

Autumn Scheme of learning **Year 3**

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 3 Autumn term Block 1 – Skeletons Step 1	
Name and identify bones in the human body	
Notes and guidance In this small step, children explore the human skeleton for the first time by naming and identifying 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. By the end of this step, children should be able to name, identify and locate these bones in the human body. The enquiry question for this block is "How can we sort and group animals based on their skeletons?" This is an identifying, grouping and classifying enquiry. Within this step, children can create relevant questions to begin the enquiry process.	Key questions <ul style="list-style-type: none">How many bones are there in the human skeleton?Where is the skull found in the skeleton?Where is the femur found?Where is the pelvis found in the skeleton?Where is the ribcage found?Where is the spine found in the skeleton? Enquiry question <ul style="list-style-type: none">How can we sort and group animals based on their skeletons?
Things to look out for <ul style="list-style-type: none">Children may think that the skeleton is one large bone, rather than a collection of bones.They 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 are one long bone, rather than made up of multiple bones.	National curriculum links <ul style="list-style-type: none">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.

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.



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

Name and identify bones in the human body



Notes and guidance

In this small step, children explore the human skeleton for the first time by naming and identifying 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. By the end of this step, children should be able to name, identify and locate these bones in the human body.

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

Things to look out for

- Children may think that the skeleton is one large bone, rather than a collection of bones.
- They 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 are one long bone, rather than made up of multiple bones.

Key questions

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

Enquiry question

- How can we sort and group animals based on their skeletons?

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.

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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.

National Curriculum links

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

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

Experiment variables

- Independent variable** (what will change) – the surface area of the parachute.
- Dependent variable** (what will be measured) – the time taken 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.

Experiment information

Equipment needed

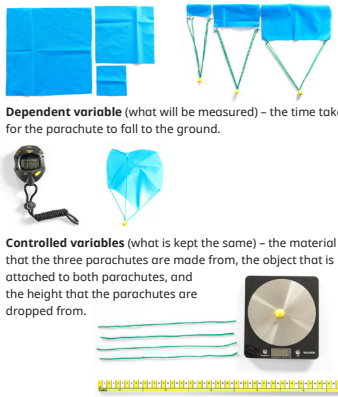
- Plastic bags
- Scissors
- 12 pieces of string 30 cm each
- Ruler
- 12 paper clips
- Stopwatch
- Scales
- Modelling clay to attach to the strings

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 variable will be ...
- The controlled variables will be ...



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

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

Functions of the skeleton

Key vocabulary

Ribcage – Curved bones in the chest that protect the heart and lungs.

Skull – The bones in the head that protect the brain.

Spine – A group of small bones stacked on top of each other in the back that support movement.

Pelvis – A rounded "bowl-like" set of bones which connect the spine to the legs.

Femur – A long bone in the upper leg that supports movement.

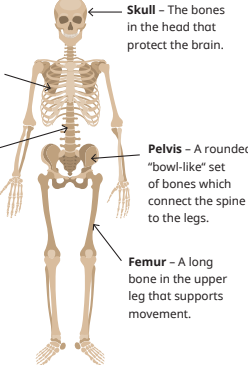
Practical ideas

- Children could work in pairs to draw around the outline of their partner's body on large sheets of paper. Children can then correctly identify and label the locations of the bones learnt in Step 1

They should then describe the functions of each of the bones. (Note: If drawing round 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 be held upright.
- The ribcage protects the heart and lungs.



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Factual knowledge written in clear, child-friendly language.

Premium supporting materials

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

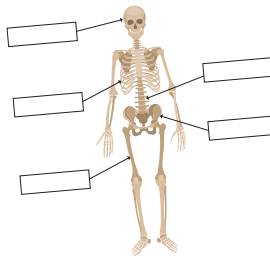
Name and identify bones in the human body

1 Here is Mo.




Draw an arrow to show the position of these parts on Mo's body.
Label your arrows.
head leg arm shoulder hand


2 Use the words to complete the labels on the skeleton.
ribcage skull femur spine pelvis



3 Diddy has been looking at the human skeleton.
The ribcage is part of the leg.
Do you agree with Diddy? Explain your answer.



4 Match the images to the names.




femur
skull
spine
ribcage
pelvis

5 Use the words to complete the sentences. You can only use each word once.
skull skeleton femur

a) The collection of bones that make up a human body is called a _____
b) The long bone in the upper leg is called the _____
c) The bones in the head are called the _____

6 Is the statement "always", "sometimes" or "never" true?
Any two human skeletons are the same.
Circle your answer.
Always Sometimes Never
Explain your answer.

7 Annie and Kim are talking about human skeletons.

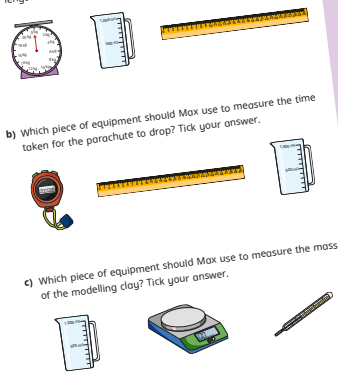


A skeleton is 1 large bone.
There are 206 bones in a typical skeleton!

Who do you agree with? Talk about it with a partner.

Investigate - parachute experiment

1 Max is setting up the equipment for his experiment.
a) Which piece of equipment should Max use to measure the length of the sides of the parachute? Tick your answer.




b) Which piece of equipment should Max use to measure the time taken for the parachute to drop? Tick your answer.

c) Which piece of equipment should Max use to measure the mass of the modelling clay? Tick your answer.

Evaluate - parachute experiment


1 The parachute is falling to the ground.



Air resistance is an invisible force acting on the parachute.

Which letter shows air resistance acting on the parachute? _____

2 Circle the parachute that hit the ground first in your experiment.



3 Write your experiment prediction below.

4 Was your prediction correct? How do you know?

5 Annie and Amir completed a parachute experiment.

Parachute length (cm)	Time taken in seconds (Attempt 1)
10	0.46
20	18.23
30	0.98

a) Circle the anomalous result in Annie and Amir's data.
b) In your own words explain what is meant by an anomalous result.

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.



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	Skeletons			Movement	Nutrition and diet			Food waste	Rocks			Consolidation
Spring term	Fossils		Soils			Light						Consolidation
Summer term	Plants A						Forces		Magnets		Plants B	Biodiversity

Autumn Block 1

Skeletons

Small steps

Step 1

Name and identify bones in the human body

Step 2

Functions of the skeleton

Step 3

Name and identify bones in a range of animals

Step 4

Animals with and without a spine

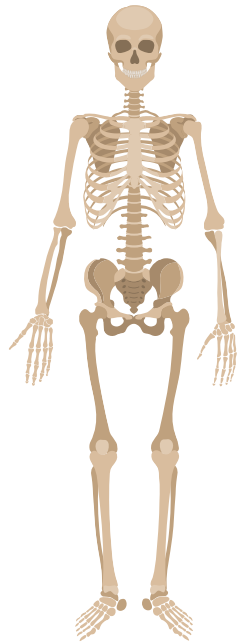
Step 5

Are all skeletons the same?

Key resources

Step 1 – Name and identify bones in the human body

- Printed outline of human skeleton



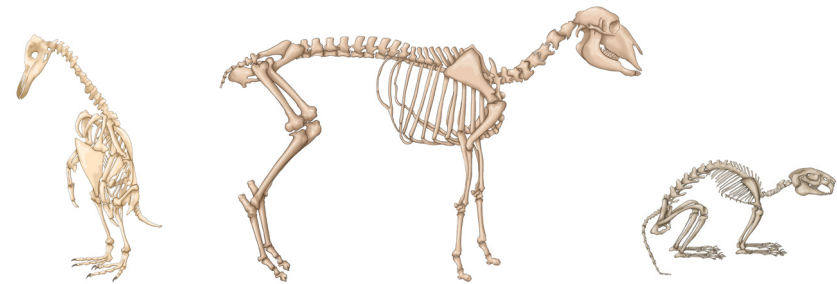
- Print outs of the skull, ribcage, femur, pelvis and spine
- A4 or A3 piece of paper

Step 2 – Functions of the skeleton

- A3 pieces of paper

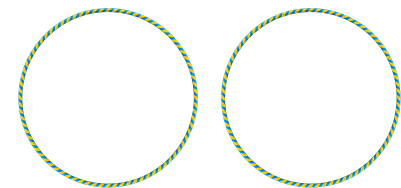
Step 3 – Name and identify bones in a range of animals

- Printouts or pictures of bones in animal skeletons.
- Scissors
- Glue
- A4 or A3 paper



Step 5 – Are all skeletons the same?

- Images of different animals
- Large hoops



Name and identify bones in the human body

Notes and guidance

In this small step, children explore the human skeleton for the first time by naming and identifying 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. By the end of this step, children should be able to name, identify and locate these bones in the human body.

The enquiry question for this block is “How can we sort and group animals based on their skeletons?” This is an identifying, grouping and classifying enquiry. Within this step, children can create relevant questions to begin the enquiry process.

Things to look out for

- Children may think that the skeleton is one large bone, rather than a collection of bones.
- They 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 are one long bone, rather than made up of multiple bones.

Key questions

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

Enquiry question

- How can we sort and group animals based on their skeletons?

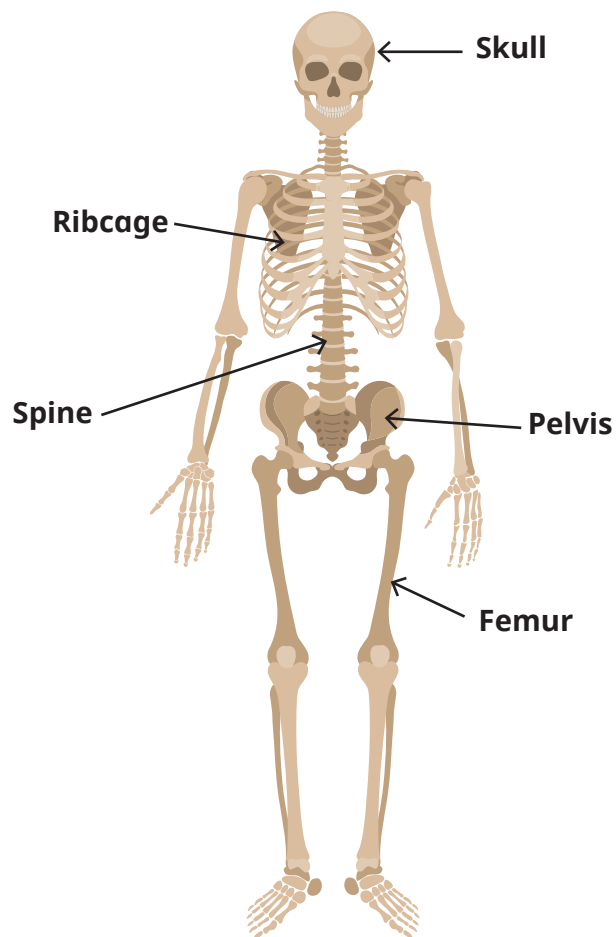
National curriculum links

- 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.

Name and identify bones in the human body

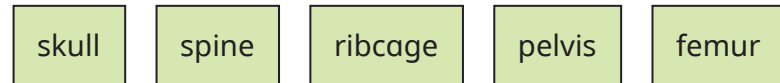
Key vocabulary

- **Skeleton** – A collection of bones.



Practical ideas

- Give children 5 labels.

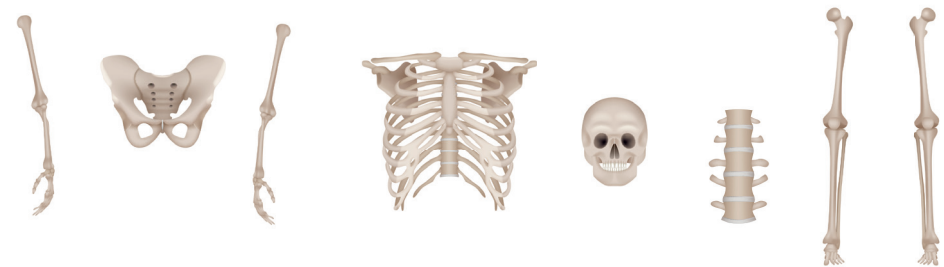


They add the labels onto a printed outline of the human skeleton.

- Give children print-outs or pictures of the skull, ribcage, femur, pelvis and spine.

Get them to assemble the skeleton by gluing the pictures on paper.

They should then label the bones correctly.



Factual knowledge

- Humans have skeletons which are made up of lots of different bones.
- An adult human typically has 206 bones that make up the skeleton.
- The skull, spine (backbone), ribcage, pelvis and femur are bones within the skeleton.

Functions of the skeleton

Notes and guidance

In this small step, children learn that humans have skeletons for movement, support and protection. They build on their learning from the previous step as they progress to outlining the functions (or jobs) of the spine, ribcage, pelvis, skull and femur.

It is important that children are not only aware of the function of the skeleton but also the jobs of specific bones. They should be able to describe the importance of humans having a skeleton with reference to movement, support and protection. The specific details about how the skeleton aids movement will be covered in Autumn Block 2

Things to look out for

- Children may think that bones within the skeleton do not have a function.
- They may believe that all bones must protect an internal organ, such as the skull or the ribcage.
- Children may think that all bones have the same function.

Key questions

- What are the functions of the skeleton?
- Why is the skeleton important?
- What is the function of the skull, or femur, or ribcage?
- What would happen if humans did not have a spine?
- What is similar about the skull and ribcage?
What is different?

Enquiry question

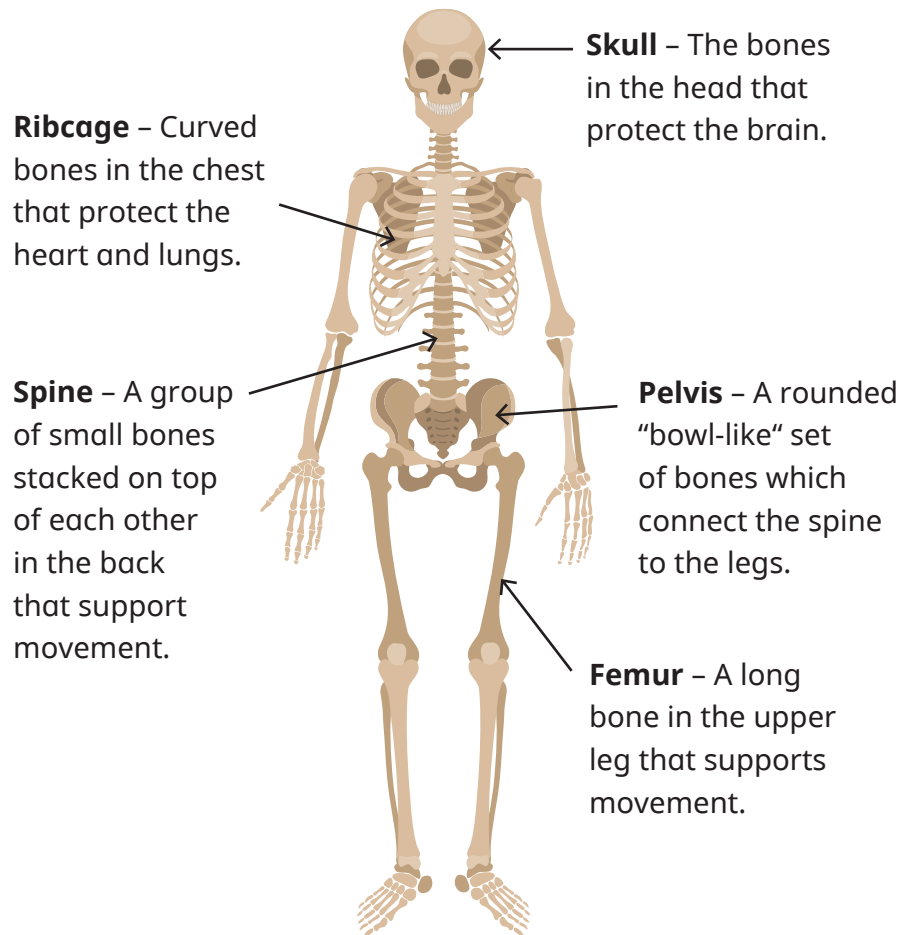
- How can we sort and group animals based on their skeletons?

National curriculum links

- Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
- **Working scientifically** – Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

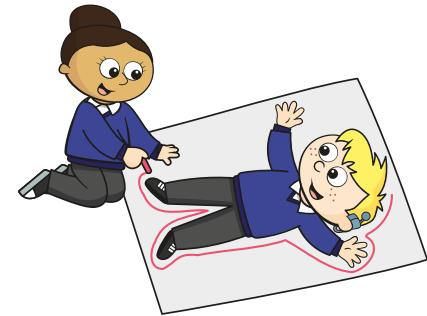
Functions of the skeleton

Key vocabulary



Practical ideas

- Children could work in pairs to draw around the outline of their partner’s body on large sheets of paper. Children can then correctly identify and label the locations of the bones learnt in Step 1



skull

ribcage

femur

pelvis

spine

They should then describe the functions of each of the bones. (Note: If drawing round 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 be held upright.
- The ribcage protects the heart and lungs.

Name and identify bones in a range of animals

Notes and guidance

In this small step, children learn that some animals have skeletons. They use their knowledge of bones in the human skeleton to identify, locate and name bones in a variety of animals.

It is important that children are shown a wide range of animal skeletons including mammals, birds, fish, amphibians and reptiles. This allows them to label the bones of the skeleton and spot any similarities or differences between them. Children do not need to use the term “vertebrate” as this is introduced in Year 4

Children need to be given the opportunity to sort and group animals as their understanding of the enquiry question develops.

Things to look out for

- Children may think that humans are not mammals and that other mammals have a different skeletal system to humans.
- They may think that all animals have a skull, spine, femur, pelvis and ribcage. Show examples of a wide range of animals to challenge this misconception.

Key questions

- What bones can you identify in these amphibian, or reptile, or fish, or bird skeletons?
- What are the similarities between mammal and bird skeletons? What are the differences?
- How are human skeletons similar to other mammals? Are there any differences?
- Do each of these animals have a spine/femur/pelvis/ribcage? Where is it on the skeleton?

Enquiry question

- How can we sort and group animals based on their skeletons?

National curriculum links

- Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
- **Working scientifically** – Talk about criteria for grouping, sorting and classifying (non-statutory).

Name and identify bones in a range of animals

Key vocabulary

- **Mammal** – A warm-blooded animal with a spine and hair or fur.



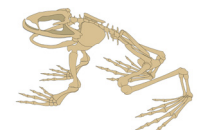
- **Bird** – An animal with a spine, feathers, wings and a beak.



- **Fish** – Animals that live in water with fins, gills and scales.



- **Amphibian** – A cold-blooded animal with a spine that lives on land and in water.



- **Reptile** – A cold-blooded animal with a spine and dry scales.

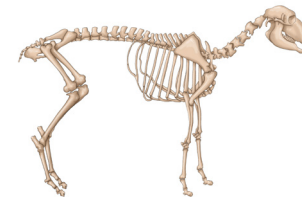


Practical ideas

- Children can play games to test their knowledge of animal skeletons. They could match animal skeletons with pictures of the animals. Or they could play “guess the animal” using just the images of animal skeletons, which would be more challenging.



penguin



sheep



rabbit

- Give children print-outs or pictures of bones in animal skeletons. Get them to assemble the skeleton by gluing the cut-outs on paper. They should then label the bones correctly.

Factual knowledge

- Mammals, birds, fish, amphibians and reptiles have skeletons.
- There are some similarities and differences in skeletons of different animals.
- Animal skeletons are made up of lots of different bones.

Animals with and without a spine

Notes and guidance

In this small step, children look at animals with and without a spine. They are introduced to the term “exoskeleton” to describe an animal with a skeleton on the outside of its body. Children should use the terms with and without a spine when grouping animals, not “vertebrate” and “invertebrate” as this vocabulary is introduced in Year 4

Children should explore a wide range of animals including insects, spiders, slugs and snails to allow them to further their understanding of animals with and without a spine.

Children will continue to develop their answers to the enquiry question for this block by sorting and grouping animals in different ways.

Things to look out for

- Children may think that if an animal does not have a spine, then it cannot move.
- Children may believe that animals without a spine have no form of skeleton.
- Children may think that all spineless animals have an exoskeleton. They should be shown a range of animals without a spine or exoskeleton to address this misconception, e.g. a slug.

Key questions

- Name 3 animals that have a spine.
- Name 3 animals that do not have a spine.
- What is an exoskeleton?
What is its function?
- Name 2 animals with an exoskeleton.
- How can we sort these spineless animals into groups?
How many ways can you group them?

Enquiry question

- How can we sort and group animals based on their skeletons?

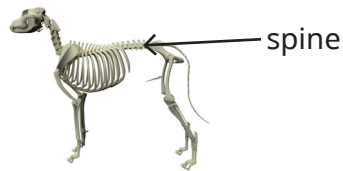
National curriculum links

- Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
- **Working scientifically** – Talk about criteria for grouping, sorting and classifying (non-statutory).

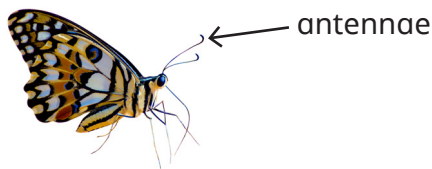
Animals with and without a spine

Key vocabulary

- **Spine** – A group of small bones stacked on top of each other in the back, also known as the “backbone”.



- **Antennae** – The organ on an insect's head that it uses to touch and smell.



- **Insect** – A small animal that has three body sections, six legs and antennae.

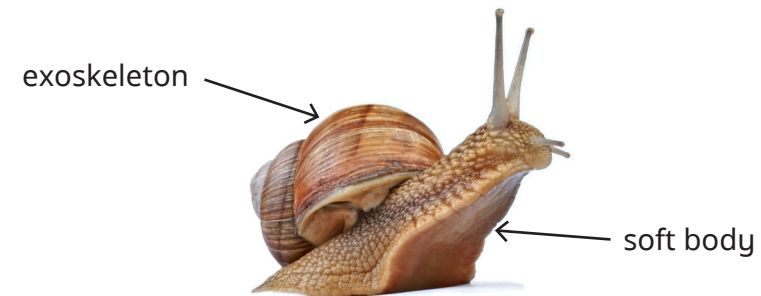


- **Exoskeleton** – A form of skeleton on the outside of an animal's body that provides support and protection.



Practical ideas

- Allow children to explore and identify animals with or without a spine in an outdoor environment.



A snail does not have a spine. A snail has an exoskeleton.

- Play games with children to help them name and identify animals with and without a spine. This could include “guess my animal” where children have to guess the animal an adult is thinking of using simple yes/no questions.

Factual knowledge

- Some animals have a spine.
- Some animals do not have a spine.
- Some animals have an exoskeleton.
- An exoskeleton provides support and protection.

Are all skeletons the same?

Notes and guidance

In the final step of this block, children provide answers to the enquiry question “Are all skeletons the same?” They should identify, sort and group animals in different ways based on their skeletal systems.

Children should consider mammal, bird, fish, amphibian and reptile skeletons when forming their answers. In addition to this, they could compare animals with and without a spine to demonstrate a deeper understanding of skeletons.

Children should be given opportunities to present their findings to a wider audience. This can include presentations, discussions and written responses.

Things to look out for

- Children may think that all skeletons are the same and have the same bone structure.
- When looking at specific groups, children may think that all animals within that group have the same skeletal structure. For example, snakes and lizards have very different skeletons but are both classified as reptiles. Another example of this could be humans and whales.

Key questions

- Name 3 animals with a spine.
- Name 3 animals without a spine.
- What is an exoskeleton?
- What are the differences between the skeletons of a bird and a snail?
- How can you sort and group these animals?
- How many ways can you think of?

Enquiry question

- How can we sort and group animals based on their skeletons?

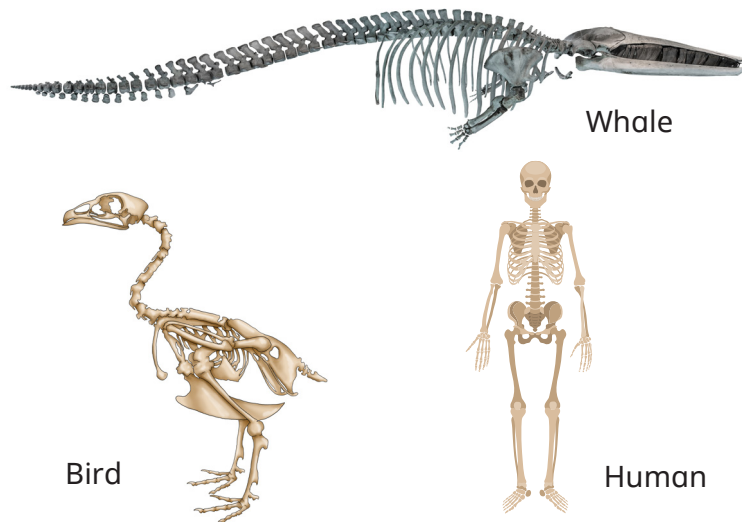
National curriculum links

- Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
- **Working scientifically** – Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

Are all skeletons the same?

Key vocabulary

- **Skeleton** – A collection of bones that provide protection and support movement. This appears different in different animals.



- **Exoskeleton** – A form of skeleton on the outside of an animal's body that provides support and protection.



Practical ideas

- Split the class into small groups.
Give each group an animal category.
Children should become “skeleton experts” on the category given.
They use knowledge from previous steps to form an answer to the enquiry question.
Children should discuss and choose how they want to record their answers.
They then present their findings to the rest of the group.



Factual knowledge

- Animals have different skeletons.
- All mammals, birds, fish, reptiles and amphibians have a spine.
- Some animals do not have spines.
- Skeletons provide support, protection and allow movement.