

Living Things and Their Habitats

Lesson 2: Vertebrates

Science KS2 Year 4



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Science

Key Stage 2 Year 4

Learning aims

- Learn that animals can be classified as vertebrates or invertebrates
- Find out what a backbone is and what invertebrates have instead.
- Learn that vertebrates are divided into five groups: mammals, fish, birds, reptiles and amphibians.
- Vertebrate Detectives – Identify an animal from each of these groups from the list we created in our Classification Challenge.
- Vertebrate Challenge – Create a flowchart to help identify which group a vertebrate belongs to.

Curriculum objective

- recognise that living things can be grouped in a variety of ways
- explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment

Working scientifically

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.



Reading links

A list of reading links is supplied on page 4 of this PDF.

Keywords

Vertebrate. Invertebrate. Backbone. Spine. Spinal column. Mammals. Fish. Birds. Reptile. Amphibians. Warm blooded. Cold blooded.

These can also be found at the end of this PDF and can be placed on a learning wall as they are discussed during the lesson.



Equipment

You will need:

- Pens and pencils for colouring and labelling
- Scissors
- Glue/Sellotape
- Vertebrate Detective worksheet on pages 8 to 17 of this PDF
- Vertebrate Challenge worksheet on pages 18 and 19 of this PDF



Reading links:

Books for learning about vertebrates

1. **“Darwin’s Tree of Life”** written by Michael Bright. This beautifully illustrated book starts from the dawn of life and shows the order in which plants and animals evolved, the different branches of 'The Tree of Life', and how plants and animals have changed over time in many amazingly different ways.
2. **“Classification & Evolution (Straight Forward with Science)”** written by Peter Riley - offers a straightforward, but fun, approach to key science learning.
3. **“Who might you be?”** written by MSc student Clare Fearon – A free story that explores animal classification through a fun rhyme and colourful illustrations. This story explores the animals in your garden, how they interact with one another and how we group them together.
4. **“Animal classification – A guide to vertebrates”** written by Polly Goodman - There are over 2 million kinds of living organisms on Earth, and more are being discovered all the time. Scientists divide these things into groups. This book looks at the group of animals classified as vertebrates: fish, amphibians, reptiles, birds and mammals.



PowerPoint presentation

The accompanying PowerPoint presentation has 35 slides with the following learning points. At intervals throughout the lesson, we suggest asking the children what questions they might have. These can be collected throughout the unit of learning and added to the slide at the end of the lesson.

- Slides 1 and 2: introduce the lesson
- Slide 3: recap Lesson 1, then introduce today's learning about how vertebrates are classified.

Activity 1 Nature Detectives (Slides 4 to 6)

- Slide 4: Can the children identify all the animals in the photo?
- Slide 5: The answers are revealed.
- Slide 6: Ask the children to use post-it notes to add any new animals to the class list on the wall.
- Slide 7: Introduce the concept that animals can be classified into vertebrates and invertebrates depending on whether they have a backbone or not.
- Slide 8: Learn what a backbone is and that vertebrates have a backbone.
- Slide 9: Learn what invertebrates have instead of a backbone.

Activity 2 (Slide 10)

- Slide 10: Print the labels for "vertebrates" and "invertebrates" on page 7 of this PDF. Add them to the wall, side by side, above the class list of animals. Ask the children to classify the list of animals into vertebrates and invertebrates by moving the post-it notes into the correct list.

Activity 3 (Slide 11)

- Slide 11: Learn that vertebrates are divided into five groups. Can the children correctly identify which animal from the photos belongs to which group? The answers are revealed. We can now look at how the different groups are classified.
- Slide 12: We look at the features animals share which mean they can be classified as mammals.
- Slides 13 and 14: We look at the features animals share which mean they can be classified as birds.
- Slides 15 and 16: We look at the features animals share which mean they can be classified as fish.
- Slides 17 to 19: We look at the features animals share which mean they can be classified as reptiles.
- Slides 20 to 21: We look at the features animals share which mean they can be classified as amphibians.



Activity 4 – Vertebrate Detectives (Slides 22 to 26)

- Slide 22: Use this slide to help the children fill in their worksheet “Vertebrate Detectives”, for identifying features to classify mammals. Can they identify a mammal from the class list?
- Slide 23: Use this slide to help the children fill in their worksheet, “Vertebrate Detectives”, for identifying features to classify birds. Can they identify a bird from the class list?
- Slide 24: Use this slide to help the children fill in their worksheet, “Vertebrate Detectives”, for identifying features to classify fish. Can they identify a fish from the class list?
- Slide 25: Use this slide to help the children fill in their worksheet, “Vertebrate Detectives”, for identifying features to classify reptiles. Can they identify a reptile from the class list?
- Slide 26: Use this slide to help the children fill in their worksheet, “Vertebrate Detectives”, for identifying features to classify amphibians. Can they identify an amphibian from the class list?

Activity 5 – Vertebrate Challenge (slides 27 to 29)

- Slide 27: Recap on the characteristics of vertebrates in the five different groups. Encourage children to fill in their “Vertebrate Challenge” worksheet. Can they think of five questions to tell the different groups apart?
- Slide 28: Use the questions for the children to create a classification key to identify each group of vertebrates.
- Slide 29: Ask the children to continue their classification key for one animal. Then ask them to test it out, and then get a partner to guess whether their animal is a mammal, fish, bird, reptile or amphibian.

Quiz (slides 30 to 32)

- Slides 31 to 32: What have the children learned about vertebrates?
- Slide 33: Your questions
- Slide 34: Useful weblinks
- Slide 35: End of presentation.



Vertebrates

(have a backbone)

Invertebrates

(do not have a backbone)



Vertebrate Detectives

What features do different vertebrates have?

Animal 1

1. What is the animal below?

Is it a vertebrate or invertebrate?

How do you know?

2. What group of animals is it classified as? (Tick the correct one):

Mammal ☐ Bird ☐ Reptile ☐ Amphibian ☐ Fish ☐

3. This animal lives on land.

Can you draw the habitat around this animal to show where it lives?



4. What features do animals in this group have? Cut out the correct ones and use them to label the picture of the sheep.

✂ Hair/fur

✂ Scales

✂ Cold blooded

✂ Warm blooded

✂ Mothers feed babies with milk

✂ Ear holes, rather than ears

✂ Lungs (need air to breathe)

✂ 4 legs (or 2 legs and 2 arms)

✂ Hard-shelled eggs

✂ Give birth to live young (some produce eggs)

5. Can you identify a mammal from the class list?

6. What features does it have which allow you to classify it as a mammal?



Animal 2

1. What is the animal below?

Is it a vertebrate or invertebrate?

How do you know?

2. What group of animals is it classified as? (Tick the correct one):

Mammal ☐ Bird ☐ Reptile ☐ Amphibian ☐ Fish ☐

3. This animal lives in trees on land.

Can you draw the habitat around this animal to show where it lives?



4. What features do animals in this group have? Cut out the correct ones and use them to label the picture of the bird.

Hair/fur

Feathers

Cold blooded

Warm blooded

Beak

Ear holes, rather than ears

Lungs (need air to breathe)

Wings

Hard-shelled eggs

2 Legs

5. Can you identify a bird from the class list?

6. What features does it have which allows you to classify it as a bird?



Animal 3

1. What is the animal below?

Is it a vertebrate or invertebrate?

How do you know?

2. What group of animals is it classified as? (Tick the correct one):

Mammal ☐ Bird ☐ Reptile ☐ Amphibian ☐ Fish ☐

3. Where do animals from this group live?

Can you draw the habitat around this animal to show where it lives?



4. What features do animals in this group have? Cut out the correct ones and use them to label the picture of the goldfish.

Hair/fur

Scales

Cold blooded

Warm blooded

Beak

Fins

Lungs (need air to breathe)

Gills

Hard-shelled eggs

Lots of soft eggs
(Laid outside their body)

5. Can you identify a fish from the class list?

6. What features does it have which allows you to classify it as a fish?



Animal 4

1. What is the animal below?

Is it a vertebrate or invertebrate?

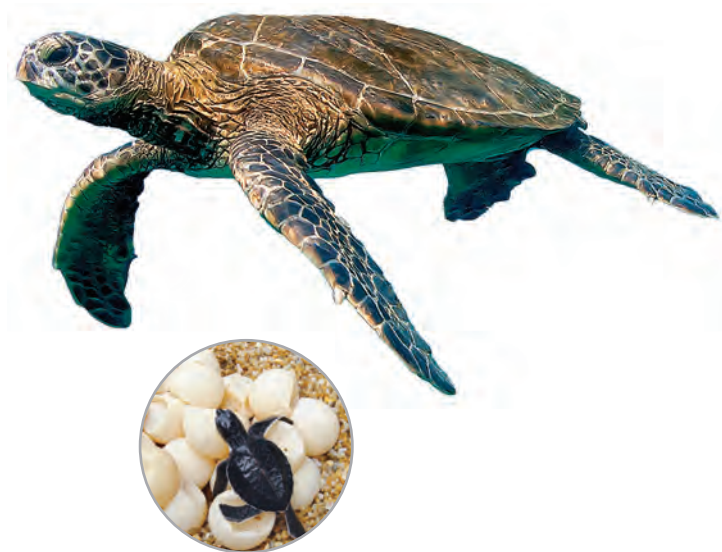
How do you know?

2. What group of animals is it classified as? (Tick the correct one):

Mammal ☐ Bird ☐ Reptile ☐ Amphibian ☐ Fish ☐

3. Where do animals from this group live?

Can you draw the habitat around this animal to show where it lives?



4. What features do animals in this group have? Cut out the correct ones and use them to label the picture of the turtle.

Hair/fur

Scales/dry skin

Cold blooded

Warm blooded

Beak

Ear holes, rather than ears

Lungs (need air to breathe)

Gills

Lay eggs (sometimes live young)

4 legs or no legs

5. Can you identify a reptile from the class list?

6. What features does it have which allows you to classify it as a reptile?



Animal 5

1. What is the animal below?

Is it a vertebrate or invertebrate?

How do you know?

2. What group of animals is it classified as? (Tick the correct one):

Mammal ☐ Bird ☐ Reptile ☐ Amphibian ☐ Fish ☐

3. Where do animals from this group live?

Can you draw the habitat around this animal to show where it lives?



4. What features do animals in this group have? Cut out the correct ones and use them to label the picture of the toad.

✂ **Moist, smooth skin**

✂ **Scales**

✂ **Cold blooded**

✂ **Warm blooded**

✂ **4 legs
(sometimes more)**

✂ **2 legs**

✂ **Webbed feet**

✂ **Gills/lungs**

✂ **Hard-shelled eggs**

✂

5. Can you identify an amphibian from the class list?

6. What features does it have which allows you to classify it as an amphibian?



Vertebrate Challenge

1. For my "Vertebrate Detective" activity I classified the following animals from the class list. Complete the table with your answers.

Mammal	Fish	Bird	Reptile	Amphibian

2. I can use the following questions to help tell these animals apart (what makes them different? Use your Vertebrate Detective worksheet to help you).

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____



3. I can create a classification key to help identify my five animals. The classification key will allow me to identify a mammal, fish, bird, reptile and amphibian.

What is your first question?

1. _____

Can you add more questions to allow you to identify each of your animals?

2. _____

3. _____

4. _____

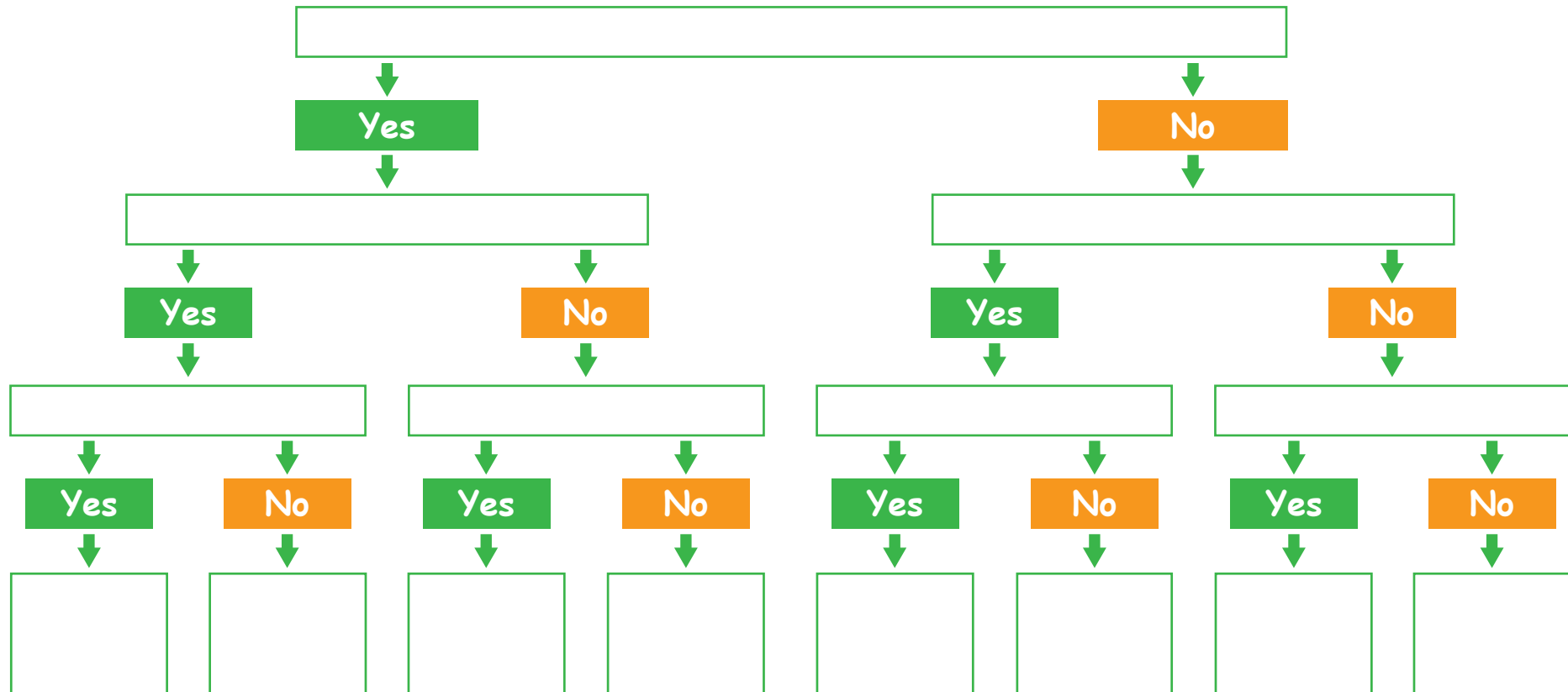
Draw your classification key on the next page.



Draw your new classification key below.

Could you divide any of the groups further? What questions would you ask?

Think of one of your animals. Test your classification key works by getting your partner to work through the questions to guess what your animal is.



Living Things and Their Habitats: Keywords Flashcards



Vertebrate

Invertebrate

Backbone

Spine

**Spinal
column**

Mammals





Fish

Birds

Reptile

Amphibians

**Warm
blooded**

**Cold
blooded**



Vertebrate



Invertebrate



Backbone



Spine



Spinal column



Mammals



Fish



Birds



**Cold
blooded**



Warm blooded



Amphibians



Reptile

