White-tailed Deer:
How Many are There?

In a Nutshell

Students will learn methods wildlife biologists use to estimate wildlife population size. Through a simulated white-tailed deer population survey and a wildlife survival game, students will better understand the relationship between habitat and wildlife population size.

Grades	5 & 6
Seasons	Fall, Winter, Spring
Location	Visitor Center

Learning Objectives

After participating in this activity, students will be able to:

- list two methods wildlife biologists use to manage deer populations.
- explain how managing deer population size protects habitat.
- describe how predators (like wolves) affect prey (like deer) populations.

Literature Connections

Wild Science: Amazing Encounters between Animals and the People Who Study Them by Victoria Miles

The White-Tailed Deer by Michael Zwaschka

White-Tailed Deer by Dorothy Hinshaw Patent

All About Deer by Jim Arnosky

Pre-Visit Suggestion

Oh Deer! Project WILD (page 36)

Students play a game in which they discover the critical connection between deer population and habitat quality.

On-site Activities

Students will conduct a deer pellet survey to estimate the population of white-tailed deer on the refuge. As a group, students will discuss whether or not their estimations are reasonable. Students will learn about methods biologists use to ensure the most accurate data is collected and discover the connection between deer population and a healthy habitat.

Classroom Connection

Research

Divide the class into wildlife research teams. Assign each team to research a different question related to Minnesota white-tailed deer (or a deer relative). Ask each team to report their findings to the class. Examples of research questions include:

- What are three unique adaptations of white-tailed deer that help them to survive in Minnesota?
- Research two other mammals that are related to white-tail deer. What are the most notable similarities and differences?
- What are two other methods wildlife biologists use to monitor deer populations?
- What are the top three causes of deer mortality in Minnesota? How could these causes be reduced?

Deer Dilemma, Project WILD (page 426)

Conduct a mock board of commissioners meeting to hear the concerns of constituents regarding the ever-increasing deer population in and around a local park. Then make a decision concerning the issue.

Teacher Resources

Oh, Deer! By Tom Dickson, Minnesota Conservation Volunteer Teachers Guide
http://files.dnr.state.mn.us/education_safety/education/teachers/activities/volunteer_studyguides/ohdeer_studyguide.pdf
The Deer Watcher's Field Guide: Whitetails of the Midwest by John H. Williams

White-tailed Deer: How Many?
Pre-Visit Activities

Oh Deer! (Project WILD, page 36)
Materials

- Game instructions for leader
- Notepad and pencil for recording numbers each round
- Flip chart paper and markers (or dry erase board) back in the classroom
- Red bandanas to mark predators
- 2 blaze orange vests to mark hunters
- 4 large red field marker cones

Play the game as described in the Project WILD Curriculum (page 36) in a wide, open area inside the building. Set up the playing field by using the 4 field cones to mark the ends of two imaginary parallel lines on the ground or floor, about 10 to 20 yards apart.

Introduction

Discus with students the 4 critical components of habitat that all animals need to survive: food, water, shelter and space. Remember to include that these components must all be available in a suitable arrangement for an area to be considered a healthy habitat.

Activity

Start by teaching and demonstrating to all the players the symbols used in the game.
   a. Food (clasp hands over the stomach)
   b. Water (clasp hands over the mouth)
   c. Shelter (clasp hands over the head)

Space, while a critical component of habitat, is assumed to be available to all deer in this game as represented by the playing field. It does not therefore have a symbol.

1. Have students number off 1-4. Have all the students who will represent deer in the first round of this game go to one end of the

playing field. They will choose which component of habitat they need at the beginning of each round.

2. Assign numbers 2, 3 and 4 to play as habitat components. They will choose which component they represent at the beginning of each round.

3. Start the game with deer and habitat components, standing at opposite ends of the field, with their backs turned to the players on the opposite end. On the count of three, deer and habitat components turn to face each other. At this point players may not change their symbols.

4. Deer walk fast (not run) to a habitat component that matches their habitat need. The deer and the matching habitat component quickly walk back to the deer end of the playing field together. The habitat component becomes a deer in the next round of the game.

5. Continue play in this manner for 10-12 rounds. Count and record the deer population <u>after</u> each round.

6. Introduce environmental factors such as a flood or a drought into the game by "conspiring" with the habitat components. For example: ask all the habitat players to represent water to simulate a flood. In a drought year perhaps only one or two players represent water. How do these events impact the deer population? Count and record the deer population <u>after</u> each round. Be sure to note the rounds in which these events occurred to make interpreting results easier back in the classroom.

7. Note the pattern that develops as students continue to play. Do they see the pattern? The population rises until the habitat can no longer support the herd resulting in a tremendous die off.

8. Now introduce the stabilizing effect of predators on the deer herd. Use red bandanas in the back pocket or around the wrist of 2 students that represent predators. Play several rounds. Count

and record the deer population after each round. Ask students to describe the effect predators have on deer populations.

9. Ask students if the same number of predators exist today, as in the past, especially in urban areas. How could the deer population be controlled in the absence of large predators like wolves? Hunting is considered a population management tool. Select 2 students to represent hunters. Direct them to wear a blaze orange hunting vest to identify their role in the game. Play several rounds. Count and record the deer population after each round. Ask students to describe the effect hunters have on deer populations.

Wrap-up
Return to a classroom to graph the results of each round and discuss what the students learned. Explain that during their fieldtrip to the refuge they will conduct a white-tailed deer population survey to estimate the size of the current refuge deer population.

White-tailed Deer: How Many?
On-site Activities

Materials

- Clipboards (1 per group)
- Deer and rabbit scat examples (real in Riker mount or replicas)
- Laminated photos of fresh and old deer scat
- Pencils (1 per group)
- Backpacks (1 per group)
- Mammal Track & Scat Guide (1 per group)
- 50' string (1 per group)
- Survey info sheet (1 per group)
- Calculator (1 per group)
- 30 flags
- Flip chart or dry erase board for calculations
- Laminated deer silhouettes

Introduction

Amphitheater/Inside Visitor Center (20 minutes)

Welcome students to the refuge. Review with students the identifying characteristics of scat (shape, size, content, habitat, etc.). Explain to students the activity they will conduct today will focus on identifying deer scat on the Refuge. Using the deer scat examples, remind students about the characteristics of deer scat - elongated sphere shaped, similar to a coffee bean.

Point out how to differentiate between deer and rabbit scat, the most common identification mistake. Rabbit scat tends to be lighter in color, very round, and is drier looking even when it is fresh.

Deer scat will change in appearance depending upon the diet of a deer and the season. During the winter a deer's food source is mainly twigs, and the scat will appear light brown and as separate pellets. During warmer seasons when more food source varieties are available (berries, leaves, nuts) deer scat appears dark brown and the pellets may stick together.

To complete the survey activity students will need to be familiar with how to determine fresh scat from scat that has been on the ground

longer than a day. Ask students the following questions: Who has a dog? How many of you are in charge of cleaning up after the dog? When you're cleaning up after the dog, how do you know their scat is fresh? (wet or moist looking, steaming, melted snow around it, warm to touch [when picking it up with a trash bag]). These observations are the same for all animals including deer. Pass around the photos of deer scat to the class. Ask students to identify which photos appear to have fresh scat. Remind students to look for these indicators when searching for deer scat during the activity.

Remind students about their activities as scatologists, when they used scat and the dichotomous key to identify an unknown mammal. Explain to students that Wildlife Biologists have figured out a method of counting the number of fresh deer pellet piles as one method for estimating the deer population in a habitat. Students will conduct a similar survey, called a plot-survey. Students will count deer pellet piles within a random set of 10' x 50' plots.

Monitoring the deer population through surveys like this one provides important information about the condition of habitat, population changes, and the health of the deer herd in an area.

Activity
Pellet Group Surveys
On refuge, (60 minutes)
A pellet survey involves counting the number of scat piles left behind by deer. Wildlife biologists use mathematics to determine the deer populations based on the number of deer pellet piles and the daily defecation rate (number of times a deer defecates each day). In this survey students will estimate the refuge deer population using this method.

Explain to students the process for setting up a deer pellet survey plot. Assign students to survey teams and pass out one survey backpack per team. Ask each team to check the equipment in their backpack as the items in the backpack are described (mammal scat guide, string, pencil, and calculator). Provide each student with a clipboard, a journal page and a pencil.

Lead students outside. Demonstrate for students the survey procedure (below) using a mock survey plot as an example. Clarify any questions students may ask about the equipment or survey process. Emphasize to students this is not a competition to find the most scat piles. It is more important to collect accurate data than to compete with the other teams.

Procedure:

1. Instruct students to fill out the top portion of the data sheet.
2. Explain to students the survey area is the length of the rope, plus 5 feet on both sides of the rope. Students can estimate this plot width by using their arm span to measure the 5 feet area. When the survey is complete students will have surveyed a 500 square foot area (10' x 50') which equals 1/100 of an acre.
3. Ask each team to select two members to hold the rope that will mark the 50 foot long plot survey area.
4. The remaining team members will be responsible for locating the deer scat piles in the survey area. Pass out flags to the remaining team members. Instruct the flag holders to search for any signs of scat within the designated 10 foot area along the rope. When a sign of scat has been located instruct students to place a flag next to the pile.
5. When the survey is complete, students should return the rope to the backpack. As a team, all team members should carefully examine all flagged scat piles and then identify the wildlife species using the scat guide. Students should tally on the data sheet only the number of fresh deer pellet piles found in their plot. This is important because the math calculation is based on daily defecation rates. Counting old scat piles along with fresh will inflate the deer population estimate.
6. If time remains, allow students to complete a second plot survey.
7. Return students to the original meeting place (classroom/amphitheater) to complete the population calculations and discuss team findings as a class.

Class Calculations
Amphitheater/Inside Visitor Center (20 minutes)
When students have re-grouped, ask each team to work together. While the entire class will work through the calculations together, led by the

field trip leader, each team must use the data they collected to contribute to the calculations.

<u>Average piles per plot</u>   avg. piles per plot: 2

On a board, ask each team to write the number of fresh deer piles they found for each survey plot they sampled. Combine each team's data to determine an average number of piles per plot. Ask students to work together in their team, using their calculator, to determine the average piles per plot. This is simply the sum of all piles divided by the total number of teams.

Example:
Data Collected from Each Team = 5,1,3,4,0,0,2,1,1,3
Sum= 20
Sum/ Number of Teams
Average= 20/10= 2 piles per survey plot

<u>Average piles per acre</u>   avg. piles per acre: 200

Divide the average piles per plot by 0.01 (one hundredth of an acre) to get the average piles per acre.

Example:
2 average piles per plot/ 0.01= 200 piles per acre

<u>Is this a reasonable estimate of the number of deer?</u>   NO!

Why Not? This is a very large number, and there are 2 more steps that need to be completed. Biologists take two more numbers into consideration when estimating population size. The first is called the Daily Defecation Rate, simply the number of times a deer makes a scat pile each day. The Daily Defecation Rate for Minnesota White-tailed Deer is 13 (as determined by the MN Department of Natural Resources).

To translate the piles into a population estimate biologists must divide by the daily defecation rate:

Example:
200/13= 15.38 round to nearest whole= 15 deer

This is A LOT of deer. What else are we forgetting? How often are these surveys completed? A deer that stays within its territory will be leaving many piles daily. If we don't take the time between surveys into account, we may be counting each deer many times over. To reach a more accurate number, biologists would divide the estimated number of deer by the days between

surveys. In most cases this is 30 (biologists usually survey about once each month) but may be any number of days.

Example:
15/30 days between surveys= .5 deer/acre

Wrap-up Management Connection
Amphitheater/Inside Visitor Center (5 minutes)

Discuss the environmental and survey factors that influence the population density per acre of white-tailed deer on the refuge using the following questions.

1. The actual deer density in MN is estimated at about 1 deer per 5 acres. How does the **class** data compare to the state average? Use the laminated deer silhouettes to illustrate the state average compared to the number of deer estimated by the students. (1 deer = 5 x.5 or 2.5)

   Our data shows a much greater density than the state average. Under these conditions it would be very likely to see at least one deer or see recent deer sign during our hikes. Did we see deer? (we usually don't).

2. What environmental factors would cause our population density estimate to be so much higher than the state average?

   One reason for the high concentration of deer may be habitat loss as urban areas surrounding the refuge continue to grow. Another factor might include the bird feeding area behind the Visitor Center – deer will come in to eat the bird seed. A third factor might also be the topography of the area as a natural habitat corridor for deer movement along the river valley.

3. What survey methods might cause our population density to appear so much higher than the state average?

   Remember that an average balances out the high and low population numbers gathered throughout the state. Changes from year to year

in deer population estimates in the metro area might be a more meaningful comparison.

4. Does the habitat we surveyed appear to be good or poor deer habitat? How can a biologist tell?

   Often the state of the habitat (enough understory in this case) is a good indicator of general population size of deer. As the population of the herd gets too large for the habitat they occupy, understory starts to disappear.

The refuge is managed to provide healthy food, water, shelter and space for all wildlife. In certain areas of the Refuge (example: Long Meadow Lake Unit by the Mall of America) the white-tailed deer population is too high for the habitat to remain healthy. The refuge wildlife biologists and managers have learned how to balance wildlife populations in a way to maintain healthy habitats on the refuge. When a wildlife population grows larger than a habitat can handle, decisions are made to help control deer population growth. Methods that Minnesota Valley National Wildlife Refuge may include: public hunting, public education (educating local citizens about feeding wildlife and reasons why not to provide feed for deer), controlled special hunts (groups who plan to donate meat & hides to various food shelves may be issued a special permit), natural predation (work with habitat plants and animals to increase species like coyotes, who will eat young or old/sick deer).

Inform students the research they conducted today has helped refuge wildlife biologists. The data collected will be complied with previous surveys. The wildlife biologists will use the data to help make decisions on how to manage the white-tailed deer population on the refuge.

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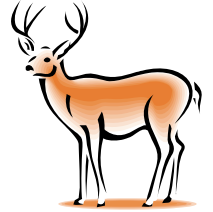Naturalist: _____ Date: _____ Location: _____

Weather: _____

DEER PELLET SURVEY DATA FORM

OBSERVERS: _____

DATE: _____   TIME: _____   TEMP: _____

HABITAT TYPE: _____

Transect 50 feet long X 10 feet wide (5 feet on each side of the line)

Total number of FRESH pellet groups = _____

Sketch an aerial view of your survey plot.

Sketch and label the different types of scat you found in your survey plot.

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Naturalist: _____ Date: _____ Location: _____

Weather: _____

CLASS CALCULATIONS: Deer Population at MN Valley NWR

<u>Average piles per plot:</u>
Sum of all piles divided by the total number of plots.

<u>Average piles per acre:</u>
Divide the average piles per plot by 0.01 (one hundredth of an acre) to get the average piles per acre.

<u>Refuge Deer Population Estimate:</u>
To translate the piles into a population estimate biologists must divide by the defecation rate of 13 piles per day.

And then divide by the days between surveys (use 30 days)
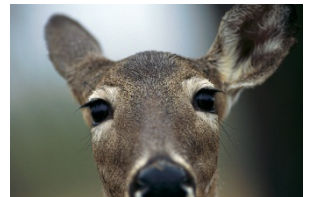
Can this habitat maintain this many deer?

Cut and laminate an assortment of whole and ½ deer for illustration during the population discussion. Each deer illustration represents 1 deer per 5 acres.

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White-tailed Deer: How Many?
Rainy Day Alternatives

Who Left that Scat?
Materials

- Scat examples: deer, rabbit, raccoon, coyote, fox, mouse, otter, mink, turkey, goose
- Mammal Track & Scat Guide (1 per group)
- Whose Scat is That? Datasheet (1 per group)
- Rulers (1 per group)
- Pencils (1 per group)

Introduction

Begin the topic explaining to students that people have been fascinated by and have studied animal signs for thousands of years. Ask students to list types of signs that wildlife may leave behind. Write the answers on a board or large sheet of paper. If scat is not mentioned, include it in the list.

Explain to students that some biologists specialize in studying individual wildlife signs. One type of biologist is a scatologist. Ask students what wildlife sign they think a scatologist would study? (answer: scat) If necessary, show them a replica of scat as a hint. Engage students in a discussion about scat.

Scat serves two purposes for wildlife; to eliminate waste and to mark territory. Scatologists can learn a lot about wildlife by studying scat. Scat provides clues to:

- the identity of the animal that has left the scat behind,
- the food and the habitat the animal prefers,
- the health of the animal as well as
- the size of the population.

Explain to students for this activity they will become scatologists and learn how to identify mammals from the scat they leave behind. This is an important skill they will use during their fieldtrip to the Refuge. Scat can be identified by shape, size, color, abundance, smell, contents, and the habitat where the scat is found.

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Activity
Building a Dichotomous Key

Show students the dichotomous key they will use to identify the animal that left the scat. If students are not familiar with using a dichotomous key, share with them the following information:

A dichotomous key is a guide biologists use to identify an item they are studying (like the name of a butterfly, a plant, or a rock). Dichotomous means "divided in two parts". Dichotomous key users are asked to choose between 2 noticeable features, narrowing the possibilities one set of questions at a time. Biologists use comparison to answer the two questions at each step. (It's like playing 20 questions.) As a biologist compares the item to the key, the questions focus on more specific features narrowing the choices until a positive identification is made.

For a simple example, construct a dichotomous key for students (or another group of items) in the classroom. Begin with simple questions to answer (like gender) then move on to more specific details for each group: hair length/color, wearing glasses or not wearing glasses. Remember to focus on physical features that cannot be easily changed. Form the key on the board for everyone to view.

Example:
Question 1: Is the person male or female?
Question 2: Does the person wear glasses or not?
Question 3: Does the person have freckles or no freckles?
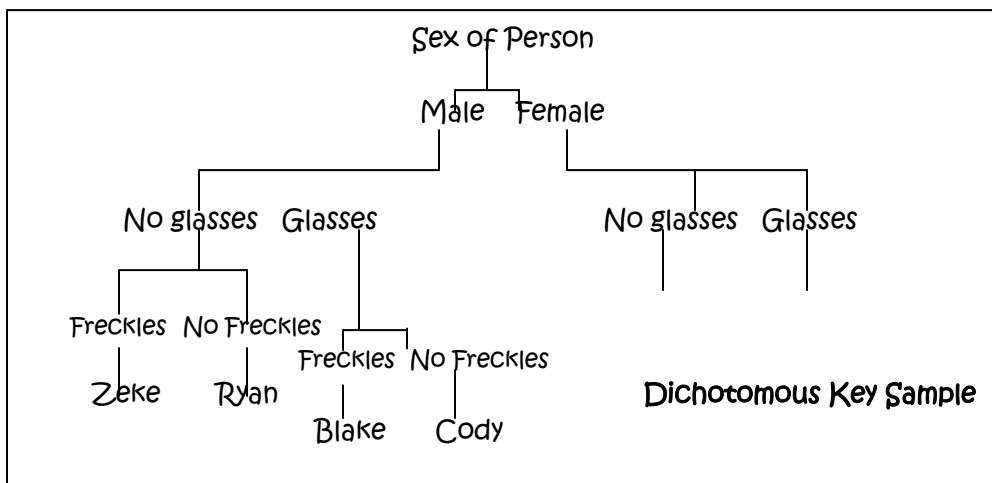
Dichotomous Key Sample

Each branch of the key should end with a student's name. All dichotomous keys will provide enough questions to specifically identify each item of a group. To test if the key has been designed correctly, ask each student to follow the key based on their physical features to see if their name has been identified at the end of a branch.

Scat Identification

Divide students into groups of three. Pass out one Mammal Track & Scat guide to each group. Instruct students to open the guides to page 16. Discuss with the students how to classify scat using examples for each type of scat. Instruct the students to follow along in the key as you discuss the different categories of scat.

Scat is classified into 2 main groups: sphere (rabbit) or cylinder (coyote). Each group is further classified by specific features.

> The sphere group includes round (rabbit) or elongated shapes (beaver). The elongated shape is either large (deer) or small (gray squirrel) with the length twice the diameter. These animals are mainly herbivores (plant eaters). The only exception to this rule is the shrew, which primarily eats insects.

> The cylinder group includes pointed (red fox), broken (bobcat), twisted (mink), blunt (raccoon), or miscellaneous (skunk) as identifying choices. These animals are either carnivores, (meat eaters), or omnivores (meat and plant eaters). Within this group of animal scat, fur and bones will likely be a part of the contents.

When students appear to understand the classification process, pass out the "Who Left that Scat?" data sheet, rulers, and pencils to each group. Explain to students to answer the questions using the guide on the first side of the datasheet.

Check student answers before they complete the back page. When a group provides the correct answer, instruct them to complete the activity on the back page. To complete this activity, provide the group with a scat replica. Using the scat replica each group should use the dichotomous key to start identifying the mammal. Rulers will be useful to measure the length and diameter of scat necessary for identification.

When the group has correctly identified the mammal, instruct them to write their answer in the appropriate column. If time remains, allow the group to identify another specimen.

Wrap-Up

Explain to students the activity they completed as scatologists has helped to prepare them for a survey they will complete during their visit to the refuge. During the fieldtrip students will focus on deer scat, and will travel off the main trail to collect data that will help them to determine the refuge deer population. Remind students to wear appropriate outdoor clothing, including pants, shoes or boots and coats depending on the season.

Who Left that Scat?

Name(s):_____   Date:_____

Read pages 16-23 in the Mammal Tracks & Scat Guide and answer the questions below.

1. Name 2 purposes of scat.

2. List 4 characteristics used to identify scat.

3. Besides identification, what else can be learned from studying scat?

4. What shape is the scat of herbivores? Carnivores? Omnivores?

5. For each shape of scat listed in the chart below, list 1 example of a mammal with that type of scat.

Scat	Type of Mammal
Round	
Round- Elongated Small	
Round- Elongated Large	
Cylinder- Pointed	
Cylinder- Broken	
Cylinder- Twisted	
Cylinder- Blunt	
Cylinder- Miscellaneous	

Who Left that Scat?

For each scat replica, fill in the chart below.

Scat #	Shape	Mammal	Identifying Characteristics
1			
2			
3			
4			
5			

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Who Left that Scat?

ANSWER KEY

Read pages 16-23 in the Mammal Tracks & Scat Guide and answer the questions below.

6. Name 2 purposes of scat.
   Eliminate waste and mark territory

7. List 4 characteristics used to identify scat.
   Shape, size, color, abundance, smell, contents, habitat where scat was found

8. Besides identification, what else can be learned from studying scat?
   Animal's diet, habitat preference, population size

9. What shape is the scat of herbivores? Carnivores? Omnivores?
   Herbivores- Sphere   Carnivores & Omnivores- Cylinder

10. For each shape of scat listed in the chart below, list 1 example of a mammal with that type of scat.

Scat	Type of Mammal
Round	Cottontail Rabbit & Snowshoe Hare
Round- Elongated Small	Chipmunk, Red & Gray Squirrel, Mouse, Shrew
Round- Elongated Large	Beaver, Deer, Moose, Muskrat, Porcupine, Woodchuck
Cylinder- Pointed	Coyote, Gray & Red Fox
Cylinder- Broken	Bobcat & Domesticated Cat
Cylinder- Twisted	Fisher, Marten, Mink, Weasel
Cylinder- Blunt	Bear & Raccoon
Cylinder- Miscellaneous	Opossum, Otter, Skunk

White-tailed Deer: How Many?
Rainy Day Alternatives

Deer Dilemma

Students participate in a simulated board of commissioners meeting regarding the challenges presented by an ever-increasing deer population in and around a local park.

Materials

- Crystal Lake Park scenario (1 per student)
- Role Cards
- MN DNR, 2009 Pre-Fawn Deer Density from Deer Population Model Map poster

Introduction

This is a modified version of *Deer Dilemma* from Project WILD.

Using the Conservation Volunteer article *Oh Deer!* along with the background information provided, lead a class discussion on the life history of White-tailed Deer. Transition the student discussion into wildlife management. Wildlife management is the application of scientific knowledge and techniques to protect, preserve, conserve, limit, or enhance wildlife and habitat. In an urban setting, similar to Minnesota Valley National Wildlife Refuge, biologists continually seek to find a balance between the needs and desires of people with the impacts (positive or negative) to wildlife.

Mock Public Meeting

Distribute copies of the Crystal Lake Park scenario to students before reading it to the class. Select five to seven students to serve as members of the Board of Commissioners and appoint one student as the chairperson. The Chairperson will lead the meeting and make sure all voices are heard. The board will be asked to decide how to manage the growing deer population in Crystal Park.

Assign one student to each role card. Allow students time to develop a position on the role they have been assigned. Instruct students to present a short statement to the board that explains the opinion they were assigned and to offer a suggestion to resolve the deer population issue in the park.

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If there are students without role cards, assign these students the role of townspeople. Instruct the townspeople to first listen to the opinions and suggestions of each speaker; then form their own personal opinions about how to manage the deer herd at Crystal Lake.

Explain to students that this simulated meeting will be conducted in the same manner as a normal public meeting; everyone has the chance to speak and no one interrupts. Set a 3-minute time limit for each student with a role card to present their opinion and suggestions. Instruct the Chairperson to start the simulated meeting.

When the students, assigned to role cards, have presented their opinions and suggestions to the Board of Commissioners and townspeople, instruct the Chairperson to call a brief recess. Explain to students that during the recess the Board of Commissioners will make a decision about how to best manage the deer herd at Crystal Lake. As the commissioners meet to form a decision, the remaining students, called constituents (the students representing townspeople as well as the students with role cards), cast their own written votes. Tally the student votes; however, do not share the vote information with the commissioners until after the commissioners' decision has been announced.

Wrap-Up

The Board of Commissioners will rejoin the constituents and report their decision. Compare the decision to the tally vote. Discuss with students how they feel about the Board of Commissioners' decision. Did the decision reflect the existing viewpoint of the constituents? Did everyone in the group vote the same? How did the viewpoint of each board member and group representative (role player) influence the votes? Which groups are supportive of the board's decision and which groups oppose the decision?

Ask the students to write down an answer to the following question: How do you think the U.S. Fish and Wildlife Service studies wildlife? Encourage students to think of the methods and/or equipment used. Explain to students the question will be discussed during the upcoming fieldtrip to the Refuge.

Deer Dilemma Support Materials
Crystal Lake Park Scenario

Crystal Lake Park is an 850-acre park in the USA. The park has soccer fields, baseball fields, and a 6-acre lake used for fishing and canoeing.

Nature trails wind around the lake and the upper end of the lake is made up of a wetland where people watch birds. The Wolfpack River flows along the north side of the park.

Hiking trails exist in the park's forest, but 600 acres of the forest is not used by people.

Houses surround the park on the south and east sides. A farm lies to the west of the park. Residents of the homes, along with Charlie Fields, the local farmer, have asked the Board of Commissioners to do something about the deer in the park.

Mr. Fields allows hunting on his farm but complains that the deer simply move to the park when the hunting starts. Very few deer are taken by hunters on his property during the hunting season. He has been using nuisance permits to shoot the deer at night while they are eating his crops. Mr. Fields does not like doing this but feels he must shoot the deer in order to save his crops.

The residents of the local community have tried fences, deer repellents, and feeding the deer in hopes of keeping them away from their flowers and off the roads. Many residents are ready to use lethal control in the area.

This problem has split the community and many people argue about what to do with the deer. Many park visitors do not want the deer harmed in any way because they enjoy seeing the herds of deer in the evening as they drive through the park.

The Board of Commissioners has set up a meeting to listen to the concerns of the residents and to make a decision about the problem. State law does not forbid hunting in the park, so the decision will need to be made at the local level. The board has made no decision about the problem and will listen to ideas from the residents about what they suggest to do.

Commissioners Meeting

Lynn Ranger

You are a park biologist who has studied the deer herd. The studies have discovered that fewer plants are growing in the forest understory because too many deer are eating the plants. You have evidence that some rare plants are declining in number and certain wildlife is being affected by the lower plant diversity.

Betty Bumper

You live at the end of the county road near the park. Your work schedule demands you to drive at sunrise and sunset when the deer are most active. Therefore, you have hit several deer and the price of your car insurance has increased. You support any means that can be taken to reduce the number of deer.

Amy Coach

You are a grounds maintenance worker for the park. You maintain the soccer and baseball fields and trails. Once a day you remove deer droppings from the athletic fields. You would like to remove the deer from the park in order to make your job easier.

Michael Green

You live in a house near the park, and you love to garden. Your roses were once the envy of friends and neighbors. Now the roses are food for the deer herd. You are very upset and tried several forms of repellents and fences but nothing works. You hate the deer and want all deer removed from the park.

Bob Stats

You're an environmental biology teacher at the local college. You do research on wildlife populations, specifically things that affect population changes. You prefer to watch the size of the deer herd and to use management methods based on the size of the deer herd each year.

Dan Dearlove

You're a member of an animal rights group that believes that hunting animals for any reason is cruel. You enjoy seeing deer but are concerned about car accidents and the health of the deer herd. You feel residents should use other methods of control.

Brad Arms

You are one of the people who hunt on Charlie Field's land. You believe the best way to manage the deer population is to allow regulated hunting in the park. This is also an opportunity to provide hunter education to the community and dispel misunderstandings about hunting and deer management. You are willing to pay for the chance to hunt in the park and will donate some of the deer meat to the local food shelf.

John Dodds

Your son had Lyme disease last year and you blame the deer. You are in favor of removing the deer to lower the threat of catching Lyme disease.

Sue Right

You are a lawyer who lives near the park. You enjoy hiking in the park during the evening with your children. You are concerned about the idea of hunting near homes and don't want any harm to come your children. You're not opposed to hunting; just want to be sure things are done safely and in the least obvious way possible.

Charlie Fields

You are a local farmer, growing mostly grain. For the past five years, you have lost a lot of money from the deer eating your crops. You allow people to hunt on your land. Hunters have told you that they see very few deer on your land during the hunting season and feel they must all move into the park. You are frustrated and would like the park to open deer hunting to reduce the population.

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