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

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.

William Rideg, Kishenehn Wildlife Works

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 16. Provide one year's worth of telemetry data (2004).
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 2004 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 2005 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 2005 differ from the 2004 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 selecting "Track Wild Wolves."

WOLF TELEMETRY DATA

2004 WOLF LOCATION DATA

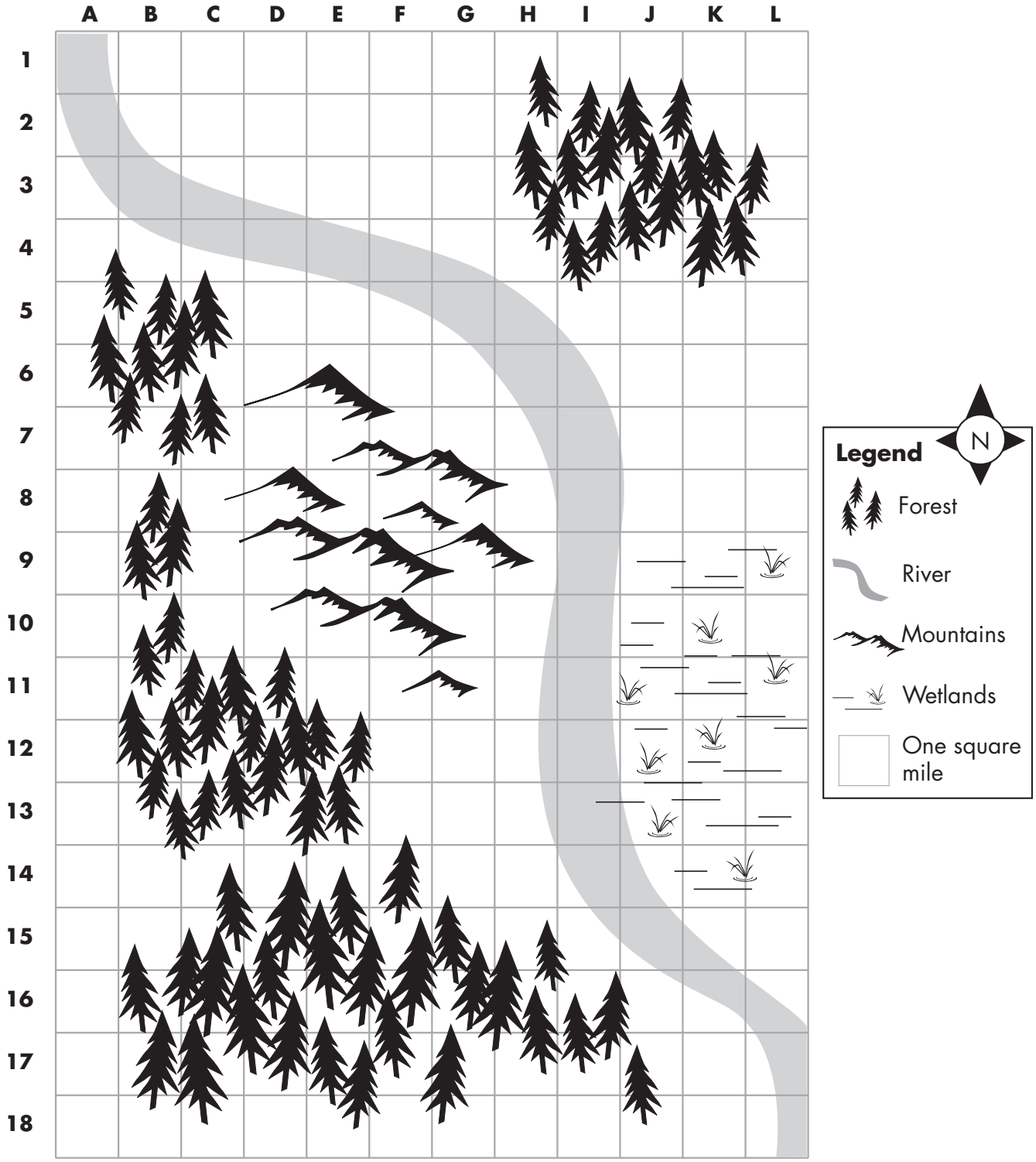
	Wolf 248	Wolf 101	Wolf 127	Wolf 328	Wolf 975
1/15	A5	I7	E17	A7	A16
1/30	A7	I7	E14	B10	C16
2/15	B10	I10	H14	A5	E16
2/28	C10	H2	H14	A6	F16
3/15	D11	G4	E12	B6	F13
3/30	D15	G4	E12	B8	F13
4/15	--	K7	H16	A8	E12
4/30	--	I10	I11	A5	D12
5/15	--	I6	G17	B6	C16
5/30	--	J4	I15	B6	F17
6/15	--	K1	G14	A11	H15
6/30	--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

2005 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)



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 2005 differ from the 2004 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?