War and Wildlife

Habitat Fragmentation; Cold War; Technology **Time Frame:** 1 class period **Grade:** 8

Overview:
This lesson focuses on the unique behavior of deer along a stretch of the former Iron Curtain in Germany. Students will read and analyze a newspaper article about wildlife research tracking the migration of red deer between Germany and the Czech Republic. Then, they will observe a map of similar research on elk taking place in Arizona and compare the two situations.

Essential Questions
- How do biologists study wildlife populations and movements?
- How can human activities benefit and harm wildlife?
- What role does technology play in the management of wildlife?

Objectives
- Describe the affects of habitat fragmentation caused by roads and fences.
- Use a graphic organizer to increase reading comprehension.
- Interpret data depicted on two different maps.
- Explain the impact that GPS technology has made on wildlife biology.

Arizona Department of Education Standards

Reading
- S1-C6-PO1
- S1-C6-PO2
- S1-C6-PO4
- S1-C6-PO5
- S3-C1-PO8
- S3-C1-PO10

Science
- S2-C1-PO3
- S3-C2-PO1
- S4-C4-PO5

Social Studies
- S2-C8-PO13
- S4-C1-PO3
- S4-C5-PO1

Materials and Resources
- "Deep in the Forest" article (1 per student)
- "War and Wildlife Comprehension Activity" worksheet (1 per student)
- "War and Wildlife Comparison Activity" worksheet (1 per student)
- Elk Location Map (1 per student or group)

Teacher Preparation
- Make copies of the "Deep in the Forest" article. If you prefer, the article can also be accessed via the Internet at http://online.wsj.com/article/SB125729481234926717.html.
- Make copies of the two student worksheets.
- Make copies of the Elk Location Map. It is best for this map to be printed in color. Consider laminating the maps for continued use in the future.

Background Information:
The Berlin Wall was originally constructed in 1961 to prevent people from the communist East Berlin from travelling to West Berlin. The wall, along with the larger Inner German Border which separated East and West Germany, became a physical barrier between western culture and communism. Together they would become known as the Iron Curtain, a major symbol of the Cold War.

On November 9, 1989, the East German government opened the gates in the Berlin Wall, allowing people to freely travel across the

border for the first time in nearly three decades. Less than a month later, U.S. President George H.W. Bush and Soviet General Secretary Mikhail Gorbachev declared the end of the Cold War at the Malta Summit.

This lesson was originally introduced to coincide with the 20th anniversary of the fall of the Berlin Wall. It shows that war and other political tensions can impact the wildlife as well as the people.

Procedures:

1. Ask students to explain what the Iron Curtain and the Cold War were. If they are unfamiliar with the term, provide students with a little background information.
2. Inform students that they will be spending some time looking at some of the "forgotten victims" of the Cold War.
3. Hand out copies of the newspaper article and the comprehension activity.
4. Have students read the article and complete the worksheet individually.
5. Once everyone has finished, discuss the answers as a class.
6. Inform students that we will now be moving from Germany to Arizona to look at wildlife populations in our state.
7. Hand out a copy of the Elk Location Map and the comparison activity. If preferred, students can be divided into groups for this section.
8. Give students time to complete the worksheet and then discuss as a class.

Differentiated Instruction:

Extensions:

- Have students read Chapter 13 (The World Without War) from the book *The World Without Us* by Alan Weisman and compare the impact that the Demilitarized Zone between North and South Korea has on wildlife to that of the Iron Curtain region.
- Have students watch the Wildlife Crossings video found at: (http://www.azgfd.gov/video/WildlifeCrossings.shtml) Have them compare their proposed solutions to get elk across highways to those actually being implemented by the AZ Game and Fish Department. They also discuss how different technologies have improved wildlife management.

Modifications:

- Read the newspaper article as a Read-aloud with the entire class. Stop periodically to discuss important concepts and vocabulary.
- Have students work in groups to analyze the Elk Location Map.

Reflection:

Use the space below to reflect on the success of the lesson. What worked? What didn't? These notes can be used to help the next time you teach the lesson. In addition, the Department would appreciate any feedback. Please visit http://www.azgfd.gov/focuswild and submit a lesson evaluation.

War and Wildlife Comprehension Activity

Your teacher will provide you with a copy of a recent newspaper article. Before reading the article, review the questions below. Write your answer to the question in the column titled "Guess". After you have read the article, go back and write the correct answers, based on the reading, in the column titled "Answer".

Article Preview Guide

Questions	Guess (Before Reading)	Answer (After Reading)
1. How do scientists track the movements and migration of deer and other large animals?		
2. How did the presence of an electric, barbed wire fence protected by armed guards impact the nearby wildlife diversity in Europe during the Cold War?		
3. How did the removal of the fence and guards impact the nearby wildlife diversity following the Cold War?		
4. How did the removal of the fence and guards change the migration of deer in the area?		

Analyzing Quotes:

A number of people were quoted in the article. Below are some of those quotes. Based on your understanding of the reading, explain what each person meant.

Quote 1: "Now this border, which meant death, pain and separation, celebrates nature and creation."

- Horst Koehler, German President

Summary:

Quote 2: “We have them [the red deer] on an electric leash.”

- Horst Burghart, Germany’s National Park administration data manager

Summary:

Quote 3: “The wall in the head is still there.”

- Tom Synnatzschke, German nature film producer

Summary:

Quote 4: “Our data showed that the animals behaved very traditionally. But some of the young animals are searching for new territory. They are more and more deleting the border behavior that was there before.”

- Pavel Sustr, Czech Republic zoologist

Summary:

Analyzing Maps:

Use the map included in the article to answer the following questions.

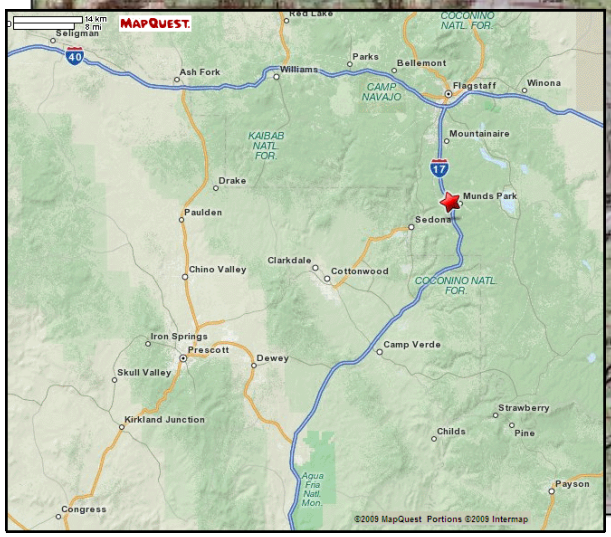
1. Which two countries border this section of Germany to the east?

2. Which city is closest to the known location of the red deer named Ahornia?

3. What is Ahornia’s approximate home range size?
    a. 1 square mile
    b. 5 square miles
    c. 10 square miles
    d. 50 square miles

4. What was the author’s purpose for including this map?

5. In your opinion, did the biologists collect enough data to make valid conclusions about Ahornia movement patterns? Explain your answer.



Elk 2
Elk 3
Elk 4
Elk 6
Elk 7
Elk 9
Elk 11

Elk Locations along
I-17 near Munds Park
3/27/06 - 4/20/07

Kilometers
0 2 4

N

War and Wildlife Comparison Activity

Use the map provided by your teacher to help you answer the following questions. You will also need to compare the data shown in the map with the newspaper article you just read.

1. Briefly describe the location of this map.

2. Which of the following cities is the shortest driving distance to this location?
    a. Camp Verde
    b. Paulden
    c. Prescott
    d. Williams

3. What do the different colors represent? What do each of the dots represent?

4. Which major highway are the dots located near?

5. Which individual elk seems to have the largest range? Smallest range?

6. What impact, if any, does the highway have on elk movements in this area?

7. In what ways are the highway impacts from the map and the fence impacts from the reading similar and different?

8. Based on your own knowledge and the reading, how can biologists in Arizona help the elk along this highway?

9. How has the development of GPS technology improved the monitoring and management of wildlife around the world?

War and Wildlife Comprehension Activity

Your teacher will provide you with a copy of a recent newspaper article. Before reading the article, review the questions below. Write your answer to the question in the column titled "Guess". After you have read the article, go back and write the correct answers, based on the reading, in the column titled "Answer".

Article Preview Guide

Questions	Guess (Before Reading)	Answer (After Reading)
1. How do scientists track the movements and migration of deer and other large animals?		Using GPS collars which determine the animal's location on a regular basis.
2. How did the presence of an electric, barbed wire fence protected by armed guards impact the nearby wildlife diversity in Europe during the Cold War?		The fence cut the habitat and limited movement. However, the guards, as well as the lack of roads, factories, etc., kept people away and wildlife thrived.
3. How did the removal of the fence and guards impact the nearby wildlife diversity following the Cold War?		Wildlife continued to thrive. Some animals made use of the abandoned structures. Some animals, like the elk and lynx, which hadn't been seen in the area for years, came back.
4. How did the removal of the fence and guards change the migration of deer in the area?		Red deer continued to behave as if the wall still existed. They moved along the area where the fence once stood, but usually refused to cross.

Analyzing Quotes:

A number of people were quoted in the article. Below are some of those quotes. Based on your understanding of the reading, explain what each person meant.

Quote 1: "Now this border, which meant death, pain and separation, celebrates nature and creation."

- Horst Koehler, German President

Summary:

During the Cold War, the fence, protected by armed guards, was a symbol of death and separation. It kept Eastern and Western Europe divided. However, now the area is full of life, as nature reclaims where the fence once stood.

Quote 2: "We have them [the red deer] on an electric leash."

- Horst Burghart, Germany's National Park administration data manager

Summary:
Electronic GPS collars were fitted on to the deer which allowed biologists to follow them wherever they went.

Quote 3: "The wall in the head is still there."

- Tom Synnatzschke, German nature film producer

Summary:
Even though the wall no longer remained, the deer continued to behave as if the wall was there. They had learned their migration routes and ranges from their parents.

Quote 4: "Our data showed that the animals behaved very traditionally. But some of the young animals are searching for new territory. They are more and more deleting the border behavior that was there before."

- Pavel Sustr, Czech Republic zoologist

Summary:
Most of the animals, particularly the adults, tended to stick to the learned migration pathways. However, the biologists were starting to see signs of the younger animals, looking for territories of their own, branch out and cross the border.

Analyzing Maps:

Use the map included in the article to answer the following questions.

1. Which two countries border this section of Germany to the east? Czech Republic and Austria.

2. Which city is closest to the known location of the red deer named Ahornia? Grafenau, Germany.

3. What is Ahornia's approximate home range size?
   a. 1 square mile
   b. 5 square miles
   c. 10 square miles
   d. 50 square miles

4. What was the author's purpose for including this map?

The visual depiction of the deer's locations through time supports the claim in the article that the deer did not cross over into the Czech Republic.

5. In your opinion, did the biologists collect enough data to make valid conclusions about Ahornia movement patterns? Explain your answer.

There were 11,000 data points collected for this single deer. That is more than enough data to draw conclusions about its movement. However, additional deer would have to be tracked to get a better idea of general deer movement patterns in this area.

War and Wildlife Comparison Activity

Use the map provided by your teacher to help you answer the following questions. You will also need to compare the data shown in the map with the newspaper article you just read.

1. Briefly describe the location of this map.

This map is showing the area around Mund's Park in northern Arizona. It is about 20 miles south of Flagstaff.

2. Which of the following cities is the shortest driving distance to this location?
    a. Camp Verde
    b. Paulden
    c. Prescott
    d. Williams

3. What do the different colors represent? What do each of the dots represent?

The colors represent individual elk. The dots represent an elk's location at a specific time.

4. Which major highway are the dots located near?

Interstate 17.

5. Which individual elk seems to have the largest range? Smallest range?

Largest: either 4, 7 or 11. Smallest: 3.

6. What impact, if any, does the highway have on elk movements in this area?

The highway seems to be a major barrier for elk movement through this area. It fragments the habitat, and could affect the survival of the elk. Very few of the elk actually cross the highway.

7. In what ways are the highway impacts from the map and the fence impacts from the reading similar and different?

Both the fence and the highway were barriers that divided the habitat, forcing animals to one side or the other. The fence was removed which allowed the potential for movement between the two sides. A limited amount of movement is seen along the highway, however.

8. Based on your own knowledge and the reading, how can biologists in Arizona help the elk along this highway?

Answers will vary. The freeway could be removed or rerouted, although this possibility seems unlikely. However, perhaps the highway could be raised, at least in sections, which would allow animals to move below the highway.

9. How has the development of GPS technology improved the monitoring and management of wildlife around the world?

GPS has allowed wildlife biologists to get a better understanding of animal movements. Prior to this invention, the animals had to be physically observed multiple times. This was time intensive and limited the amount of data. Now, with one GPS collar, scientists can collect thousands of data points, one every couple hours, for a better look at animal movement.