Mammals and Animal Behavior Worksheets

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CHAPTER 1. MAMMALS AND ANIMAL BEHAVIOR WORKSHEETS

CHAPTER OUTLINE

1.1 MAMMALIAN TRIATS
1.2 REPRODUCTION IN MAMMALS
1.3 EVOLUTION AND CLASSIFICATION OF MAMMALS
1.4 OVERVIEW OF ANIMAL BEHAVIOR

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- Lesson 20.1: Mammalian Traits
- Lesson 20.2: Reproduction in Mammals
- Lesson 20.3: Evolution and Classification of Mammals
- Lesson 20.4: Overview of Animal Behavior
Lesson 20.1: True or False

Write true if the statement is true or false if the statement is false.

____ 1. Examples of mammals include frogs, bats, whales, mice, and humans.
____ 2. Milk contains disease-fighting molecules and nutrients a baby mammal needs.
____ 3. The heart of a mammal consists of three chambers, making it very efficient and powerful for delivering oxygenated blood to tissues.
____ 4. The mammalian middle ear has three tiny bones that carry sound vibrations from the inner to outer ear.
____ 5. The cheetah is the fastest land mammal.
____ 6. Herbivores such as zebras and lions live in herds.
____ 7. Of all animals, mammals are most capable of learning.
____ 8. The cerebrum controls functions such as memory and learning.
____ 9. Clusters of alveoli in the lungs resemble tiny bunches of grapes.
____ 10. Cellular respiration maintains the high metabolic rate in mammals.
____ 11. Omnivores, such the bear, fox, wolf, and rat, eat both plants and animals.
____ 12. Maintaining the high metabolic rate needed by mammals takes a lot of energy, which comes from either the sun or food.
____ 13. Goosebumps result from tiny muscles in the skin.
____ 14. Mammals, like all vertebrates, have four different types of teeth.
____ 15. Mammals have hair, scales, or fur, which insulates the body to help conserve body heat.

Lesson 20.1: Critical Reading

Read these passages from the text and answer the questions that follow.

Characteristics of Mammals

Two characteristics are used to define the mammal class. They are mammary glands and body hair (or fur).

a. Female mammals have **mammary glands**. The glands produce milk after the birth of offspring. Milk is a nutritious fluid. It contains disease-fighting molecules as well as all the nutrients a baby mammal needs. Producing milk for an offspring is called **lactation**.
b. Mammals have hair or fur. It insulates the body to help conserve body heat. It can also be used for sensing and communicating. For example, cats use their whiskers to sense their surroundings. They also raise their fur to look larger and more threatening.

Most mammals share several other traits. The traits in the following list are typical of, but not necessarily unique to, mammals.

- The skin of many mammals is covered with sweat glands. The glands produce sweat, the salty fluid that helps cool the body.
- Mammalian lungs have millions of tiny air sacs called alveoli. They provide a very large surface area for gas exchange.
- The heart of a mammal consists of four chambers. This makes it more efficient and powerful for delivering oxygenated blood to tissues.
- The brain of a mammal is relatively large and has a covering called the neocortex. This structure plays an important role in many complex brain functions.
- The mammalian middle ear has three tiny bones that carry sound vibrations from the outer to inner ear. The bones give mammals exceptionally good hearing. In other vertebrates, the three bones are part of the jaw and not involved in hearing.
- Mammals have four different types of teeth. The teeth of other vertebrates, in contrast, are all alike.

Questions

1. What are the two characteristics used to define the mammal class?

2. What are mammary glands?

3. What is the role of fur or hair?
4. List three other traits of mammals.

5. What is unique about the mammalian ear?

Lesson 20.1: Multiple Choice

Circle the letter of the correct choice.

a. Examples of mammals include
   a. fish.
   b. snakes.
   c. whales.
   d. frogs.

b. Two characteristics used to define mammals include
   a. mammary glands and scales.
   b. mammary glands and hair or fur.
   c. mammary glands and sweat glands.
   d. sweat glands and a four-chamber heart.

1.1. MAMMALIAN TRAITS
c. Mammals generate heat by
   a. keeping a high metabolic rate.
   b. laying in the sun and absorbing heat.
   c. increasing blood flow to the skin.
   d. all of the above

d. Mammals are unique in having
   a. lungs with alveoli, tiny, sac-like structures where gas exchange occurs.
   b. kidneys with alveoli, tiny, sac-like structures where blood filtering occurs.
   c. alveoli, which increase blood flow to the skin allowing excess heat to escape.
   d. alveoli with extra mitochondria, keeping metabolism high and generating heat.

e. Mammals with a carnivorous diet include the
   a. rabbit, mouse, elephant, zebra, and monkey.
   b. bear, badger, fox, human, and rat.
   c. aardvark, whale, hyena, dog, dolphin, and mole.
   d. giraffe, deer, elk, walrus, human, and rat.

f. Which of the following statements are true of the mammalian brain? (1) Of all vertebrates, mammals have the biggest and most complex brain for their body size. (2) The cerebrum controls functions such as memory and learning. (3) The larger the neocortex, the greater the mental abilities of an animal. (4) The area of the neocortex is greatest in humans.
   a. 1 and 2
   b. 3 and 4
   c. 1, 2, and 3
   d. 1, 2, 3, and 4

g. Mammals are social animals. Which of the following statements is correct?
   a. Herbivores such as zebras and dolphins live in herds.
   b. Adults in a herd surround and protect the young, who are most vulnerable to predators.
   c. Adult males in a pride hunt cooperatively, which is more efficient than hunting alone.
   d. all of the above

h. Tree-living mammals have a variety of different specializations for moving in trees, including
   a. very long arms for swinging from tree to tree.
   b. sticky pads on their arms and legs that help them cling to tree trunks and branches.
   c. a prehensile tail used for climbing and hanging from branches.
   d. all of the above.

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Lesson 20.1: Vocabulary I

Name___________________ Class______________ Date________

Match the vocabulary word with the proper definition.

Definitions
_____ 1. producing milk for an offspring
_____ 2. include bats, whales, mice, and humans
_____ 3. part of the brain that controls functions such as memory and learning
_____ 4. eats plants and animals
| 1. Mammals have four limbs and produce _________ eggs. |
| 2. _________ glands produce milk after the birth of offspring. |
| 3. _________ or fur insulates the body to help conserve body heat. |
| 4. _________ in the lungs provide a very large surface area for gas exchange. |
| 5. Three tiny bones in the _________ give mammals exceptionally good hearing. |
| 6. Mammals can generate and conserve heat when it’s _________ outside. |
| 7. The cells of mammals have many more _________ than the cells of other animals, allowing mammals to have a high metabolic rate. |
| 8. The larger the surface area of the brain’s _________, the greater the mental abilities of an animal. |
| 9. In some mammals, a _________ tail is used for climbing and hanging from branches. |

### Terms

- a. alveoli
- b. arboreal
- c. brachiation
- d. carnivore
- e. cerebrum
- f. diaphragm
- g. herbivore
- h. lactation
- i. mammals
- j. mammary gland
- k. neocortex
- l. omnivore

### Lesson 20.1: Vocabulary II

*Fill in the blank with the appropriate term.*

1. Mammals have four limbs and produce _________ eggs.
2. _________ glands produce milk after the birth of offspring.
3. _________ or fur insulates the body to help conserve body heat.
4. _________ in the lungs provide a very large surface area for gas exchange.
5. Three tiny bones in the _________ give mammals exceptionally good hearing.
6. Mammals can generate and conserve heat when it’s _________ outside.
7. The cells of mammals have many more _________ than the cells of other animals, allowing mammals to have a high metabolic rate.
8. The larger the surface area of the brain’s _________, the greater the mental abilities of an animal.
9. In some mammals, a _________ tail is used for climbing and hanging from branches.

### 1.1. MAMMALIAN TRAITS
10. Many mammals live in social groups, such as ____________ of elephants or prides of lions.
11. The four-chambered mammal ____________ is very efficient at delivering oxygenated blood to tissues.
12. Mammals have ____________ different types of teeth.

Lesson 20.1: Critical Writing

Thoroughly answer the question below. Use appropriate academic vocabulary and clear and complete sentences.
Describe three characteristics of mammals.
Lesson 20.2: True or False

Write true if the statement is true or false if the statement is false.

_____ 1. Most mammals are viviparous.
_____ 2. Mammals that are viviparous are called therian mammals.
_____ 3. There are mammals that lay eggs instead of giving birth to an infant or embryo.
_____ 4. The vagina is a pouch-like, muscular organ where the baby develops.
_____ 5. Therian mammals are divided into three groups: placental mammals, monotreme mammals, and marsupial mammals.
_____ 6. The uterus sustains the fetus while it grows inside the mother’s placenta.
_____ 7. The placenta allows the exchange of gases, nutrients, and other substances between the fetus and mother.
_____ 8. Kangaroo and koala are marsupials.
_____ 9. The marsupial embryo is nourished inside the placenta with food from a yolk sac instead of through the uterus.
_____ 10. Because the mother produces a placenta, a fetus can become large and mature before birth.
_____ 11. Marsupials live mainly in Australia.
_____ 12. Therian females have reproductive structures that are not found in other vertebrates.
_____ 13. The only living monotreme specie is the platypus.
_____ 14. Female monotremes are like reptiles and birds, with a cloaca with one opening.
_____ 15. Only five living species of mammals are therian mammals.

Lesson 20.2: Critical Reading

Read these passages from the text and answer the questions that follow.

Marsupials

Marsupials have a different way of reproducing that reduces the mother’s risks. A marsupial is a therian mammal in which the embryo is born at an early, immature stage. The embryo completes its development outside the mother’s body in a pouch on her belly. Only a minority of therian mammals are marsupials. They live mainly in Australia. Examples of marsupials are pictured below.

1.2. REPRODUCTION IN MAMMALS
Marsupials. Marsupials include the kangaroo, koala, and opossum. (From left to right, images courtesy of Fir0002/Flagstaffotos and under GNU-FDL 1.2, koala courtesy of David Iliff and under the Creative Commons license CC-BY-SA 3.0, and courtesy of Drcyrus and under the Creative Commons license CC-BY-SA 2.1 Australia. Composite created by CK-12 Foundation.)

The Marsupial Embryo

The marsupial embryo is nourished inside the uterus with food from a yolk sac instead of through a placenta. The yolk sac stores enough food for the short period of time the embryo remains in the uterus. After the embryo is born, it moves into the mother’s pouch, where it clings to a nipple. It remains inside the pouch for several months while it continues to grow and develop. Even after the offspring is big enough to leave the pouch, it may often return to the pouch for warmth and nourishment. Eventually, the offspring is mature enough to remain outside the pouch on its own.

Pros and Cons of Marsupial Reproduction

In marsupials, the short period of development within the mother’s uterus reduces the risk of her immune system attacking the embryo. In addition, the marsupial mother doesn’t have to eat extra food or carry a large fetus inside her. The risks of giving birth to a large fetus are also avoided. Another pro is that the mother can expel the embryo from her pouch if she is pursued by a predator or if food is scarce. On the other hand, a newborn marsupial is tiny and fragile. Therefore, it may be less likely to survive than a newborn placental mammal.

Questions

1. What is a marsupial? Give an example.

2. What is unique about the marsupial embryo?
3. How is the marsupial embryo nourished?

4. Describe an advantage of marsupial development.

5. Describe a disadvantage of marsupial development.

Lesson 20.2: Multiple Choice

Name___________________  Class_________________  Date________

Circle the letter of the correct choice.

1.2. REPRODUCTION IN MAMMALS
a. Therian mammals
   a. are viviparous.
   b. have young that are born live.
   c. have young that are born either as relatively large, well-developed fetuses or as tiny, immature embryos.
   d. all of the above

b. All female mammals have
   a. ovaries, which are the organs that produce eggs.
   b. a uterus, which is a tubular passageway through which the embryo or fetus leaves the mother’s body during birth.
   c. a vagina, a pouch-like, muscular organ where the embryo or fetus develops until birth.
   d. all of the above.

c. Which statement is true of a placenta?
   a. The placenta passes oxygen, nutrients, and other useful substances from the fetus to the mother.
   b. The placenta passes oxygen, nutrients, and other useful substances from the mother to the fetus.
   c. The placenta mixes blood from the mother and fetus together.
   d. The placenta protects the mother from being attacked by the fetal immune system.

d. Advantages to placental reproduction include
   a. reduced mobility of the mother as the baby grows.
   b. the ability to abandon the baby to save the mother’s life if necessary.
   c. a long period of fetal growth, allowing the fetus to become large and mature before birth.
   d. all of the above.

e. Marsupials include
   a. the kangaroo.
   b. the platypus.
   c. humans.
   d. all whales.

f. Among mammals, female monotremes are unique in that they
   a. have a pouch where the fetus completes development.
   b. have a cloaca with one opening.
   c. “sweat” milk from a patch on their mammary glands.
   d. live mainly in Australia.

g. Female monotremes
   a. lay eggs.
   b. have a placenta.
   c. lack a vagina but have a uterus.
   d. lay eggs and have a placenta.

h. An advantage to marsupial reproduction is that
   a. the marsupial mother has to eat extra food, and marsupials love to eat.
   b. there is a short period of development within the mother’s uterus.
   c. a newborn marsupial is small, making delivery and development easy on the mother.
   d. due to their size, newborn marsupials have a very high survival rate.
Match the vocabulary word with the proper definition.

Definitions
_____ 1. viviparous mammals
_____ 2. the organ that produces eggs
_____ 3. opening that is used to excrete wastes as well as lay eggs
_____ 4. a tubular passageway through which the embryo or fetus leaves the mother’s body during birth
_____ 5. a pouch-like, muscular organ where the fetus develops
_____ 6. mammals that reproduce by laying eggs
_____ 7. a therian mammal in which the embryo is born at an early, immature stage
_____ 8. therian mammals in which a placenta develops during pregnancy
_____ 9. sustains the fetus while it grows inside the mother’s uterus

Terms
a. cloaca
b. marsupial
c. monotreme
d. ovary
e. placenta
f. placental mammal
g. therian mammal
h. uterus
i. vagina

Lesson 20.2: Vocabulary II

Fill in the blank with the appropriate term.

1. Therian mammals are divided into two groups: ___________ mammals and marsupial mammals.
2. A placenta sustains the ___________ while it grows inside the mother’s uterus.
3. The placenta passes ___________, nutrients, and other useful substances from the mother to the fetus.
4. A ___________ is a therian mammal in which the embryo is born at an early, immature stage.
5. ___________ are mammals that reproduce by laying eggs.
6. The only living monotreme species are the ___________ and echidnas.
7. Female monotremes have a ___________ with only one opening.
8. The ___________ embryo is nourished inside the uterus with food from a yolk sac.
9. ___________ mammals give birth to relatively large and mature infants.
10. Female therian mammals have an ___________ where the embryo or fetus develops.

1.2. REPRODUCTION IN MAMMALS
11. All female mammals have ovaries, the organs that produce ____________.
12. ____________ are born either as relatively large, well-developed fetuses or as tiny, immature embryos.

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**Lesson 20.2: Critical Writing**

Name___________________ Class______________ Date________

_Thoroughly answer the question below. Use appropriate academic vocabulary and clear and complete sentences._

Explain how marsupials reproduce.
Lesson 20.3: True or False

Name___________________ Class______________ Date________

Write true if the statement is true or false if the statement is false.

_____ 1. Ancestors of mammals evolved close to 30 million years ago.

_____ 2. The positioning of legs under the body instead of along the sides was an early adaptation in mammal evolution.

_____ 3. The ability to regulate body temperature would allow nocturnal animals to remain active at night.

_____ 4. A good sense of vision would be more useful than good hearing when hunting in the dark.

_____ 5. Cynodonts were early ancestors to mammals, and were about the size of a rat.

_____ 6. Of all the mammals, placental mammals were probably the first to evolve.

_____ 7. Unlike modern monotremes, early monotremes did not lay eggs.

_____ 8. The earliest placental mammals were tree climbers and probably ate insects and worms.

_____ 9. Dinosaurs went extinct 65 million years ago.

_____ 10. To this day, marsupials remain the most common and diverse mammals found only in Africa.

_____ 11. The extinction of the dinosaurs allowed mammals to flourish.

_____ 12. The most widely accepted classification of mammals divides living placental mammals into 17 families.

_____ 13. Whales are mammals, but seals are not.

_____ 14. Humans and rats are grouped into the same superorder.

_____ 15. Though not mammals, cynodonts evolved many mammalian traits.

Lesson 20.3: Critical Reading

Name___________________ Class______________ Date________

Read these passages from the text and answer the questions that follow.

Evolution of Early Mammals
The earliest mammals evolved from cynodonts. But the evolution of mammals didn’t end there. Mammals continued to evolve. Monotreme mammals probably split off from other mammals first. They were followed by marsupials. Placental mammals probably evolved last.

Evolution of Monotremes
The first monotremes may have evolved about 150 million years ago. Early monotreme fossils have been found in Australia. An example is a genus called Steropodon. It may have been the ancestor of the platypus. Early
monotremes retained some of the traits of their therapsid ancestors. For example, they laid eggs and had a cloaca. These traits are still found in modern monotremes.

**Evolution of Marsupials**

The first marsupials may have evolved about 130 million years ago. One of the earliest was the extinct genus *Sinodelphys*. A fossil of this mammal is shown in the FlexBook. It is a remarkable fossil find. It represents a nearly complete animal. Even tufts of hair and imprints of soft tissues were preserved. *Sinodelphys* was about 15 centimeters (6 inches) long. Its limb structure suggests that it was a climbing animal. It could escape from predators by climbing into trees. It probably lived on a diet of insects and worms.

**Evolution of Placental Mammals**

The earliest placental mammals may have evolved about 110 million years ago. The ancestor of placental mammals may be the extinct genus *Eomaia*. Fossils of *Eomaia* have been found in what is now China. It was only about 10 centimeters (4 inches) long. It was a tree climber and probably ate insects and worms. *Eomaia* had several traits of placental mammals. The illustration below shows how *Eomaia* may have looked.

![Probable Ancestor of Placental Mammals: Eomaia](Image courtesy of Mateus Zica and under the Creative Commons license CC-BY-SA 3.0.)

The placental mammal descendants of *Eomaia* were generally more successful than marsupials and monotremes. On most continents, placental mammals became the dominant mammals, while marsupials and monotremes died out. Marsupials remained the most common and diverse mammals only in Australia. The debate over the reasons for their success there is not yet resolved.

**Questions**

1. Describe an early monotreme mammal.

2. Describe an early marsupial mammal.
3. Describe an early placental mammal.

4. What is the order of evolution of the three types of mammals? How long ago did they evolve?

5. Which type of mammals became the most successful?

Lesson 20.3: Multiple Choice

Name___________________ Class______________ Date________

Circle the letter of the correct choice.

1.3. EVOLUTION AND CLASSIFICATION OF MAMMALS
a. When did the earliest mammal live?
   a. over 150 million years ago
   b. 150 million years ago
   c. 130 million years ago
   d. 110 million years ago

b. Pelycosaurs
   a. had sprawling legs and walked like a lizard.
   b. had teeth of different types.
   c. was a synapsid.
   d. all of the above

c. Therapsids
   a. had a good sense of hearing.
   b. had the ability to regulate their body temperature.
   c. had legs positioned under the body instead of along the sides.
   d. all of the above

d. By the end of the Triassic Period, cynodonts had
   a. three tiny bones in the middle ear.
   b. ectothermy.
   c. a diaphragm for eating.
   d. all of the above.

e. Place the following in their correct evolutionary order.
   a. marsupials - placental mammals - monotremes
   b. monotremes - marsupials - placental mammals
   c. marsupials - monotremes - placental mammals
   d. placental mammals - marsupials - monotremes

f. The most widely accepted traditional classification of mammals divides living placental mammals into ____________ orders.
   a. 7
   b. 12
   c. 17
   d. 22

g. Traits of primates include
   a. five digits on their hands and feet.
   b. rubbery pads on their feet.
   c. long, pointed canine teeth.
   d. all of the above.

h. The most successful mammals are the
   a. marsupials, who practically have a whole continent to themselves.
   b. monotremes, who have a very specific niche without competitors.
   c. placental mammals, who have become dominant on most continents.
   d. none of the above

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Lesson 20.3: Vocabulary I

Name___________________ Class______________ Date________
Match the vocabulary word with the proper definition.

Definitions

_____ 1. active at night
_____ 2. may be the ancestor of the platypus
_____ 3. one of the earliest marsupials
_____ 4. amniotic ancestors of mammals
_____ 5. have long pointed canine teeth, like the coyote
_____ 6. have small sharp teeth, like the mole
_____ 7. have feet with fins, like the seal
_____ 8. have five digits on hands and feet, like the monkey
_____ 9. have incisor teeth grow continuously, like the mouse
_____ 10. have tusks, like the elephant
_____ 11. the most common land vertebrates during the first half of the Permian Period
_____ 12. the ancestor of placental mammals
_____ 13. became the most common and diverse land vertebrates during the second half of the Permian Period
_____ 14. flourished worldwide during the first half of the Triassic Period

Terms

a. Carnivora
b. cynodonts
c. Eomaia
d. Insectivora
e. nocturnal
f. pelycosaurs
g. Pinnipedia
h. Primates
i. Proboscidea
j. Rodentia
k. Sinodelphys
l. Steropodon
m. synapsids
n. therapsid

Lesson 20.3: Vocabulary II

Fill in the blank with the appropriate term.

1.3. EVOLUTION AND CLASSIFICATION OF MAMMALS
1. Ancestors of mammals evolved close to ____________ million years ago.
2. Ancestors of mammals were amniotes called ____________.
3. Pelycosaurs evolved some mammalian traits, including ____________ of different types.
4. Therapsids evolved ____________ positioned under the body instead of along the sides.
5. A nocturnal niche was one of the few niches that ____________ did not take over in the Triassic Period.
6. ____________ had the ability to regulate their body temperature.
7. Cynodonts probably gave rise to mammals about ____________ million years ago.
8. Placental mammals can be divided into ____________ orders.
9. Carnivora, like the coyote, have long pointed canine ____________.
10. Chiroptera, like the bat, have digits support membranous ____________.
11. Perissodactyla, like the horse, have odd-toed ____________.
12. Cetacea, like the whale, have paddlelike ____________.

Lesson 20.3: Critical Writing

Name___________________ Class______________ Date________

Thoroughly answer the question below. Use appropriate academic vocabulary and clear and complete sentences.

Summarize the evolution of modern mammals.
1.4 Overview of Animal Behavior

Lesson 20.4: True or False

Write true if the statement is true or false if the statement is false.

1. The branch of biology that studies animal behavior is called psychology.
2. Some behaviors are controlled by genes.
3. Hunting in packs is an adaptive behavior because it increases the chances of killing prey and obtaining food.
4. A spider spinning a web is a learned behavior.
5. Innate behaviors must be practiced to be learned.
6. Innate behaviors involve basic life functions, such as finding food.
7. A society forms from all the different species that live together.
8. Animals can communicate with sounds, chemicals, or visual cues.
9. Social animals live and work together for the good of the group.
10. Ants communicate with sounds while frogs communicate with chemicals.
11. Circadian rhythms are regular changes in biology or behavior that occur in a daytime-nighttime cycle.
12. Aggression is behavior that is intended to cause harm or pain.
13. Two male deer competing for mates is an example of interspecific competition.
14. In most species of mammals, parents provide little care to their offspring.
15. In many mammals, females are more selective than males in choosing mates.

Lesson 20.4: Critical Reading

Read these passages from the text and answer the questions that follow.

Evolution of Animal Behavior

To the extent that behaviors are controlled by genes, they may evolve through natural selection. If behaviors increase fitness, they are likely to become more common over time. If they decrease fitness, they are likely to become less common.

Nature vs. Nurture

Some behaviors seem to be controlled solely by genes. Others appear to be due to experiences in a given environment. Whether behaviors are controlled mainly by genes or by the environment is often a matter of debate. This is
called the **nature-nurture debate**. Nature refers to the genes an animal inherits. Nurture refers to the environment that the animal experiences. In reality, most animal behaviors are not controlled by nature or nurture alone. Instead, they are influenced by both nature and nurture. In dogs, for example, the tendency to behave toward other dogs in a certain way is probably controlled by genes. However, the normal behaviors can’t develop in an environment that lacks other dogs. A puppy raised in isolation from other dogs may never develop the normal behaviors. It may always fear other dogs or act aggressively toward them.

**How Behaviors Evolve**

It’s easy to see how many common types of behavior evolve. That’s because they obviously increase the fitness of the animal performing them. For example, when wolves hunt together in a pack, they are more likely to catch prey (see the figure below). Therefore, hunting with others increases a wolf’s fitness. The wolf is more likely to survive and pass its genes to the next generation by behaving this way.

The evolution of certain other types of behavior is not as easy to explain. An example is a squirrel chattering loudly to warn other squirrels that a predator is near. This is likely to help the other squirrels avoid the predator. Therefore, it could increase their fitness. But what about the squirrel that raises the alarm? This squirrel is more likely to be noticed by the predator. Therefore, the behavior may actually lower this squirrel’s fitness. How could such a behavior evolve through natural selection?

One possible answer is that helping others often means helping close relatives. Close relatives share many of the same genes that they inherited from their common ancestor. As a result, helping a close relative may actually increase the chances that copies of one’s own genes will be passed to the next generation. In this way, a behavior that puts oneself at risk could actually increase through natural selection. This form of natural selection is called kin selection.

**Questions**

1. Is behavior controlled by genes? If a behavior is controlled by a gene, does that behavior evolve?

*(Image courtesy of Doug Smith and the U.S. National Park Service and under the public domain.)*
2. What is the nature-nurture debate?

3. How do many common types of behavior evolve in animals? Give an example.

4. “Helping others often means helping close relatives.” What does this statement refer to?

5. What is “kin selection”? 

1.4. OVERVIEW OF ANIMAL BEHAVIOR
Lesson 20.4: Multiple Choice

Name___________________ Class______________ Date________

Circle the letter of the correct choice.

a. Examples of animal behaviors include
   a. a spider spinning its web.
   b. children playing.
   c. animals hunting.
   d. all of the above.

b. The branch of biology that studies animal behavior is
   a. veterinary biology.
   b. ethology.
   c. psychology.
   d. behaviology.

c. Behaviors that are closely controlled by genes with little or no environmental influence are
   a. innate behaviors.
   b. instinct behaviors.
   c. learning behaviors.
   d. cooperation behaviors.

d. The nature-nurture debate is a discussion of
   a. the effects of nature on behavior.
   b. the effects of one’s parents on their behavior.
   c. whether behaviors are controlled mainly by genes or by the environment.
   d. the effects of the constant struggle between nature and the environment.

e. A reflex is a
   a. response that always occurs when a certain instinct is present.
   b. response that always occurs when a certain stimulus is present.
   c. response that always occurs when a certain behavior is present.
   d. response that always occurs when a certain learning is present.

f. Social animals
   a. must have a way to communicate.
   b. cooperate together for the good of the group.
   c. can do many things that a lone animal could never do.
   d. all of the above

g. Circadian rhythms
   a. are regular changes in biology that occur in a 24-hour cycle.
   b. are seasonal movements of animals.
   c. refers to the union of a male and female of the same species for reproduction.
   d. is a rhythm that develops as a result of learned experience.

h. Aggression
   a. is a learned behavior.
   b. is based on one’s circadian rhythms.
   c. is intended to cause harm or pain.
   d. all of the above
Lesson 20.4: Vocabulary I

Match the vocabulary word with the proper definition.

Definitions

1. branch of biology that studies animal behavior
2. whether behaviors are controlled mainly by genes or by the environment
3. something that triggers behavior
4. are regular changes in biology or behavior that occur in a 24-hour cycle
5. a close-knit group with other members of their species
6. a change in behavior that occurs as a result of experience
7. the ability of an animal to perform a behavior the first time it is exposed to the proper stimulus
8. behaviors that are closely controlled by genes
9. allows animals to do many things that a lone animal could never do
10. a response that always occurs when a certain stimulus is present
11. behavior that is intended to cause harm or pain
12. animals that live in a society

Terms

a. aggression
b. circadian rhythm
c. cooperation
d. ethology
e. innate behavior
f. instinct
g. learning
h. nature-nurture debate
i. reflex
j. social animal
k. society
l. stimulus

Lesson 20.4: Vocabulary II

Fill in the blank with the appropriate term.

1. Animal ____________ includes all the ways that animals interact with each other and the environment.

1.4. OVERVIEW OF ANIMAL BEHAVIOR
2. ____________ the branch of biology that studies animal behavior,

3. ____________ behaviors are closely controlled by genes with little or no environmental influence.

4. A dog drooling when exposed to food is an ____________.

5. ____________ is a change in behavior that occurs as a result of experience.

6. A reflex is a response that always occurs when a certain ____________ is present.

7. ____________ animals live together in a society.

8. ____________ rhythms are regular changes in biology or behavior that occur in a 24-hour cycle.

9. Animals can ____________ with sounds, chemicals, or visual cues.

10. ____________ is behavior that is intended to cause harm or pain.

11. Parental care is generally longest and most involved in ____________.

12. ____________ refers to seasonal movements of animals from one area to another.

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**Lesson 20.4: Critical Writing**

**Name___________________ Class______________ Date________**

*Thoroughly answer the question below. Use appropriate academic vocabulary and clear and complete sentences.*

Define innate behavior. Give an example.
1.4. OVERVIEW OF ANIMAL BEHAVIOR