

Physical  
Life  
Earth and Space

## LESSON 31

### Identifying characteristics of classes of vertebrates

#### Lesson Preparation

##### Program Materials

- Child's Booklet C *Investigating Characteristics of Animals* (pp. 6 and 7)
- Science Word List C (see inset)
- Optional: Frozen Frogs Video at [nancyarsonhomeschool.com](http://nancyarsonhomeschool.com), *Science 4*, Lesson 31
- Lesson Review 31

##### Tool Kit Materials

- Mammals, Birds, Reptiles, Amphibians, and Fish posters

##### Collected Materials

- Yellow highlighter
- Whiteboard or scrap paper

Science  
Word List C

homeotherm

poikilotherm

## The Lesson

**"In your last science lesson, you used posters to learn about five of the classes of vertebrates."**

**"What classes of vertebrates are shown on the posters?"** *mammals, birds, reptiles, amphibians, and bony fish*

**"What are some animals that are mammals?"**

- Allow time for your child to name 3–6 mammals.

**"What is a characteristic you learned about mammals?"**

- Ask your child to name three or four facts about mammals.
- Repeat for birds, reptiles, amphibians, and bony fish.

**"In today's science lesson, you will learn how animals in one class of vertebrates differ from those in another class."**

**"Take out your zoology booklet and highlighter."**

“Turn to page 6.”

“Before we read about the classes of vertebrates, let’s review what all vertebrates have in common.”

“What are the five characteristics all vertebrates have in common?” *vertebral column, endoskeleton, cranium, spinal cord, closed circulatory system*

“Let’s read about the characteristics that are used to sort vertebrates into different classes.”

“What is the title of page 6?” *Classifying Vertebrates*

“Follow along as I read paragraph 1.”

- Read paragraph 1 as your child follows along.

Vertebrates are sorted into groups, called classes, based on differences such as their body coverings, how they bring oxygen into their bodies, their internal body temperatures, and how they reproduce. Five of the classes of vertebrates are mammals, birds, reptiles, amphibians, and bony fish.

“What is the title of the chart at the bottom of page 7?” *Characteristics of Classes of Vertebrates*

“The chart lists four characteristics used to sort vertebrates into classes.”

“What is the first characteristic?” *Body Covering*

“What is the second characteristic?” *How Oxygen Enters the Body*

“The third characteristic is body temperature.”

“What is the fourth characteristic?” *Reproduction*

“Let’s read about each of these four characteristics.”

“Paragraph 2 describes the body coverings of each class of vertebrates.”

“Follow along as I read paragraph 2 on page 6.”

- Read paragraph 2 as your child follows along.

Vertebrates have different types of body coverings. Reptiles have dry, scaly skin. Most amphibians have moist, smooth skin. Most fish have skin with overlapping scales. Birds have skin with feathers. Most mammals have skin with hair.

“What type of body covering do reptiles have?” *dry, scaly skin*

“What type of body covering do most amphibians have?” *moist, smooth skin*

“What type of body covering do most fish have?” *skin with overlapping scales*

- **Teacher Note:** Some fish, such as catfish, do not have skin covered by scales.

**“What type of body covering do birds have?”** *skin with feathers*

- **Teacher Note:** Birds have dry, scaly skin on their legs and feet.

**“What type of body covering do most mammals have?”** *skin with hair*

**“You will fill in the information about the body coverings of each group of vertebrates listed on the chart on page 7.”**

**“What could you write in the box below the word ‘Mammals’ to remind you about the body covering of mammals?”** *skin with hair*

**“Write the words ‘skin with hair’ on your chart in the column labeled ‘Mammals.’”**

- Repeat for the body coverings of birds (*skin with feathers*), reptiles (*dry, scaly skin*), amphibians (*moist, smooth skin*), and bony fish (*skin with scales*).

**“All animals need to take oxygen into their bodies and remove carbon dioxide to live.”**

**“When you inhale, you take oxygen into your body and when you exhale, carbon dioxide leaves your body.”**

**“Let’s practice inhaling and exhaling.”**

- Inhale and exhale with your child.

**“Paragraph 3 describes how oxygen enters the bodies of each class of vertebrates.”**

**“Follow along as I read paragraph 3.”**

- Read paragraph 3 as your child follows along.

Vertebrates have different ways of bringing oxygen into their bodies and removing carbon dioxide. The absorption of oxygen and the release of carbon dioxide take place in the lungs of mammals, birds, reptiles, and most adult amphibians when they breathe. The exchange of oxygen and carbon dioxide in fish and some young amphibians takes place in gills. Some amphibians, such as salamanders, can also absorb oxygen through their moist skin.

- **Teacher Note:** Gills are located on both sides of a fish’s or a young amphibian’s head. Water enters through the animal’s mouth and passes over its gills. The blood vessels in the gills absorb oxygen from the water and release carbon dioxide into the water.

**“You will fill in the information about how oxygen enters the bodies of each group of vertebrates on the chart on page 7.”**

**“How does oxygen enter the bodies of mammals?”** *in lungs*

**“Write the word ‘lungs’ in the column labeled ‘Mammals.’”**

- Repeat for birds and reptiles.

**“How does oxygen enter the bodies of fish?”** *gills*

**“Write the word ‘gills’ on your chart in the column labeled ‘Bony Fish.’”**

**“How does oxygen enter the bodies of amphibians?”** *lungs, gills, skin*

**“Write the words ‘lungs, gills, skin’ in the column labeled ‘Amphibians.’”**

- Allow time for your child to do this.

**“Paragraph 4 describes the body temperatures of each class of vertebrates.”**

**“Mammals and birds have body temperatures that stay about the same, regardless of the air temperature.”**

- **Teacher Note:** Normal body temperature for human beings is about 98.6°F. Dogs and cats have body temperatures between 100.5°F and 102.5°F. Birds have body temperatures of about 105°F.

**“A vertebrate with a body temperature that stays about the same all the time is called a homeotherm (hō'mē-ə-thûrm').”**

- Write the word **homeotherm** on the whiteboard or scrap paper. Say the word “homeotherm” several times with your child.

**“Other animals, such as snakes, fish, and frogs, have body temperatures that change with their surroundings.”**

**“A vertebrate whose body temperature is able to change with its surroundings is called a poikilotherm (poi-kil'ə-thûrm').”**

**“Fish, reptiles, and amphibians are poikilotherms.”**

- Write the word **poikilotherm** on the whiteboard or scrap paper. Say the word “poikilotherm” several times with your child.

**“Let’s read about homeotherms and poikilotherms.”**

**“Follow along as I read paragraph 4.”**

- Read paragraph 4 as your child follows along.

Some vertebrates have relatively constant, or about the same, body temperatures. An animal whose body temperature remains about the same is called a homeotherm. Birds and mammals are homeotherms. An animal whose body temperature is able to change with its surroundings is called a poikilotherm. Reptiles, amphibians, and fish are poikilotherms.

- **Teacher Note:** Homeotherms are often described as warm-blooded animals and poikilotherms as cold-blooded animals.

**“Which sentence tells us the definition of a homeotherm?”** *second sentence*

**“At the end of the second sentence, highlight the word ‘homeotherm.’”**

**“What did you learn about homeotherms?”** *Their body temperatures remain about the same.*

**“Which sentence tells us the definition of a poikilotherm?”** *fourth sentence*

**“At the end of the fourth sentence, highlight the word ‘poikilotherm.’”**

**“What did you learn about poikilotherms?”** *Their body temperatures are able to change with their surroundings.*

**“You will fill in the information about the body temperatures of each class of vertebrates on the chart on page 7.”**

**“You will write a capital ‘H’ for homeotherm and a capital ‘P’ for poikilotherm.”**

**“Are mammals homeotherms or poikilotherms?”** *homeotherms*

**“Write a capital ‘H’ on your chart in the column labeled ‘Mammals.’”**

- Repeat for the other classes of animals. *Birds (H), Reptiles (P), Amphibians (P), Bony Fish (P)*

**“Another characteristic of vertebrates is they produce new animals of the same kind.”**

**“For example, a young bird that hatches from a robin’s egg will always be another robin.”**

**“Paragraph 5 describes how vertebrates reproduce, or make more of their own kind, in a process called reproduction.”**

**“Follow along as I read paragraph 5.”**

- Read paragraph 5 as your child follows along.

Adult vertebrates are capable of producing more of their own kind in a process called reproduction. Most mammals have young that are born live. The young of birds—and most reptiles, fish, and amphibians—develop in eggs outside of the mother’s body. Birds have hard-shelled eggs laid on the ground or in nests. Reptile eggs have soft, leathery shells and are usually laid on or buried under the ground. Fish and amphibians have jelly-like eggs that do not have shells. Fish and most amphibians lay their eggs in water.

**“You will fill in the information about the reproduction of vertebrates on the chart on page 7.”**

**“What words describe the reproduction of mammals?”** *young born live*

**“Write the words ‘young born live’ on your chart in the column labeled ‘Mammals.’”**

- **Teacher Note:** One mammal, the platypus, begins its life cycle in an egg. A few reptiles, such as rattlesnakes, copperheads, boas, and garter snakes, have eggs that remain in the mother until the eggs hatch, so they are sometimes said to be “born live.”

**“Where do the young of birds and most fish, amphibians, and reptiles develop?”** *in eggs*

**“What did you learn about the eggs of birds?”** *hard-shelled eggs laid on the ground or in nests*

**“Write the words ‘hard-shelled eggs’ on your chart in the column labeled ‘Birds.’”**

- Allow time for your child to do this.

**“What did you learn about the eggs of reptiles?”** *Reptile eggs have soft, leathery shells and are usually laid on or buried under the ground.*

**“Write the words ‘soft-shelled eggs’ on your chart in the column labeled ‘Reptiles.’”**

- Allow time for your child to do this.

**“What did you learn about the eggs of fish and most amphibians?”** *They lay their jelly-like eggs in water, and the eggs do not have shells.*

**“Write the words ‘jelly-like eggs in water’ on your chart in the columns labeled ‘Amphibians’ and ‘Bony Fish.’”**

- Allow time for your child to do this.

**“You can use this chart to summarize and compare the characteristics of classes of vertebrates.”**

**“What is something you learned in today’s science lesson?”**

**“Let’s see if you can identify the vocabulary words I will write on Science Word List C.”**

**“This word describes an animal with a relatively constant body temperature. What is it?”** *homeotherm*

- Write the word homeotherm on Science Word List C.

**“This word describes an animal with a body temperature that is able to change with the surroundings. What is it?” *poikilotherm***

- Write the word **poikilotherm** on Science Word List C.

**“In your next science lesson, you will learn about the life cycles of vertebrates.”**

- **Optional:** Show the video of frozen frogs from our website to your child.
- **Optional:** Post the word cards **homeotherm** and **poikilotherm** on the Science Word Wall.

## Lesson Review

- Hand Lesson Review 31 to your child.
- Read the title, directions, and questions to your child.
- Allow your child to use his/her booklet to answer the questions.
- Correct your child’s paper. Review incorrect answers with your child.

Lesson 31

### Classifying Vertebrates

- Vertebrates are sorted into groups, called classes, based on differences such as their body coverings, how they bring oxygen into their bodies, their internal body temperatures, and how they reproduce. Five of the classes of vertebrates are mammals, birds, reptiles, amphibians, and bony fish.
- Vertebrates have different types of body coverings. Reptiles have dry, scaly skin. Most amphibians have moist, smooth skin. Most fish have skin with overlapping scales. Birds have skin with feathers. Most mammals have skin with hair.
- Vertebrates have different ways of bringing oxygen into their bodies and removing carbon dioxide. The absorption of oxygen and the release of carbon dioxide take place in the lungs of mammals, birds, reptiles, and most adult amphibians when they breathe. The exchange of oxygen and carbon dioxide in fish and some young amphibians takes place in gills. Some amphibians, such as salamanders, can also absorb oxygen through their moist skin.
- Some vertebrates have relatively constant, or about the same, body temperatures. An animal whose body temperature remains about the same is called a **homeotherm**. Birds and mammals are homeotherms. An animal whose body temperature is able to change with its surroundings is called a **poikilotherm**. Reptiles, amphibians, and fish are poikilotherms.
- Adult vertebrates are capable of producing more of their own kind in a process called reproduction. Most mammals have young that are born live. The young of birds—and most reptiles, fish, and amphibians—develop in eggs outside of the mother’s body. Birds have hard-shelled eggs laid on the ground or in nests. Reptile eggs have soft, leathery shells and are usually laid on or buried under the ground. Fish and amphibians have jelly-like eggs that do not have shells. Fish and most amphibians lay their eggs in water.

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Science 4

Lesson 31

### Characteristics of All Vertebrates

	vertebral column
	endoskeleton
	cranium
	spinal cord
	closed circulatory system

### Characteristics of Classes of Vertebrates

Characteristics	Mammals	Birds	Reptiles	Amphibians	Bony Fish
Body Covering	skin with hair	skin with feathers	dry, scaly skin	moist, smooth skin	skin with scales
How Oxygen Enters the Body	lungs	lungs	lungs	lungs, gills, skin	gills
Body Temperature <small>H: Homeotherm P: Poikilotherm</small>	H	H	P	P	P
Reproduction	young born live	hard-shelled eggs	soft-shelled eggs	jelly-like eggs in water	jelly-like eggs in water

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Name \_\_\_\_\_ **Answer Key**  
 Date \_\_\_\_\_

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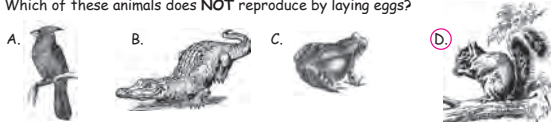
**Characteristics of Classes of Vertebrates**

Use the clue given and write the class or classes of vertebrates described.

- Some of these vertebrates absorb oxygen through their skin. \_\_\_\_\_ **amphibians**
- Most of these vertebrates have skin with hair. \_\_\_\_\_ **mammals**
- Dry, scaly skin is found on these vertebrates. \_\_\_\_\_ **reptiles**
- Both the young and adults of these vertebrates have gills. \_\_\_\_\_ **fish**
- These two classes of vertebrates are homeotherms. \_\_\_\_\_ **birds, mammals**
- These three classes of vertebrates are poikilotherms. \_\_\_\_\_ **reptiles, amphibians, fish**

Circle the letter of the correct answer.

- An animal lays eggs and has scales and gills. To which class does it belong?  
 A. fish    B. reptile    C. amphibian    D. bird
- Which word best describes a cat?  
 A. reptile    B. invertebrate     C. vertebrate    D. amphibian
- Which of these animals does **NOT** reproduce by laying eggs?



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- Which pair of animals gives birth to live young?  
 A. catfish and salamanders  
 B. eagles and lizards  
 C. salamanders and eagles  
 D. grizzly bears and wolves

- Circle the letter of all the animals that are mammals.



- Circle the letter of all the animals that are reptiles.



- A cat, goldfish, and bluebird are alike in many ways. Which of the following do these animals have in common?  
 A. lungs    B. wings     C. spinal column    D. hair

**Use What You Have Learned**

- Compare a snake's body temperature to the body temperature of a human being.  
**Possible answer: A snake's body temperature changes with the surroundings and a human being's body temperature remains constant.**

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