

Wolf Jeopardy

Students play a quiz game to check their wolf knowledge.

OBJECTIVES:

At the end of the lesson, students will be able to:

1. Assess what they know or do not know about wolves.
2. Extrapolate the important topics related to wolf management.

VOCABULARY:

body language • vocalization • management • bounty • stakeholder

TEACHER BACKGROUND:

This game is a useful pre-test for your students prior to beginning the unit on wolves. It will assist you in assessing students' current knowledge and attitudes toward wolves.

This activity's categories are intended to provide a broad range of topics concerning wolves. You may want to read the following explanations and use them to introduce each category to your students.

Category Names:

Legal Ease: laws and legal issues dealing with wolf management

Home on the Range: wolf range and dispersal

Life or Death: life cycle and factors in wolf survival

Wolf Parts: the physical adaptations of wolves

On the Move: migration and territory

Myths and Facts: cultural history and human attitudes toward wolves



Chris Darimont

SECTION 1 The Wolf

Subjects:

biology, sociology



Approximate lesson time:

30 minutes



Materials:

game questions, books or fact sheets about wolves



ACTIVITIES:

1. Before playing the game, write the categories on the board, with the dollar amounts below each category:

Legal Ease	Wolf Parts	Life & Death	(etc.)
\$100	\$100	\$100	
\$200	\$200	\$200	
\$300	\$300	\$300	
\$400	\$400	\$400	
\$500	\$500	\$500	

Make a scorekeeping table on the board for each of the teams.

2. Divide the class into five or six teams of roughly equal numbers of players. Tell each team to choose a (wolf-oriented) name for themselves.
3. Choose one team to begin. This team will have the first option of choosing a category. They may select any dollar amount and respond to the question. The higher dollar amounts have more difficult questions.

4. If the team cannot answer the question or answers incorrectly, the option to answer goes to the next team. If they cannot answer, the option passes to the next team, and so on. Keep score until the end, declaring a winner.

Discussion:

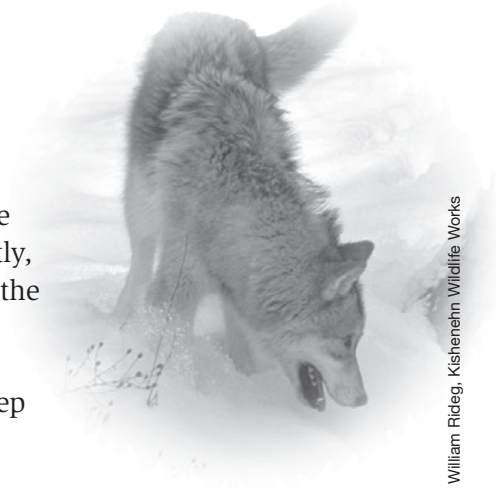
1. On a scale of 1–10, rate your knowledge of wolves.
2. What area do you know the most about? The least?
3. How can you learn more about wolves?
4. Why does it matter if anyone learns about wolves?

ASSESSMENT:

By making notes along the way, a teacher may assess what areas students lack knowledge in or depth of knowledge.

EXTENSION:

Repeat this quiz at the end of the unit to assess learning.



William Ridg, Kishenehn Wildlife Works

National Science Education Standards

Life Science (5–8)

Structure and function in living systems

Regulation and behavior

Population and ecosystems

Life Science (9–12)

Interdependence of organisms

Science in Personal and Social Perspectives (5–8)

Populations, resources, and environments

Science in Personal and Social Perspectives (9–12)

Population growth

Natural resources

Environmental quality

LEGAL EASE**HOME ON RANGE****LIFE AND DEATH****\$100****Question:**

What do we call a person who shoots a wolf illegally?

Answer: A poacher.

\$100**Question:** True or false?

Wolf range originally spanned a wider area than any other land mammal (other than humans).

Answer: True.

\$100

Question: Name three species wolves might prey on.

Answer: Deer, elk, moose, bison, hare, beaver, caribou, musk ox, cow, sheep...

\$200**Question:**

What do we call an animal or plant that is in danger of becoming extinct?

Answer:
An endangered species.

\$200

Question: Most wolves will disperse from the pack they were born into by what age?

Answer: Three years of age.

\$200

Question: On the average, what percentage of pups die each year?

Answer: 40–60 percent.

\$300

Question: What year was the Endangered Species Act passed by Congress?

Answer:
1973.

\$300

Question: What is the entire geographic area over which wolves are distributed known as?

Answer: Wolf range.

\$300

Question: Who are the main predators of the wolf?

Answer: Humans.

\$400**Question:**

What is delisting?

Answer:
The process of removing a species from the endangered species list

\$400

Question: Wolves may expand their range in two ways: natural recolonization or what human-directed activity?

Answer: Reintroduction.

\$400

Question: What is a leading cause of death for the wolf?

Answer: Starvation.

\$500

Question: What year was the first bounty established in Minnesota?

Answer: 1849.

\$500

Question: The farthest a wolf is known to have dispersed from its home is

- 78 miles
- 330 miles
- 660 miles.

Answer: c.

\$500

Question: How much food does an average wolf need per day to survive?

Answer: Average of 7 lbs. per wolf per day.



WOLF PARTS

\$100

Question: Name three colors that a wolf's fur could be.

Answer: Gray, white, brown, black, tan.

\$200

Question: List three wolf body parts that are important to wolf communication.

Answer: The tail, eyes, ears and teeth.

\$300

Question: What do we call a male and female wolf that mate to produce pups?

Answer: The breeding pair.

\$400

Question: What is the average weight of an adult male wolf?

Answer: 70–100 pounds.

\$500

Question: What does a four-month-old wolf pup eat?

Answer: Regurgitated food from an adult pack mate.

ON THE MOVE

\$100

Question: What is an area that a wolf calls home?

Answer: A territory.

\$200

Question: How far may a wolf travel in search of food?

Answer: 10–30 miles a day.

\$300

Question: What factor most determines the size of a wolf pack territory?

Answer: Food availability.

\$400

Question: What is the name of the area where pups remain when they are 8–20 weeks of age?

Answer: The rendezvous site.

\$500

Question: Name three ways wolves "mark" their territory.

Answer: Urination, howling, scat

MYTHS VS. FACTS

\$100

Question: True or false? It is common for wolves to kill people.

Answer: False.

\$200

Question: What does it mean if a person is described as "a wolf in sheep's clothing"?

Answer: That person is not as trustworthy as s/he appears.

\$300

Question: What is the name of the mythological character that is a man who turns into a wolf?

Answer: A werewolf.

\$400

Question: What does a person tell when s/he "cries wolf"?

Answer: A lie.

\$500

Question: What is anthropomorphism?

Answer: The act of attributing human actions and motivations to animals.

Nature's Stock Market

Students play a card game to learn the habitat needs of north-woods animals

STUDENT OBJECTIVES:

At the end of this lesson, students will be able to:

1. Define the habitat needs of common north-woods mammals.
2. Compare the habitat components among common north-woods mammals.
3. Predict how habitat change affects different species.

VOCABULARY:

habitat • carrion

TEACHER BACKGROUND:

All animals need a habitat that provides them with food, water, shelter and space. While all animals have these needs, they satisfy them in different ways.

For example, deer eat twigs, wolves eat deer, beavers build a lodge they create for shelter, and adult wolves sleep out in the open. In this game, each player will try to collect all of their animals' needs by trading habitat cards. This game is similar to a stock market setting. By playing several times, students will gain a sense for the needs of several north-woods animals.

The "north woods" is divided into several distinct habitats. The "evergreen forest" is a forest made up of white and red pines, balsam firs and white spruce, all trees that retain their leaves (needles) during the winter. The "mixed woods" forest contains a mixture of evergreens and northern broadleaf trees (quaking aspen, paper birch and northern red oak). The "shrub woods" is an area dominated by short, brushy tree growth. Shrub woods plant species are generally shorter than 20 feet tall at maturity and may grow so densely that it is difficult to walk through them. Speckled alder and mountain maple are common shrub woods trees. Regrowth forest is one that has been clear-cut but new trees have begun to grow.

ACTIVITIES:

1. Divide the class into groups of six.
2. Give each group six animal needs charts and a deck of animal needs cards.
3. Direct one student in each group to deal out the animal needs cards to the members of his or her group.



Chris Darimont

SECTION 1 The Wolf

Subjects:

biology



Approximate lesson time:

1 hour



Materials:

animal needs cards,
animal needs charts
(See pages 21–22)



- Students look at their cards and determine if they have any cards that are needed to fill their animal needs charts. If they have a card listed on their chart, they place the card on top of that square in the chart.
- When you say go, students begin trading habitat cards the same way stockbrokers trade commodities on the stock market. If a student has three cards they can't use, they hold them up and yell, "three, three, three" (without revealing the item on the cards). If another player wants to trade three cards, they exchange three cards face down. This fast-moving exchange continues until one player has collected all the necessary cards and calls out, "Habitat!"
- Direct players to rotate animal charts and play again.

Discussion Questions:

- How is this game like reality in the north-woods ecosystem? Answers may include: animals have habitat needs, animals compete to fill their needs, and resources are limited.
- How is this game not like reality in the north-woods ecosystem? Answers may include: animals don't trade resources, animals may be able to share resources, and animals may be able to adapt to new resources.
- Which were the most precious commodities? What does that tell you about the importance of that element of the ecosystem? Answers will vary.
- Which animals had the easiest time making a living? Probably the herbivores and omnivores because there are a lot of plants in north-woods ecosystems compared to the number of animals available to carnivores.
- Do some animals eat the same things as others? Explain. Yes. Deer, moose, snowshoe hare and beavers all eat aspen. Bear and wolves eat carrion and deer.
- Who would be affected first if the habitat changed (example: if the area was logged, turned into a suburb or flooded)? Herbivores would be affected first because their food source, space and shelter would be immediately impacted. Predators would be second.
- What will animals do if they can't find their habitat needs in a particular area? Migrate to a new area; find a new food, water, or shelter source; adapt; or die out.
- How are wolf needs similar or different from the other animals' needs in this game? All animals need food, water, shelter and space. A bear and wolf may share the same shelter, and both eat deer and carrion, for example.

ASSESSMENT:

Students will take a short quiz.

Quiz

- Define habitat. An area that supplies enough food, water, shelter and space for one or more organisms, such as plants, animals, fungi and algae.
- Give an example of how one animal finds food, water, shelter and space. See animal needs cards/chart.



William Ridg, Kishenehn Wildlife Works

National Science Education Standards

Unifying Concepts and Processes

Systems, order, and organization

Change, constancy, and measurement

Evolution and equilibrium

Science as Inquiry

Abilities necessary to do scientific inquiry

Understanding about scientific inquiry

Life Science (5–8)

Structure and function in living systems

Regulation and behavior

Life Science (9–12)

Interdependence of organisms

Science in Personal and Social Perspectives (5–8)

Populations, resources, and environments

3. Which animals have the easiest time finding enough food, based on this game? Answers will vary based on your observations.
4. Which of these animals is most common near your town? Why? Hint: What kind of habitat is around your town? Which species could live there and be tolerant of the presence of humans?

NOTE: Most species access multiple sources of food, water, shelter and space. For simplicity, only the specified source fulfills the requirement.

EXTENSIONS:

Play the game again, but add some additional food or space cards. For instance, add meadow cards as the result of forest fires, or add suburb cards. How do these changes affect the animals that survive the game?





Lynn and Donna Rogers





ANIMAL NEEDS CHART


(give one to each player)


ANIMAL	FOOD	WATER	SHELTER	SPACE
 bear	berries	stream	cave	evergreen forest

ANIMAL	FOOD	WATER	SHELTER	SPACE
 deer	aspen	pond	deciduous woods	regrowth forest

ANIMAL	FOOD	WATER	SHELTER	SPACE
 wolf	deer	stream	log	deciduous forest





























ANIMAL	FOOD	WATER	SHELTER	SPACE
 moose	water plants	pond	balsam fir tree	marsh

ANIMAL	FOOD	WATER	SHELTER	SPACE
 beaver	birch	pond	lodge	deciduous forest

ANIMAL	FOOD	WATER	SHELTER	SPACE
 hare	dogwood	stream	thicket	mixed woods

NATURE'S STOCK MARKET

Animal Needs Cards (cut apart)

mixed woods 	water plants 	berries 	deer 
deciduous forest 	aspen 	birch 	thicket 
dogwood 	pond 	pond 	pond 
balsam fir 	log 	stream 	stream 
deciduous forest 	stream 	cave 	evergreen forest 
lodge 	regrowth forest 	deciduous forest 	marsh 
flowers 	ferns 	rock 	meadow 



Home Is Where the Food Is

Students chart wolf travels on a map to glean wolf territorial behavior.

STUDENT OBJECTIVES:

At the end of this lesson, students will be able to:

1. Describe how researchers determine wolf pack territory size.
2. Use a map to estimate the range of wolf pack territory size in Minnesota.
3. Hypothesize why wolves disperse.

VOCABULARY:

radio telemetry • dispersal • territory • radio collar • intraspecific strife

TEACHER BACKGROUND:

Researchers study wolves in a number of ways to learn about the wolf's role in the natural system, including its survival, travels, mortality, social behavior and more. Researchers will choose a study methodology based on the data they are trying to collect and the existing environmental conditions. For example, in northern Minnesota, wolves are very elusive, and the vegetation is quite thick in summer. It would be unrealistic to try to count the number of wolves in the summer months because it

would be too difficult to see any wolves. Therefore, researchers take a census of the wolf population by airplane in winter, when the leaves are off the trees and the wolves are easier to spot.

In other areas, such as Yellowstone National Park, the terrain is much more open, so viewing wolves from a distance is more productive. In the Arctic, wolves are less fearful of humans, so scientists can get closer to them.

Wolf research has been conducted in northern Minnesota since the early 1930s. Methods of locating and observing wolves have varied, from the labor-intensive method of looking for wolves by snowshoe to the more reliable radio telemetry approach.

Radio telemetry on wolves involves three main components:

- a radio collar with a radio transmitter and battery placed around a wolf's neck
- an antenna
- a radio receiver

Scientists and field technicians use a collar's unique radio signal to determine a wolf's location approximately once each week throughout the year.



Chris Darimont

SECTION 1 **The Wolf**

Subjects:

*biology, geography,
mathematics*



Approximate lesson time:

2 hours



Materials:

*copies of Tracking Map,
copies of hypothetical
telemetry data for 2004 and
2005,*

different colored pens



*Sample
wolf radio
collar*

National Science Education Standards

Unifying Concepts and Processes

*Evidence, models, and
explanation*

*Change, constancy,
and measurement*

Science as Inquiry

*Abilities necessary to do
scientific inquiry*

*Understanding about
scientific inquiry*

Life Science (5–8)

Populations and ecosystems

Science in Personal and Social Perspectives (5–8)

*Populations, resources, and
environments*

This research has revealed important information about such things as the age at which wolves disperse from their natal packs (usually between age one and three years), causes of wolf mortality (starvation, interspecific strife, disease, humans), average wolf pack territory size (about 10 square miles per wolf in the pack), wolf wanderings (sometimes as much as 660 miles from home!), locations of certain pack territories, the dynamic nature of territory boundaries, hunting and feeding patterns, prey selection, wolf den locations, relations among neighboring packs and more. Researchers know all this from tracking about 20 wolves' locations on a given day each week for several years.

Scientists have paid particular attention to wolf dispersal in recent years. We now know that wolves disperse when they are between the ages of one and three years, especially if they are lower-ranking wolves. Some reasons they might disperse include searching for a mate and starting a new pack (low-ranking wolves almost never

reproduce in their home pack) and finding more food (low-ranking wolves generally get less to eat than higher-ranking wolves).

In this activity, students use hypothetical data to practice this research and analysis process. The extension activity describes how to analyze real wolf research data using information from the International Wolf Center's Web site and an inexpensive map. See www.wolf.org for more information.

ACTIVITIES:

1. Divide the class into groups of three to four students.
2. Give each group a copy of the map on page 27. Provide one year's worth of telemetry data (Year One).
3. Review how to read and plot this type of data using basic X and Y axes.
4. Instruct groups to plot the data points for each wolf and each date on the Year One chart. It will be helpful to use a different color ink for each wolf.
5. Instruct students to draw a circle around all of the data points for each wolf. If one or two data points are apart from the others, this may indicate the wolf left its main territory. It may be taking a short jaunt or dispersing a great distance.
6. When students are through, discuss:
 - Which wolf had the largest range in its travels?
 - Which wolves belong to the same pack? How do you know?
 - If only one or two wolves in a pack have radio collars on, speculate how researchers estimate the total number of wolves in that pack.



- Why do you suppose the data for wolf 243 stopped after March? *It may have died, dispersed, removed its collar, or the collar battery might be dead.*
 - Based on these data, how large (square miles) are pack territories in your study area?
 - Do pack territories overlap, or are they completely separate? What problems might this cause?
 - Why might a wolf disperse from its native territory?
7. Give students the Year Two wolf territory data, and instruct them to plot it on the same map. Either discuss the following, or provide each group with the worksheet on page 28.
- How do the pack territories in Year Two differ from the Year One data?
 - Hypothesize why the territory location and/or size might change in the future.
 - How would you prove your hypothesis?
 - Which wolves might be part of the same pack?
 - Why might a wolf disappear from the study? See #6 above.

ASSESSMENT:

Groups may turn in their maps and discussion worksheets.

EXTENSIONS:

Now that the students have practiced plotting and analyzing wolf location data, instruct them to use real research data on maps of Minnesota's Superior National Forest. To do this, you will need wolf location data and instructions found by going to www.wolf.org and then search "Track Wild Wolves."

WOLF TELEMETRY DATA

YEAR ONE WOLF LOCATION DATA

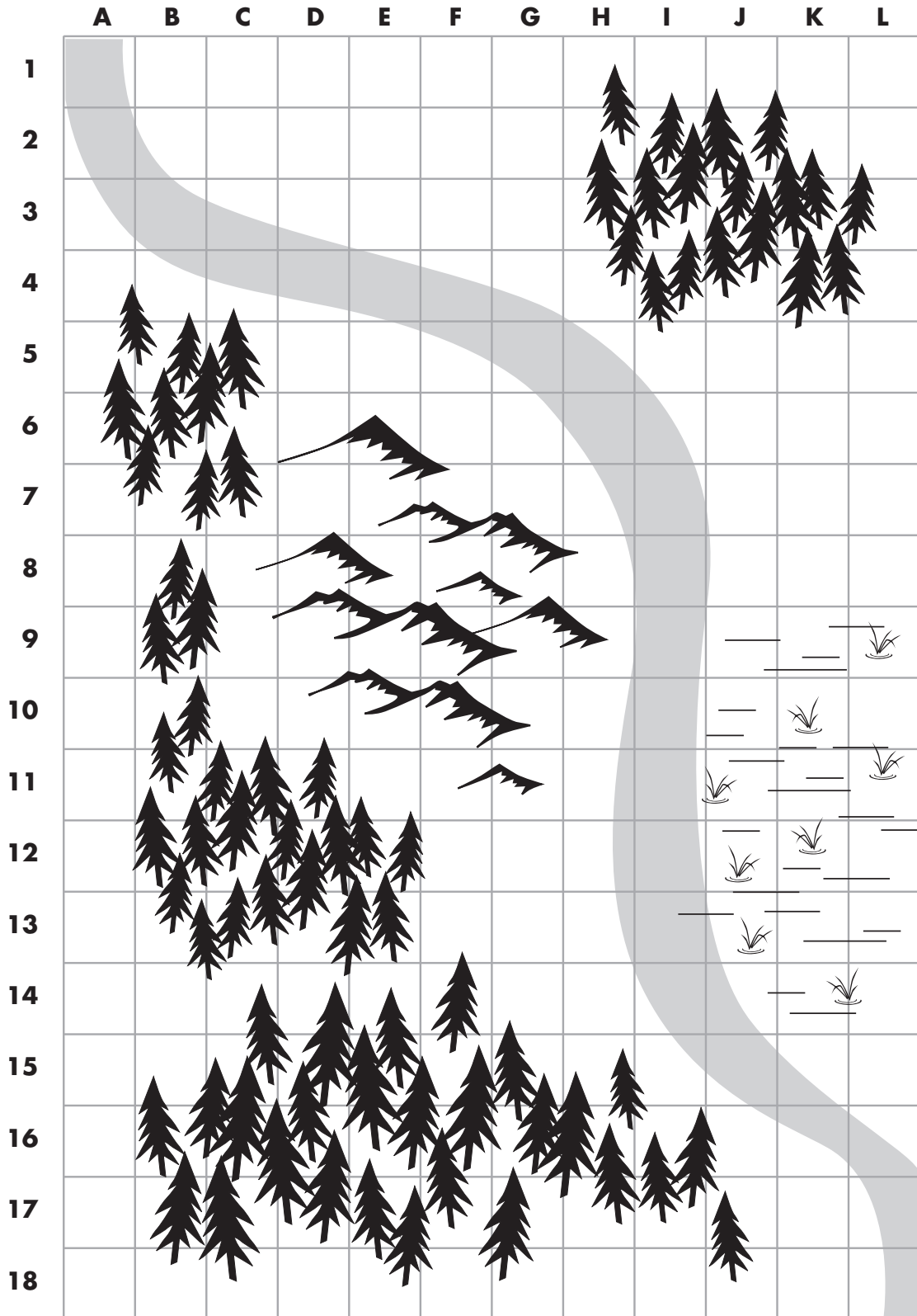
	Wolf 248	Wolf 101	Wolf 127	Wolf 328	Wolf 975
1/15	A5	I7	E17	A7	A16
1/30	A7	I7	E14	B10	C16
2/15	B10	I10	H14	A5	E16
2/28	C10	H2	H14	A6	F16
3/15	D11	G4	E12	B6	F13
3/30	D15	G4	E12	B8	F13
4/15	--	K7	H16	A8	E12
4/30	--	I10	I11	A5	D12
5/15	--	I6	G17	B6	C16
5/30	--	J4	I15	B6	F17
6/15	--	K1	G14	A11	H15
6/30	--	K3	G12	B10	F17

YEAR TWO WOLF LOCATION DATA






	Wolf 248	Wolf 101	Wolf 127	Wolf 328	Wolf 975
1/15	--	G4	E12	B6	E12
1/30	--	G1	E14	B7	E14
2/15	--	K6	H17	B8	H17
2/28	--	I9	H14	A8	H15
3/15	--	I5	E12	A7	J16
3/30	--	J3	E12	A5	J17
4/15	--	K2	I13	B3	I13
4/30	--	K1	G16	B2	G16
5/15	--	I6	I14	B7	I14
5/30	--	I8	G18	D8	F17
6/15	--	H1	G15	D10	F16
6/30	--	G3	H17	E8	H17

MAP FOR RADIO TELEMETRY

(make one copy for each group)



Legend

-  Forest
-  River
-  Mountains
-  Wetlands
-  One square mile

N

NAME: _____



Home Is Where the Food Is

Answer the following questions. Make sure to cite evidence from the data to defend your answers.

1. How does the location and size of pack territories in Year Two differ from the Year One data?
2. Hypothesize why the territory location and/or size changed.
3. What evidence would you need to prove this hypothesis?
4. Which wolves might be part of the same pack?
5. Why might a wolf disappear from the study?

