San Diego Natural History Museum
TEACHER'S GUIDE

DOGS
WOLF, MYTH, HERO & FRIEND

Overview

Today, dogs enhance the lives of millions of people in countless ways, but they are also some of humans' oldest friends. Ancient clues like cave paintings and burials reveal that dogs and people have lived together for thousands of years. But why have humans formed such close relationships with dogs, and not cows or chickens? *DOGS: Wolf, Myth, Hero & Friend* sniffs out the facts on dogs and explores what makes the human/dog relationship so unique.

The exhibition features the following sections:

Evolution and Diversity
• Explores the evolution of the dog family.

Canine Communication
• Discusses how dogs communicate with people and with each other through body language and vocalizations.

Form and Function
• Describes some attributes of dogs and ways people have used dogs.

Research and Conservation
• Introduces some current research projects promoting the survival and well being of both domestic and wild dogs.

Your Job
• Provides tips on dog care and information about dog-related careers.

Dogs Helping People
• Discusses how dogs are trained to help people with special needs.

Evolution and Diversity

Earliest members of the dog family appear in the fossil record about 40 million years ago. They are the first known carnivores (order Carnivora). Fossil evidence shows three main groups of dogs—the hesperocyons (hess pur oh SYE on), borophagines (bohr oh FAY jeens), and the canines (KAY nines). Members of the first two groups became extinct millions of years ago. Some members of the canine group such as dire wolves are also extinct. There are 35 living species of canines including domestic dogs, wolves, foxes, coyotes, jackals, and dingoes. Domestic dogs appear about 15,000 years ago—they may be even older— and are documented in cave paintings and human burials. While there was once uncertainty as to whether domestic dogs were descendents of jackals, coyotes, or wolves, modern DNA-sequencing studies indicate that wolves are dogs closest relatives.

 All of the nearly 400 domestic breeds of dog are one species, *Canus familiaris*. Different breeds of domestic dogs are the result of artificial selection, or breeding controlled by humans. Variation in wild species is the result of natural selection—change over time influenced by environmental factors.
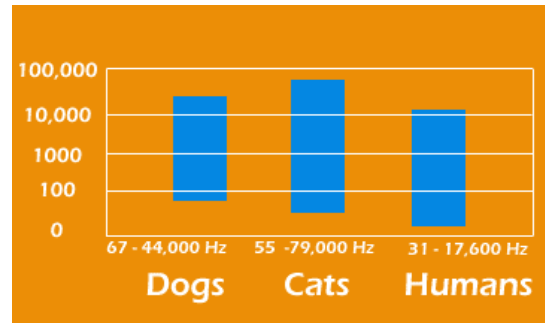
Canine Communication

Dogs communicate through vocalization and body language, much as humans do. Different pitch and intensity convey different messages—from low-pitched warning growls to high-pitched "pay attention to me" yelps. Submissive, aggressive, or play behaviors are often conveyed by body postures: belly up (submissive); tail out, hair raised, teeth bared (aggressive); or forequarters lowered (invitation to play).

Form and Function

Dogs have a very keen sense of both smell and hearing. When dogs sniff they are directing air over special smell receptors. Dogs are able to detect odors at very low concentrations. People have trained dogs to use their sense of smell to aid in rescue, tracking, and drug detection. A dog's sense of hearing is also superior to that of humans. Their ears are more mobile and the shape of the ear often helps to catch sounds—an upright type working better than floppy ears. Dogs are also able to hear higher pitch than humans.

When it comes to vision, dogs see better at night than humans, and their ability to sense motion is also well developed. However, humans have more types of cones—color receptors—and thus, are able to see a broader range of colors than dogs.

Endurance is another area where dogs excel. Many breeds are known for their ability to run over extended periods of time and for great distances. With a resting heart rate similar to human's, an exercising dog may have a heart rate of over 270 beats per minute—well above the human rate.

Research and Conservation

The exhibition sites several dog-related research projects including diseases affecting dogs; how re-introducing wolves to Yellowstone is restoring the natural balance of life; and a paper describing the relationship of coyotes to song birds.

Dogs Helping People

Through the years dogs and humans have developed a relationship of companionship, assistance, and care-giving. Combining companionship with their superior senses has led to using dogs to assist hearing and visually impaired people, while other dogs are trained as therapy dogs—befriending people who are ill or lonely.

Your Job

Domestication has made dogs dependent upon their human owners who must provide for the care and well being of their pets. Owner responsibilities are outlined in the exhibition as well as a number of careers that involved working with dogs.

Dog Vocabulary

aggressive—beginning an attack.

artificial selection—mechanism of change and variation in a species influenced by humanly controlled factors.

body language—non-verbal communication.

breed—a variety of animal within a species. There are many breeds of dogs, but they all belong to the same species.

canine—dog family of mammals, part of the larger, carnivore (order Carnivora) group.

domesticate—change from a wild to a tame state.

natural selection—mechanism of change and survival influenced by adapting to environmental factors.

pant—breathe hard and quickly.

species—a group whose members are capable of interbreeding successfully.

submissive—yielding to the power or control of another.

vocalize—produce sounds.

Museum Activity

Search the exhibition for answers to the following questions. Some questions are more difficult than others. Choose those that are appropriate for your grade level.

Evolution and Diversity

1. Which **wild canid** are dogs most closely related to?

_____

2. How do we know this?

_____

3. Do German Shepherds and Chihuahuas belong to the same or different species? _____

4. What are some differences between dogs and wolves?

_____

_____

5. What is the difference between natural selection and artificial selection?

_____

_____

6. Name one habitat occupied by members of the dog family.

_____

7. What wild dog lives in this habitat?

_____

8. Describe the habitat.

_____

9. Tell how the wild dog is adapted to the habitat.

_____

_____

Museum Activity (cont.)

Communication

10. You see a dog with ears flat, tail tucked, and lowered body or belly up.
What type of behavior does this describe? Circle your answer.

aggressive   submissive   playful

Form and Function

11. Compare these senses. Who has the better? Circle your answer and give a
reason.

• hearing: human   dog

_____

• color vision: human   dog

_____

• night vision: human   dog

_____

• smell: human   dog

_____

12. Why do dogs pant?
_____

13. When exercising, who has the higher pulse rate?

dogs   humans

Your Job

14. List three responsibilities of pet owners.

_____
_____
_____

Museum Activity (cont.)

Dogs Helping People
15. Name three ways dogs help people.

_____
_____
_____

16. What does a "therapy" dog do?
_____

Research and Conservation
17. Why are coyotes so successful?
_____
_____

18. What is hip displasia?

_____

19. What member of the dog family (besides domestic dog) is a common resident of San Diego County?
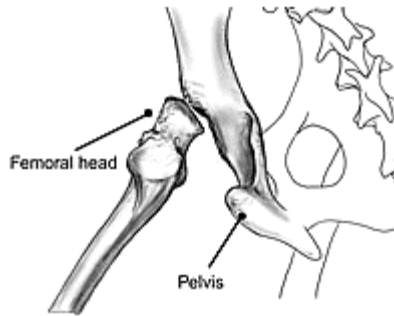
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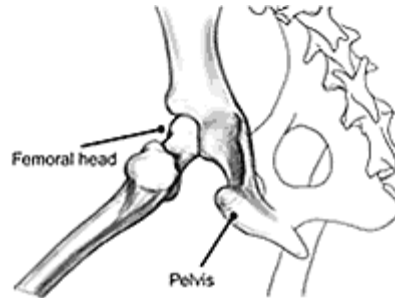20. Draw a picture of a carnasial tooth.

Answers to Museum Activity

1—wolves; 2—DNA sequencing; 3—same; 4—dog skull has more prominent break in the slope from forehead to nose tip, dog teeth are more squat; 5—natural selection influenced by environmental factors, artificial selection–breeding is controlled by humans; 6-9— answers will vary; 10—submissive; 11—hearing (dog–ear shape and mobility); color vision (human–more types of cones); night vision (dogs–more rods); smell (dog–special smell receptors); 12—to get rid of excess heat; 13—dogs; 14—provide nutritious food, water, regular vet visits, spay or neuter, exercise, obey leash laws, obedience train ; 15—guide, hearing, service, therapy, rescue; 16—companion for sick and lonely people; 17—adaptable to variety of living conditions; 18—hip socket too shallow to fit ball joint of thigh bone; 19—coyote; 20—blade-like tooth

Femoral head

Pelvis

Dysplasia

Femoral head

Pelvis

Normal

Classroom Activities

• Create a fictional breed of dog with given attributes. Use your knowledge of other breeds for selective cross-breeding to attain the desired results.

• Based on the adaptations of a given dog species, create a perfect habitat. For instance, a white arctic fox would live in a snow habitat.

• Collect several empty film canisters. Place common objects in each such as sand, popcorn kernels, or paper clips. Shake the canister, one at a time. Try to guess the contents of each canister.

• Blindfold a participant. Hold up different types of food or spices. Can the mystery item be identified just by smelling?

• Do an observational study of dogs, noting various postures. Predict the meaning of the postures you observe.

• Experiment with dogs and color vision. Throw balls of different colors noting which ones they catch more easily.

• Compare your resting pulse rate with your pulse rate after exercise. A working dog can have a pulse rate of up to 274 beats/minute.

• Research shows that there are more song birds in areas with a high coyote population. Can you hypothesize why that may be so?

• Research information on careers that involve working with dogs.

• Investigate ways that dogs are used to help people.

• Find out about some of the research being conducted on wild or domestic dogs. Write or give a report.

References for Kids

Books

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Evans, Mark. *Puppy: A Practical Guide to Caring for Your Puppy.* New York: DK Publishing, 1992.

Lang, Glenna. *Looking out for Sarah.* Watertown, Massachusetts: Talewinds, 2001.

Ring, Elizabeth. *Detector Dogs: Hot on the Scent.* Brookfield, Conn.: Millbrook Press, 1993.

Swinburne, Stephen R. *Coyote: North America's Dog.* Honesdale, Pennsylvania: Boyds Mills Press, 1999.

Websites

http://www.dogswithjobs.com/

http://www.animal.discovery.com/guides/atoz/canines.html

http://www.akc.org/love/dah/kidskorn/kidscornerhome.html

http://www.canids.org/

http://www.nhm.org/exhibitions/dogs/index.html

Sponsor

This Teacher's Guide has been adapted from materials provided by the Natural History Museum of Los Angeles County