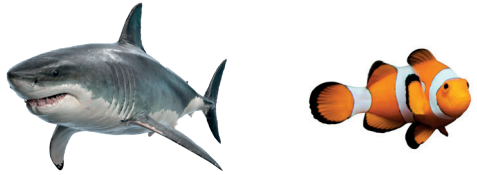
National curriculum links

- Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).
- **Working scientifically** – Identifying and classifying.

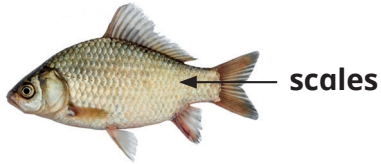
Fish

Key vocabulary

- **fish** – an animal with fins, gills and scales that lives in water

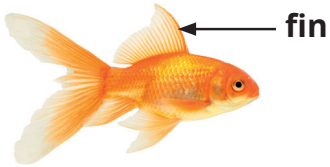


- **scales** – small, hard layers that grow from the skin



- **gills** – the part of the body that fish use to breathe

- **fin** – a thin part that sticks out from the fish to help it swim and stay balanced



Practical ideas

- Provide a whole fish for children to explore up close.

  Children can find and identify its fins, scales and gills.

  They could use hand lenses to observe the fish closely, then draw and label any findings.

- Use large hoops to sort and group images or small figures of fish, birds and mammals based on their needs for survival.

  Children should be encouraged to group the animals in more than one way.

Factual knowledge

- Fish are animals that live in water.
- Fish need air, water, food and shelter to survive.
- Fish have gills that they use to breathe.

Amphibians

Notes and guidance

In this small step, children identify and name common examples of amphibians before looking at their needs for survival. Children may think that amphibians are fish because they spend part of their life in water. It is important to explore the differences between these two animal groups. Children identify amphibians' needs for survival and compare these to other animal groups.

Children continue to explore the enquiry question in this step, and should be given opportunities to develop their ideas throughout. This can be done through sorting and grouping activities. Encourage children to sort the animals based on their needs for survival rather than their physical features.

Things to look out for

- Children may think that amphibians have scales or gills like fish.
- Children may need support to group animals based on their needs for survival. Provide structure to help them sort correctly. For example, "All animals need air. Sort these animals based on whether they breathe underwater or not."

Key questions

- Is a _____ an amphibian?

  How do you know?
- What features do amphibians have?
- What do amphibians eat?
- What do amphibians need to survive?
- What do other animal groups need to survive?
- How are these animals' needs similar?

  How are they different?

Enquiry question

- How can animals be grouped based on their needs for survival?

National curriculum links

- Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).
- **Working scientifically** – Identifying and classifying.

Amphibians

Key vocabulary

- **amphibian** – an animal that can live on land and in water

- **webbed feet** – feet with toes that are joined together to help with swimming

- **frog** – an amphibian with moist, smooth skin

- **toad** – an amphibian with dry, bumpy skin

- **newt** – an amphibian with a long tail

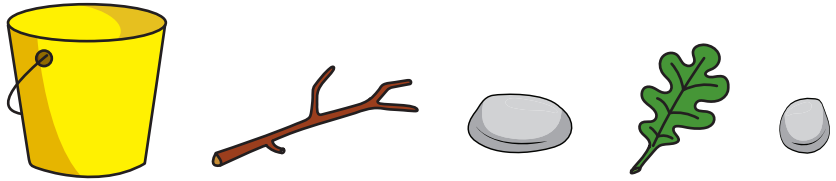
Practical ideas

- Create a mini-pond to help children further understand amphibians' needs for survival.

  Put some rocks, pebbles and sticks in a container.

  Fill the container with water and observe the mini-pond over time to see if it attracts any amphibians.

  Ensure children are discussing why the mini-pond will meet the needs of amphibians.



- Continue to sort and group images or small figures of amphibians, fish, birds and mammals based on their needs for survival.

Factual knowledge

- Amphibians live on land and in water.
- Amphibians do not have scales on their bodies.
- Some amphibians have webbed feet.
- Amphibians need air, water, food and shelter to survive.

Reptiles

Notes and guidance

In this small step, children continue to look at the needs for survival of different animal groups. This step is focused on the needs of reptiles. Children recap knowledge from Year 1, when they identified and named some familiar reptiles and labelled some common features.

By the end of this step, children should understand that reptiles need air, water, food and shelter to survive. Reptiles also need external heat to survive because they cannot generate their own body heat. This could be used as a key difference when sorting animals based on their needs for survival. Children need to discuss their answers to the enquiry question as their knowledge of animals develops.

Things to look out for

- Children may think that all reptiles are small.
- Children may think that reptiles do not live in the United Kingdom.
- Continue to provide structure to support children to group animals based on their needs for survival, not their physical features.

Key questions

- Is a _____ a reptile?

  How do you know?
- What features do reptiles have?
- What is similar about these two reptiles?

  What is different?
- What do reptiles need to survive?
- What do other animal groups need to survive?

Enquiry question

- How can animals be grouped based on their needs for survival?

National curriculum links

- Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).
- **Working scientifically** – Gathering and recording data to help in answering questions.

Reptiles

Key vocabulary

- **reptile** – an animal with dry scales on its body

- **scales** – small, hard layers that grow from the skin

- **carnivore** – an animal that eats other animals

- **herbivore** – an animal that eats plants

- **omnivore** – an animal that eats plants and other animals

Practical ideas

- Children continue to sort and group images or small figures of amphibians, fish, birds, mammals and reptiles based on their needs for survival.
- Play games with children to help them identify animals and their needs for survival.

  One child thinks of an animal but keeps it secret from others playing.

  The other children must guess the animal they are thinking of by asking yes/no questions about the animal's characteristics and needs for survival.

Factual knowledge

- Reptiles have dry scales on their bodies.
- Reptiles need air, water, food and shelter to survive.
- Reptiles need direct heat to survive.

Humans

Notes and guidance

In Year 2, children should understand that humans are mammals. In this small step, children look at humans' basic needs for survival. They should recap the features of mammals from Step 1 before applying this knowledge to categorise humans as mammals.

By the end of this step, children should be able to identify humans' needs for survival. They explore the similarities and differences between humans and other animal groups. Children continue work on the enquiry question for this block and present their findings. This can be done verbally, through simple written statements or by creating drawings and diagrams.

Things to look out for

- Children may sort and group animals based on physical features rather than their needs for survival. As a class, recap the similarities and differences between each animal group. Children can then use this information to help them sort and group correctly.
- Although children are noticing differences in how animals meet their basic needs for survival, they should identify that all animals need air, water, food and shelter to survive.

Key questions

- What is a mammal?
- Is a human a mammal?

  How do you know?
- What do babies need to survive?
- What do adults need to survive?
- How are the needs of humans similar or different from those of other animals?

Enquiry question

- How can animals be grouped based on their needs for survival?

National curriculum links

- Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).
- **Working scientifically** – Using their observations and ideas to suggest answers to questions.

Humans

Key vocabulary

- **mammal** – an animal with fur or hair on its body

- **adult** – a fully grown human

- **baby** – a newborn human

- **shelter** – a place that gives protection from weather and danger

Practical ideas

- Invite a parent with a baby into class. Allow children to ask questions to help them further understand the baby's needs for survival.
- Children could present their answers to the enquiry question in a range of ways. Suggestions are given below.
  - Create a pop-up museum in the classroom where children can present their understanding about animals' needs for survival.
  - Create a "vet's area" within the classroom where children can help to take care of animals. Children could identify the animal, the animal group, its needs for survival and what need is not being met. A doctor's area could also be created where children can learn about caring for humans.

Factual knowledge

- A mammal has fur or hair on its body.
- Humans are mammals.
- Humans need air, water, food and shelter to survive.
- All animals need air, water, food and shelter to survive.