

- In small groups, have students examine a specific mammal's use of the five senses and report back to the class. For example, marine mammals, bats and dogs rely more on sound than sight. Have students give reasons for these differences.
- Ask students to research the history of the relationship between humans and whales. Then have the class debate the treatment whales have received over the years, with some students defending humans and others defending whales.
- Design a "new and improved" mammal for a specific habitat. Have students select characteristics for the new animal that would enable it to thrive, being sure to distinguish true mammalian traits from any non-mammalian traits that they give to their animal.
- Research and report on the brains of different animal classes, showing differences in structures, sizes and capacities. Make a chart or table to summarize your findings.

Internet Resources

- www.abdn.ac.uk/mammal/records.htm
The British Mammal Society lists unusual and endangered mammals, whale songs and numerous links to other great mammal sites.
- www.ucmp.berkeley.edu/mammal/mammal.html
The "Hall of Mammals" Web site is a great place to obtain detailed information on all three living groups of mammals as well as the mammals of the past.
- www.nmnh.si.edu/VirtualTour/Tour/First/Mammal/index.html
Great virtual tour of the National Museum of Natural History at the Smithsonian. This site gives students opportunities to view fossilized and mummified mammals, as well as specific species alive today.
- www.zoomschool.com/subjects/whales/
This site gives information on marine mammal evolution, classification, anatomy and behavior.
- www.nexus.edu.au/schools/kingscot/pelican/monohome.htm
The Monotreme Extreme site has slides of echidna in the wild as well as information on egg-bearing mammals.
- nmml01.afsc.noaa.gov/education/cetaceans/cetacea.htm
Dolphins, whales and porpoises are discussed on this site by the National Marine Fisheries Service.

Suggested Print Resources

- *Encyclopedia of Mammals*. Marshall Cavendish Books, London, England; 1997.
- Jeunesse, Gallimard. *Mammals*. Scholastic Trade, New York, NY; 1997.
- Lovett, Sarah. *Extremely Weird Mammals*. John Muir, Santa Fe, NM; 1996.
- Warner, Allison. *Animal Fact-File: Head-to-Tail Profiles of Over 100 Mammals*. Facts on File, New York, NY; 1999.

TEACHER'S GUIDE CONSULTANT

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TITLES

- AMPHIBIANS
- ANIMAL ADAPTATIONS
- ANIMAL BEHAVIOR & COMMUNICATION
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Mammals

Grades 5-8

Students in grade 5-8 classrooms possess a wide range of background knowledge. Student response to this video program is sure to be varied, so the teachers for these grades need all the help they can get! This guide has been designed to help science teachers in grades 5-8 by providing a brief synopsis of the program, pre-viewing and follow-up questions, activities, vocabulary and additional resources.

Before Viewing: Extensive research tells how important it is for the teacher to discover what the students know — or think they know — about a topic, before actually starting a new unit. Therefore, after prompting discussion with the pre-viewing questions, lead your class to create a "Everything We Think We Know About..." list. You may also wish to preview key vocabulary words, and have students raise additional questions they hope will be answered.

After Viewing: Have your students share video excerpts that fascinated or surprised them, then challenge your students to prove or disprove the accuracy of the facts they put on their "Everything We Think We Know About..." list. Discuss what else they learned and use the follow-up questions and activities to inspire further discussion. Encourage students to research the topic further with the Internet and reading resources provided.

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Program Summary

There are more than 4,500 species of mammals, including humans, that live all around the world in many different habitats. But what makes mammals different from other animals? Mammary glands and body hair are two characteristics that are exclusive to mammals. In fact, the word mammal derives from mammary glands, the special structures in the skin that produce milk in females of the class. A mammal's hair can serve many functions. It can provide warmth, help animals sense their surroundings (as in the whiskers on a cat) and, in some cases, it can be used for defense (as in the quills of a porcupine).

Mammals are also warm-blooded vertebrates that breathe oxygen by using their lungs. They have a four-chambered heart and possess the most highly developed brain of all animals. A large brain size in relation to their body and the brain structure known as the cerebral cortex provide mammals with highly developed intelligence and senses that increase their ability to learn and perform detailed tasks.

Mammals are grouped according to the way they give birth. Monotremes are primitive mammals that lay eggs, while marsupials are mammals whose tiny, undeveloped newborns must live in a mother's pouch until they grow big enough to survive outside the pouch. The majority of mammals are placentals, whose babies remain inside the mother until their bodies reach a certain stage of development.

Unlike most classes of animals, mammals nurture their young for quite some time. Great emphasis is placed on feeding, protecting and teaching skills to the young in order for them to survive on their own. From the plains of Africa to the frozen tundra of the Arctic Circle, different mammals call many different habitats home. Even the oceans of the world are home to such mammals as the whale and dolphin, a further illustration of the diversity that can be found among the creatures of this amazing class.

Vocabulary

The following words are included for teacher reference or for use with students. They are listed in the order in which they appear in the video.

mammals — Warm-blooded vertebrates that have hair and mammary glands; in females of the species mammary glands produce milk to feed their young.

warm-blooded — A term describing animals that maintain a nearly constant body temperature that is not influenced by the temperature of the environment.

mammary glands — Glands present in all mammals; they produce milk in all female mammals upon giving birth and are present in a nonfunctional form in males.

vertebrates — Any animals with internal backbones made up of small bones called vertebrae. These bones provide support for the animal's muscles and organs, while providing protection for the animal's spinal nerves.

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lungs — The organs that all mammals and many other types of animals use to breathe.

cerebral cortex — The structure in a mammal's brain which gives it the ability to learn faster and perform more advanced functions than other types of animals.

opposable thumb — The ability to freely move and fully rotate the thumb, possessed by humans, apes and a few other mammals, that allows them to grasp and manipulate objects.

nurturers — Animals that feed, protect and teach survival skills to their young.

reproduction — The creation of new organisms, or offspring, from adult organisms of the same species. Mammals reproduce when a male and female cell unite inside the mother and begin to grow.

monotremes — Primitive mammals, like the platypus and spiny anteater, that lay eggs.

marsupials — Mammals that bear underdeveloped young which must complete their development in the mother's pouch. There are 260 species of marsupials.

placentals — The largest group of mammals whose young grow inside the mother and are more developed at birth than other mammals.

blubber — A thick, oily, fatty substance which insulates marine mammals living in cold habitats, helping to keep in their body heat.

herbivores — Animals that eat only plants.

carnivores — Animals that eat other animals.

omnivores — Animals that eat both plants and animals.

Pre-viewing Discussion

Before students generate their list of "Everything We Think We Know About..." for this topic, stimulate and focus their thinking by raising these questions so that their list will better reflect the key ideas in this show:

1. How are mammals different from other animals?
2. Do all mammals have the same characteristics?
3. Identify mammals that live in different habitats (land, water, air).

After the class has completed their "Everything We Think We Know About..." list, ask them what other questions they have that they hope will be answered during this program. Have students listen closely to learn if everything on their class list is accurate and to hear if any of their own questions are answered.

Focus Questions

1. What are the main characteristics of mammals?
2. What are mammary glands?
3. Name three functions of mammal hair and give an example of each.

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4. What are some animals (other than mammals) that have vertebrae?
5. What does it mean to be warm-blooded?
6. Why do mammals need well developed senses?
7. What is the cerebral cortex?
8. What percentage of their brains do humans use?
9. What is an opposable thumb?
10. Why do mammal mothers nurture their young longer than most other animal species?
11. What is a marsupium?
12. Give an example from each group of mammals: the monotremes, the marsupials and the placentals.
13. Explain the purpose and conclusion of the investigation presented in the program.

Follow-up Discussion

Research indicates that students will retain their previous misconceptions about a topic, in preference to new information, until they actively recognize and correct their own errors. Therefore, it is important to have your students re-examine the facts/beliefs they put on their "Everything We Think We Know About..." list. It might also be helpful to review the list by marking each entry with a "+" or "-" to show which facts were correct and which were incorrect.

Discussions that ensue from thought-provoking questions provide a good way to assess the overall depth of student understanding. The following are some suggested discussion questions.

1. Discuss the relationship between the number of offspring mammals have, their level of maturation and development at birth, and the nature of mammals as nurturers. Compare this with the relationship between parents and their young in other animal classes.
2. Can you explain why mammals are considered to be the most intelligent animals?
3. Discuss how marine mammals are similar to and yet different from land mammals. What unique features and adaptations do they possess?

Follow-up Activities

- Divide the class into small groups. Have some students attempt to complete a series of tasks with their thumbs taped to the side of their hands while their classmates observe and record outcomes. Brainstorm a list of things people could not accomplish without the use of their thumbs. Use this information to write an essay on what life would be like if humans had not developed opposable thumbs (more information on this activity can be found at the following Web site—<http://www.accessexcellence.org/AE/AEPC/WWC/1991/opposable.html>).

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