# GENERATIONS

## cuyahoga valley national park

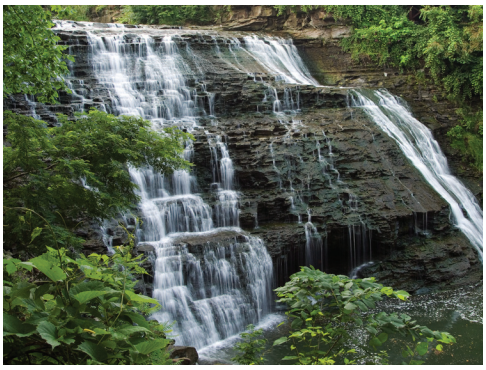
# Preserve and Protect

www.generationscvnp.org

WESTERN**RESERVE** PBS

# Table of Contents


Ian Adams


Ian Adams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GENERATIONS

cuyahoga valley national park

# Preserve and Protect

## Overview

Cuyahoga Valley National Park is the sixth most frequently visited park among the nation's 58 national parks, with 2,828,233 visitors per year. The park protects 33,000 acres along the banks of the Cuyahoga River between Cleveland and Akron and combines cultural, historical, recreational and natural activities in one setting.

The purpose of ***Generations: Cuyahoga Valley National Park — Preserve and Protect*** is to enhance students' knowledge about Ohio's only national park. Designed for grades 4-8, the multimedia kit includes interdisciplinary lessons plus a board game, a virtual tour and podcasts created specially for this project.

## The Video

**Generations: Cuyahoga Valley National Park**, produced by Western Reserve Public Media, was created as a partner piece to the national PBS video series **The National Parks: America's Best Idea**. The one-hour **Generations** documentary captures the story of Cuyahoga Valley National Park through the voices of people from all walks of life — park visitors, park personnel, historians, business and government leaders, environmentalists, educators, artists and many others. The documentary looks at all dimensions of the park, including its natural features (flora, fauna, habitats and geological features) and its social history (from Native American settlements through the post-industrial era). It also tells the story of the park's establishment in 1974, its evolution into the park it is today and the hopes for its future.

## The Teacher Guide

Lesson plans in this teacher guide help students understand these concepts:

- Mathematics: Finding the area of irregular shapes and calculating the cost of a trip to the park
- Science: Understanding issues of deer population and land and water reclamation
- Social studies: Learning about the history of the Towpath Trail and using primary sources for the Ohio and Erie Canal
- Language arts: Writing business letters and persuasive essays
- Art: Discovering nature through the creation of contour drawing and chalk and glue art

There is also a board game where students advance by answering questions about science, mathematics, social studies, language arts and animal identification. The game board, directions and questions are on the Web in PDF format as well as on the project Web site.

## The Web Site

The project Web site, **www.generationscvnp.org**, includes the complete teacher guide in PDF format and all of the lessons in a Web format. The site also includes games, student handouts and activities that are not in the teacher guide.

## Credits


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# GENERATIONS

## cuyahoga valley national park

**Preserve and Protect**

# Mathematics

www.generationscvnp.org

Denny Semick

Doug Garmon

# Finding Area

## Overview

Students will compete to find the area of irregular shapes by counting tiles.

## Standards Addressed

**Grade 4, Mathematics — Measurement**

*03-04 Benchmark*

*D. Identify appropriate tools and apply counting techniques for measuring side lengths, perimeter and area of squares, rectangles, and simple irregular two-dimensional shapes, volume of rectangular prisms, and time and temperature.*

Y2003.CMA.S02.G03-04.BD.L04.I04 / Use Measurement Techniques and Tools

04. Develop and use strategies to find perimeter using string or links, area using tiles or a grid, and volume using cubes; e.g., count squares to find area of regular or irregular shapes on a grid, layer cubes in a box to find its volume.

**Grade 7, Mathematics — Geometry and Spatial Sense**

*05-07 Benchmark*

*J. Apply properties of equality and proportionality to solve problems involving congruent or similar figures; e.g., create a scale drawing.*

Y2003.CMA.S03.G05-07.BJ.L07.I06 / Spatial Relationships

06. Determine and use scale factors for similar figures to solve problems using proportional reasoning.

## Materials

- Computers with Internet connection

## Procedure

### Part 1: O'Neil Woods Metro Park

1. Tell the students that there is going to be a contest to see who can come the closest to finding the area of Cuyahoga Valley National Park (CVNP). You can announce that there will be a prize for the winning group, such as getting to leave class first or earning points for the next activity.

2. Break the students into groups of two or three.

3. Distribute the O'Neil Woods Metro Park student handout. Each square on the map represents 2.14 acres, and students are to find the area of the park. Review that area is the plane surface of an object.

4. Ask each group to come up with a method to determine the area of the park.

5. When each group has calculated the area, record the answers publicly and let the groups tell how they figured it out. The correct answer is an area of about 295 acres. Students should end up with about 138 squares when they combine whole and partial squares.

### Part 2: Cuyahoga Valley National Park

1. Now that students have had some practice calculating area for an irregular shape, tell them that they are going to work with a very irregular shape — Cuyahoga Valley National Park.

2. Distribute the Cuyahoga Valley National Park map.

3. Tell the students that their goal is to find the area of the CVNP. Each square represents 128 square acres.

4. The correct answer is that there are approximately 258 squares in the CVNP outline. Since each square is worth 128 square acres, the actual area is about 33,000 square acres.

5. Once again, award a prize to the group that has the closest answer.

6. Have each group write the following:

    a. What procedure they used to find their estimate.

    b. What their estimate was.

    c. How they got that estimate (show mathematics involved).

    d. What they thought about the accuracy of their attempt.

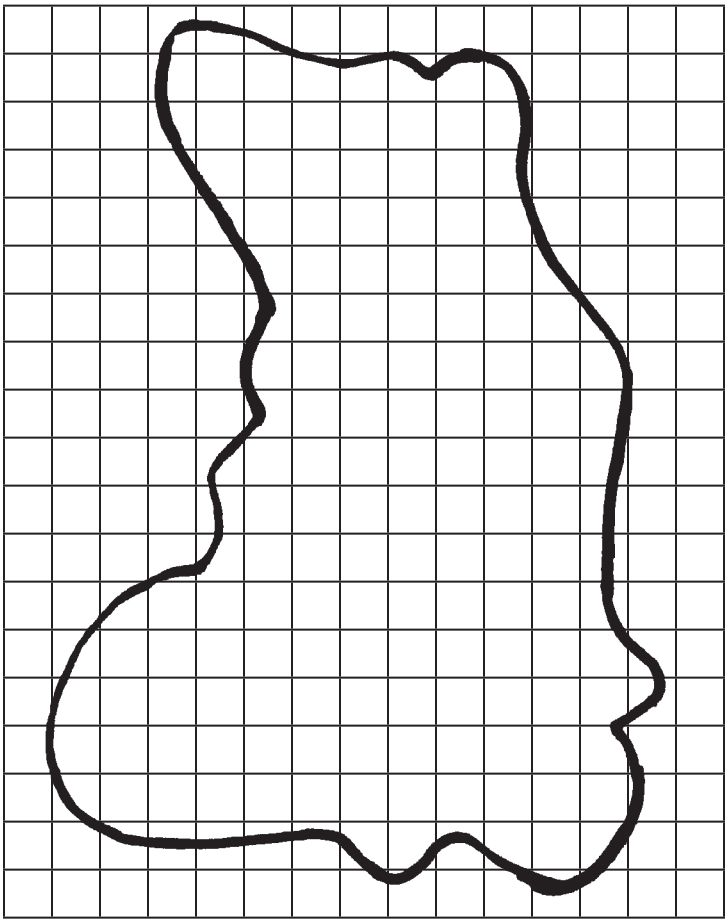
## Evaluation

Each part of their writing could equal 25 points.

| Category | 4 | 3 | 2 | 1 |
|---|---|---|---|---|
| **Explanation** | Is a complete response with a detailed explanation. | Is a good, solid response with clear explanation. | Is an unclear explanation. | Misses key points. |
| **Mechanics** | Has no math errors. | Has no major math errors or serious flaws in reasoning. | Has some serious math errors or flaws in reasoning. | Has major math errors or serious flaws in reasoning. |
| **Demonstrated Knowledge** | Shows complete understanding of the questions, mathematical ideas and processes. | Shows substantial understanding of the problem, ideas and processes. | Shows some understanding of the problem. | Shows a complete lack of understanding of the problem. |

Name(s) _____

# O'Neil Woods Metro Park
# Outline Map



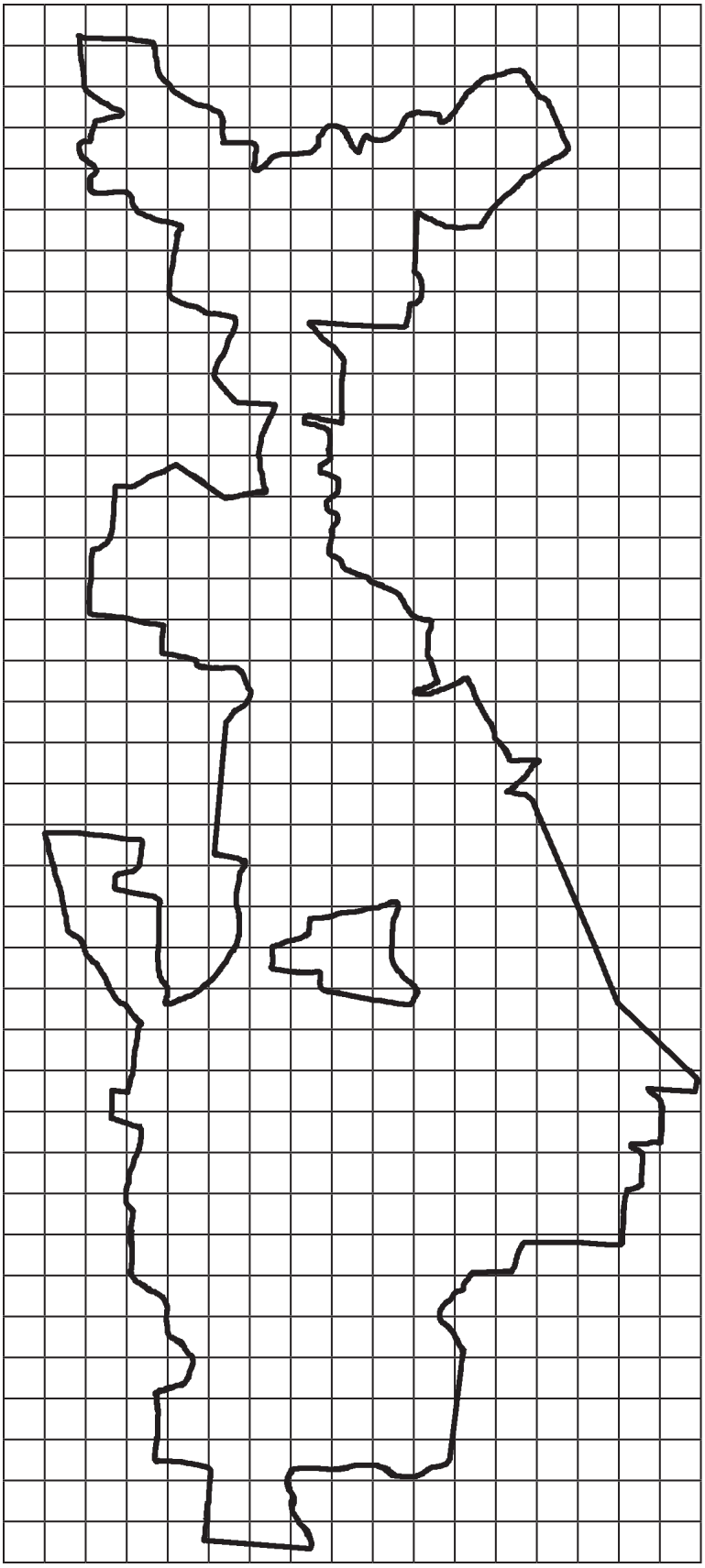
On the left is a grid that contains an outline map of O'Neil Woods, a park in the Metro Parks, Serving Summit County system within the boundaries of Cuyahoga Valley National Park.

Your task is to estimate the area of O'Neil Woods in acres. Each square equals 2.14 square acres.

We'll see who is the closest to the actual area of O'Neil Woods.

☐ = 2.14 square acres

**Show work here!**



Name(s) _____

# Cuyahoga Valley National Park Outline Map

On the left is a grid that contains an outline map of Cuyahoga Valley National Park. Each square represents 128 square acres.

Your task is to estimate the area of park in square acres. We'll see who is the closest to the actual area of the park.

**Show all work below.**

☐ = 128 square acres

Tom Jones

Jack Rigby

# Creating and Organizing Data

## Overview

Students will create a variety of graphs using data, analyze the graphs and write a conclusion about their findings.

## Standards Addressed

**Grade 6, Mathematics — Data Analysis and Probability**

*05-07 Benchmark* *E. Collect, organize, display and interpret data for a specific purpose or need.*

Y2003.CMA.S05.G05-07.BE.L06.I02 / Data Collection

02. Select, create and use graphical representations that are appropriate for the type of data collected.

*05-07 Benchmark* *D. Compare increasingly complex displays of data, such as multiple sets of data on the same graph.*

Y2003.CMA.S05.G05-07.BD.L06.I03 / Data Collection

03. Compare representations of the same data in different types of graphs, such as a bar graph and circle graph.

**Grade 7, Mathematics — Data Analysis and Probability**

*05-07 Benchmark* *A. Read, create and use line graphs, histograms, circle graphs, box-and-whisker plots, stem-and-leaf plots and other representations when appropriate.*

Y2003.CMA.S05.G05-07.BA.L07.I01 / Data Collection

01. Read, create and interpret box-and-whisker plots, stem-and-leaf plots and other types of graphs, when appropriate.

**Grade 8, Mathematics — Data Analysis and Probability**

*08-10 Benchmark* *A. Create, interpret and use graphical displays and statistical measures to describe data; e.g., box-and-whisker plots, histograms, scatterplots, measures of center and variability.*

Y2003.CMA.S05.G08-10.BA.L08.I01 / Data Collection

01. Use, create and interpret scatterplots and other types of graphs as appropriate.

**Grade 7, Science — Scientific Inquiry**

*06-08 Benchmark* *A. Explain that there are differing sets of procedures for guiding scientific investigations and procedures are determined by the nature of the investigation, safety considerations and appropriate tools.*

Y2003.CSC.S05.G06-08.BA.L07.I01 / Doing Scientific Inquiry

01. Explain that variables and controls can affect the results of an investigation and that ideally one variable should be tested at a time; however it is not always possible to control all variables.

Y2003.CSC.S05.G06-08.BA.L07.I02 / Doing Scientific Inquiry

02. Identify simple independent and dependent variables.

Y2003.CSC.S05.G06-08.BA.L07.I03 / Doing Scientific Inquiry

03. Formulate and identify questions to guide scientific investigations that connect to science concepts and can be answered through scientific investigations.

## Materials

- Graph paper
- Computer (optional)

## Vocabulary

- **Heronries:** colonies of heron nests.
- **Independent variable:** A **variable** whose value determines the value of other **variables.**
- **Dependent variable:** What you measure in the experiment and what is affected during the experiment.

## Procedure

### Activity 1: Introduction

Deer pictures are available at www.generationscvnp.org/photos.aspx.

1. Divide the class into groups or pairs.
2. Distribute the Too Many Deer? student handout and have the students read it.
3. Distribute the Using Data to Answer Questions handout and ask the students to discuss this handout in their group and write a statement explaining the graph.
4. Have one person from each group present their response. Discuss their findings.
5. Ask the students if the graph helps to tell if there are too many deer in Cuyahoga Valley National Park.

### Activity 2: Great Blue Heron

Pictures of the great blue heron are available at www.generationscvnp.org/photos.aspx.

1. Now that the students have used a prepared graph to answer a question, tell them that they will create their own graph to answer a question.
2. Give the students 10 minutes of computer time to find out one or two facts about great blue heron. Record the facts they found.
3. Distribute the Great Blue Heron student handout. Have the students read the introduction.
4. Talk about the fact that several types of graphs can be created using this data. (Scatter plots or bar graphs will allow the student to answer the question.)
5. Students can create the graph by hand or use Excel or Create a Graph (https://nces.ed.gov/nceskids/createagraph) as the teacher desires.
6. Their task is to answer the question: What is happening to the great blue heron population in the Cuyahoga Valley National Park?

### Answers

1. Independent variable is the year and will be on the x-axis.
2. Dependent variable is the number of herons and will be on the y-axis.
3. Bar graphs or scatter plots could be made.
4. Graphs will vary.

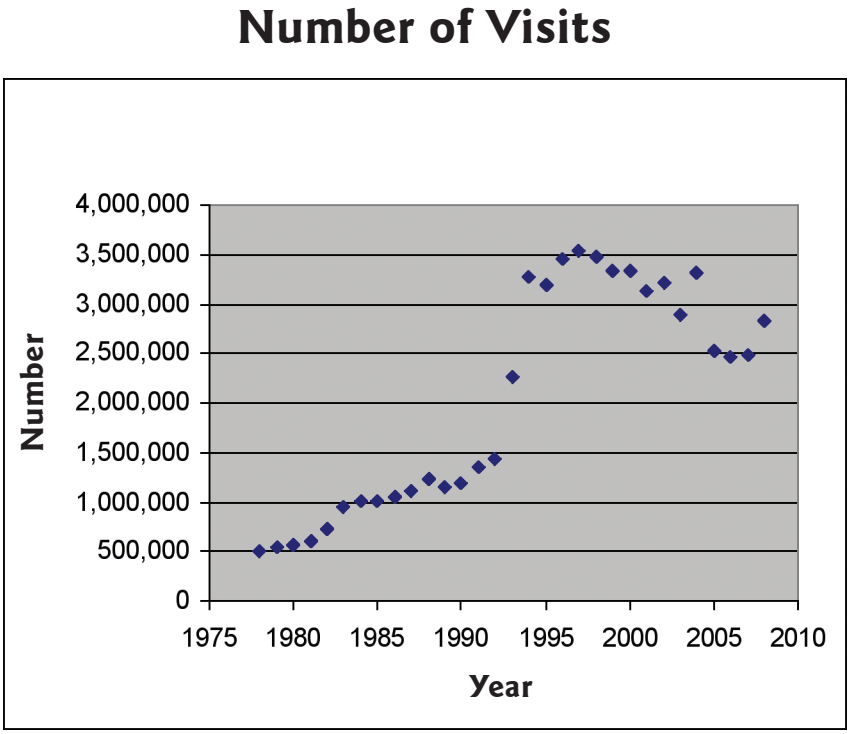
### Activity 3: Park Visitors

Pictures of the great blue heron are available at www.generationscvnp.org/photos.aspx.

1. Ask students if they had ever been to any national park or specifically to the CVNP. Elicit their experiences.
2. Distribute the student handout Park Visitors. Read together the top of the page.
3. Talk about the fact that several types of graphs can be created using this data. (*Scatter plots or bar graphs will allow the student to answer the question.)*
4. Students can create the graph by hand or use Excel or Create a Graph (https://nces.ed.gov/nceskids/createagraph) as the teacher desires.
5. Their task is to answer the questions: Has creation of the CVNP been a successful venture? Has there been consistent use of the park? What is the trend for visitors to the park?

## Answers for Number of Visitor Data

Sample graph for attendance data.




There was a steady increase from 1978 to 1992. The next years from 1992 to 1994 showed a marked jump. The years after that (until the present) show some ups and downs, but indicate a downward trend until 2008, where there was a big increase.

## Evaluation

**Rubric for Graphs**

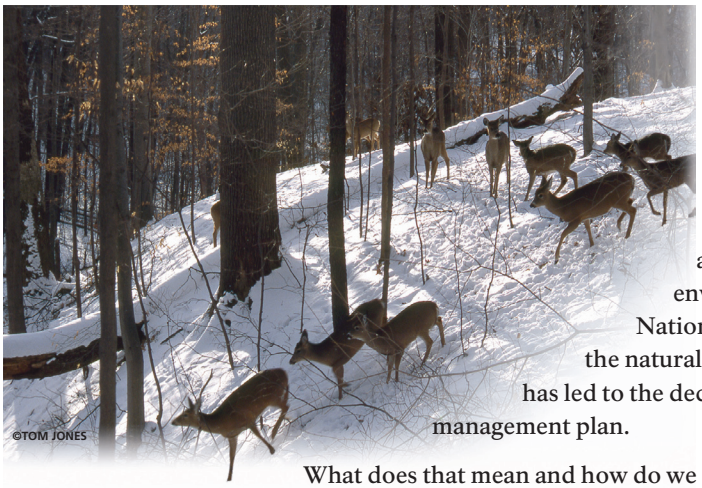
| CATEGORY | 4 | 3 | 2 | 1 |
|---|---|---|---|---|
| **Title** | Title is creative and clearly relates to the problem being graphed (includes dependent and independent variable). It is printed at the top of the graph. | Title clearly relates to the problem being graphed (includes dependent and independent variable) and is printed at the top of the graph. | A title is present at the top of the graph. | A title is not present. |
| **Labeling of X-axis** | The x-axis has a clear, neat label that describes the units used for the independent variable (e.g, days, months, participants' names). | The x-axis has a clear label that describes the units used for the independent variable. | The x-axis has a label. | The x-axis is not labeled. |
| **Labeling of Y-axis** | The y-axis has a clear, neat label that describes the units and the dependent variable (e.g., percent of dog food eaten; degree of satisfaction). | The y-axis has a clear label that describes the units and the dependent variable (e.g., percent of dog food eaten; degree of satisfaction). | The y-axis has a label. | The y-axis is not labeled. |
| **Accuracy of Plot** | All points are plotted correctly and are easy to see. A ruler is used to neatly connect the points or make the bars, if not using a computerized graphing program. | All points are plotted correctly and are easy to see. | All points are plotted correctly. | Points are not plotted correctly or extra points were included. |
| **Units** | All units are described (in a key or with labels) and are appropriately sized for the data set. | Most units are described (in a key or with labels) and are appropriately sized for the data set. | All units are described (in a key or with labels) but are not appropriately sized for the data set. | Units are neither described nor appropriately sized for the data set. |
| **Neatness and Attractiveness** | Exceptionally well designed, neat and attractive. Colors that go well together are used to make the graph more readable. A ruler and graph paper (or graphing computer program) are used. | Neat and relatively attractive. A ruler and graph paper (or graphing computer program) are used to make the graph more readable. | Lines are neatly drawn but the graph appears quite plain. | Appears messy and thrown together in a hurry. Lines are visibly crooked. |
| **Concepts** | Student has a clear understanding of plots and has answered the question effectively. | Student has satisfactory understanding of the major concepts, but has small misunderstandings. | Student has major misunderstandings of the concepts and cannot complete work on his own. | Student does not display understanding of the major concepts or did not complete the assignment. |

# Cuyahoga Valley

National Park Service
U.S. Department of the Interior

Cuyahoga Valley National Park

# Too Many Deer ?




Deer are a common sight in Cuyahoga Valley National Park (CVNP). Have you ever wondered, however, about the impact of so many deer? Two familiar concerns are automobile accidents and damage to landscaping. Less familiar are the impacts of deer on the natural environment. Since the mission of the National Park Service (NPS) is to protect the natural resources of parks, this latter concern has led to the decision to develop a CVNP deer management plan.

What does that mean and how do we decide when there are too many deer? Use this bulletin as a guide for understanding the status of white-tailed deer in CVNP and the research that is helping us understand deer impacts and make decisions.

## Deer Population Factors

The high population level of white-tailed deer is tied to its natural history. The white-tailed deer is a prey animal. Like other prey animals, it reproduces at a high rate. Most does, at 1 1/2 years of age, have their first single fawn. In each successive year of their average five-year life span, does typically will have twins or triplets. These high birth rates outweigh population losses from predation. Coyotes are the only predators in CVNP that prey on deer, primarily scavenging on dead deer or taking newborn fawns. The legislation that established CVNP prohibits public hunting on park property.


## Trends in Population


By the early 1900s, deer nearly disappeared from Ohio due to the loss of forests and unrestricted hunting. Reestablishment of the deer population began in the 1930s as a result of several factors: hunting controls; a restocking effort in southern Ohio; immigration of deer from Michigan and Pennsylvania; and improved habitat created by a mix of agriculture, old fields, and forest fragments.

Since the 1960s, Ohio's deer population has grown dramatically. From an estimated 17,000 deer in 1965, populations reached 400,000 in 1994 and up to 700,000 in 2006.

The deer population in CVNP has likewise grown to unprecedented levels. Best estimates of deer densities in eastern forests prior to European settlement are 8-11 deer per square mile. Research has shown that deer begin to adversely affect their natural surroundings at 10-20 deer per square mile. Today densities in CVNP are estimated at as many as 130 deer per square mile. The NPS has monitored deer populations since 1990 through roadside spotlight surveys, distance sampling, aerial surveys, and fecal pellet group surveys.

## Observing Deer Impacts

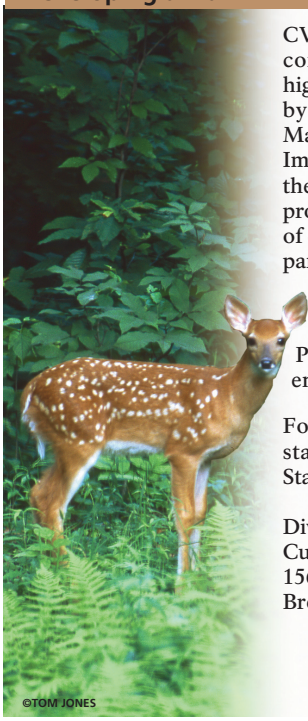

A healthy forest in our region has trees ranging from the smallest seedlings to towering giants. The forest floor is covered with many different kinds of wildflowers, including large expanses of white trillium. The different layers of the forest support a great variety of birds, insects, and other wildlife.

When walking in our forests today, observe how many woodlands differ from a well-balanced ecosystem. You see few young tree seedlings, and the larger trees have been browsed below three feet, leaving the lower forest layers nearly bare. You will likely find few, if any, trillium and other wildflowers. In their place is an abundance of garlic mustard and other invasive, exotic plants.

This situation reflects the impact of large deer populations on the forest as understood by scientific studies. Scientists consider trillium an indicator species for white-tailed deer impacts, since it is a preferred food that fails to flower when browsed by deer. Plant monitoring at locations throughout CVNP has revealed decreases in flowering trillium, less diversity of ground cover and shrubs, and fewer tree seedlings.

This scenario is not unique to CVNP or to northeastern Ohio. Adverse ecological impacts of high numbers of deer (and other hoofed animals) have been documented in hundreds of scientific studies throughout the United States.

## Developing a Plan

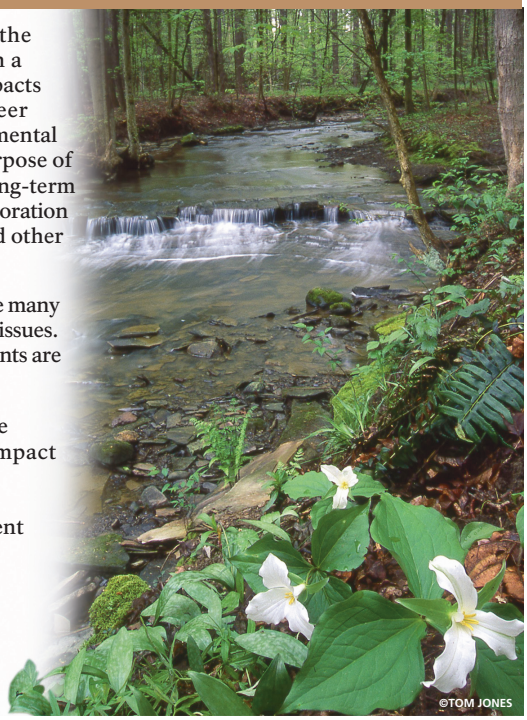



CVNP is currently addressing the complex issues associated with a high deer population and its impacts by preparing a White-tailed Deer Management Plan and Environmental Impact Statement (EIS). The purpose of the Plan and EIS is to support long-term protection, preservation, and restoration of deer, other native species, and other park resources.

The Plan and EIS will analyze many complex ecological and social issues. Public participation and comments are encouraged and needed.

For current information on the status on the Environmental Impact Statement, please contact:

Division of Resource Management
Cuyahoga Valley National Park
15610 Vaughn Road
Brecksville, OH 44141




Cuyahoga Valley National Park

www.nps.gov/cuva
www.dayinthevalley.com

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# Using Data to Answer Questions

The effect that too many deer have on the park can be measured by looking at the plant life in the region. A healthy forest has trees ranging from the smallest seedlings to towering giants. The forest floor is covered with many different kinds of wildflowers, including large expanses of white trillium. The different layers of the forest support a great variety of birds, insects and other wildlife.

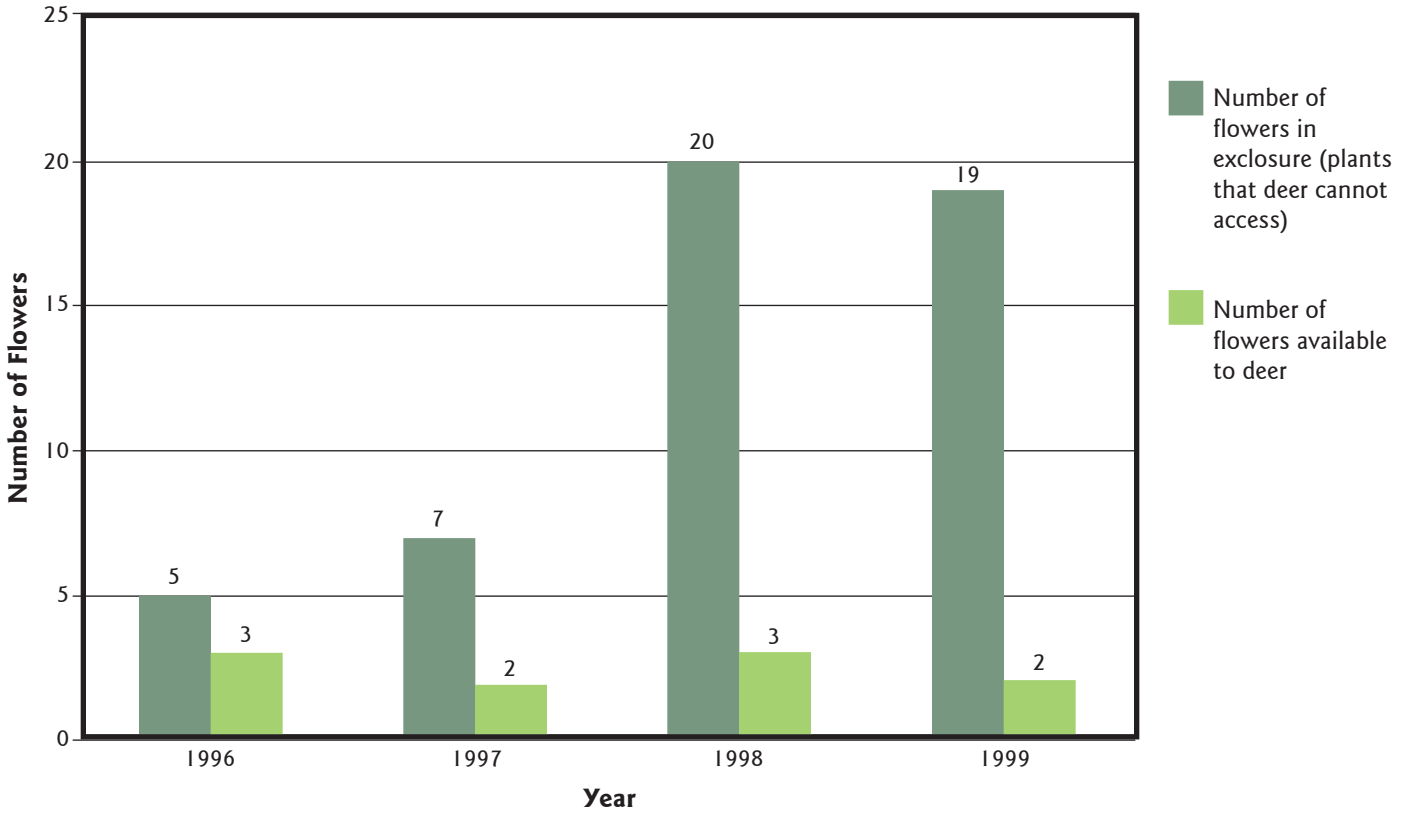
When walking in our forests today, observe how many woodlands differ from a well-balanced ecosystem. You see a few young tree seedlings and the larger trees have been browsed below three feet, leaving the lower forest layers nearly bare. You will likely find few, if any, trillium and other native wildflowers. In their place is an abundance of garlic mustard and other invasive, exotic plants.

This situation reflects the impact of large deer populations on the forest as understood by scientific studies. Scientists consider trillium an indicator species for white-tailed deer impacts since it is a preferred food that fails to flower when browsed by deer. If the deer eats a trillium flower, the plant won't grow another that year. If the plant is repeatedly browsed by deer year after year, it cannot store enough energy to produce flowers and reproduce.

Discuss the graph with your team. Decide what you think the graph is telling you and write down your description. You will then report your findings to the rest of the class.

## Trillium Flowers 1996-1999

The difference in proportion of flowers available to deer vs. those unavailable was not significant in 1996, but is significant in 1999.




**What conclusion do you draw from the graph?**

# Great Blue Heron

**What is happening to the great blue heron population in Cuyahoga Valley National Park?**

The great blue heron plays an important role in the aquatic (water) ecosystems of CVNP. These birds are highly dependent upon the quality of their habitats. Because of that, the health of this bird population can be used to measure the progress in water quality within the Cuyahoga River watershed.

Jim Schmidt

Great blue herons, not known to nest in the park before the 1980s, raise young in three heronries within or adjacent to the park boundary. Visitors have observed herons carting sticks to repair or build nests at two sites: along the Cuyahoga River north of Route 82 and along the south side of Bath Road just east of the Cuyahoga River. (The herons have built a third heronry north of Bath Road, but it is hard for visitors to access.) Heron nest monitoring has found hundreds of nests perched high above the river and filled with squawking, awkward young herons from May to July.

## Data Collection

Citizen science volunteers visited the heronries (colonies of heron nests) on a weekly basis to record changes in activity. Spotting scopes and binoculars were used to view nesting behavior. Observations began early in January when birds begin nest building and ended in June when young fledge develop feathers and leave the nests.

**Below is data from the beginning of this study until 2008.**

| Year | # Nests | # Chicks |
|---|---|---|
| 1993 | 42 | 105 |
| 1994 | 57 | 116 |
| 1995 | 69 | 158 |
| 1996 | 94 | 170 |
| 1997 | 71 | 118 |
| 1998 | 128 | 292 |
| 1999 | 123 | 350 |
| 2000 | 148 | 315 |
| 2001 | 155 | 374 |
| 2002 | 160 | 396 |
| 2003 | 176 | 441 |
| 2004 | 145 | 288 |
| 2005 | 167 | 364 |
| 2006 | 146 | 263 |
| 2007 | 129 | 316 |
| 2008 | 131 | 320 |

1. What is the independent variable?

2. What are the dependent variables?

3. What kind of graph could you make?

Create a graph of the data above. Don't forget to label your axes and include a title. Remember to have consistent intervals on the axes.

Name(s) _____

# Park Visitors

Has creation of Cuyahoga Valley National Park been a successful venture? Has there been consistent use of the park? What is the trend for visitors to the park?

In 1974, President Gerald Ford signed a bill establishing Cuyahoga Valley National Recreation Area. This was done through grassroots efforts by Ohio congressmen and local citizens who wanted to protect scenic open spaces near to home, especially for recreation. Since then, the National Park Service and its partners have worked to not only preserve significant features, but also restore the landscape to be culturally active, less polluted, a better home for wildlife and a model of sustainable living. In 2000, with help from Ohio Congressman Ralph Regula, the name was changed to Cuyahoga Valley National Park.

Was this a successful effort? Do people use the park? Let's look at some statistics. Records of attendance are not easy to compute. CVNP has records for paid attendance; however, many of the visits require no registration. One way they record attendance is using the number of cars in a parking lot as a sample. They also use aerial samples to determine an accurate number of park visitors.

| Park Recreation Visits | | |
|---|---|---|
| **Year** | **# of Visits** | **Rounded # of Visits** |
| 1978 | 496,400 | |
| 1979 | 543,025 | |
| 1980 | 563,300 | |
| 1981 | 596,300 | |
| 1982 | 717,815 | |
| 1983 | 939,562 | |
| 1984 | 1,018,828 | |
| 1985 | 1,004,858 | |
| 1986 | 1,042,148 | |
| 1987 | 1,113,405 | |
| 1988 | 1,229,717 | |
| 1989 | 1,159,648 | |
| 1990 | 1,200,622 | |
| 1991 | 1,358,984 | |
| 1992 | 1,430,382 | |
| 1993 | 2,266,139 | |
| 1994 | 3,266,401 | |
| 1995 | 3,195,207 | |
| 1996 | 3,455,878 | |
| 1997 | 3,527,837 | |
| 1998 | 3,467,107 | |
| 1999 | 3,324,284 | |
| 2000 | 3,324,918 | |
| 2001 | 3,123,353 | |
| 2002 | 3,217,935 | |
| 2003 | 2,879,591 | |
| 2004 | 3,306,175 | |
| 2005 | 2,533,827 | |
| 2006 | 2,468,816 | |
| 2007 | 2,486,656 | |
| 2008 | 2,828,233 | |

There are several types of graphs that could be made using this data. With a partner, create a graph. You may want to use Excel or the online program Create a Graph, https://nces.ed.gov/nceskids/createagraph.

Remember to use a title, have equal intervals on the axes and label the axes.

Write three sentences explaining your graph and what conclusions you draw from it.

The National Park Service visitation data is available online at http://www.nature.nps.gov/stats/. To find the latest data for this park, select Ohio, Cuyahoga Valley National Park and Annual Park Visitation.

Sara Guren

Ted Toth

# Computation and Estimation

## Overview

Students will plan an imaginary two- to three-day trip to Cuyahoga Valley National Park. They will determine who is going with them and where they want to go. They will then compute the cost of the trip and chart the trip on a map.

## Standards Addressed

**Grade 6, Mathematics — Number Sense**

*05-07 Benchmark*

*I. Use a variety of strategies, including proportional reasoning, to estimate, compute, solve and explain solutions to problems involving integers, fractions, decimals and percents.*

Y2003.CMA.S01.G05-07.BI.L06.I14 / Computation and Estimation

14. Use proportional reasoning, ratios and percents to represent problem situations and determine the reasonableness of solutions.

**Grade 7, Mathematics — Number Sense**

*05-07 Benchmark*

*I. Use a variety of strategies, including proportional reasoning, to estimate, compute, solve and explain solutions to problems involving integers, fractions, decimals and percents.*

Y2003.CMA.S01.G05-07.BI.L07.I09 / Computation and Estimation

09. Represent and solve problem situations that can be modeled by and solved using concepts of absolute value, exponents and square roots (for perfect squares).

**Grade 6, Mathematics — Measurement**

*05-07 Benchmark*

*C. Identify appropriate tools and apply appropriate techniques for measuring angles, perimeter or circumference and area of triangles, quadrilaterals, circles and composite shapes, and surface area and volume of prisms and cylinders.*

Y2003.CMA.S02.G05-07.BC.L06.I03 / Use Measurement Techniques and Tools

03. Estimate perimeter or circumference and area for circles, triangles and quadrilaterals, and surface area and volume for prisms and cylinders by estimating lengths using string or links, areas using tiles or grid, and volumes using cubes.

**Grade 7, Mathematics — Measurement**

*05-07 Benchmark* *E. Use problem solving techniques and technology as needed to solve problems involving length, weight, perimeter, area, volume, time and temperature.*

Y2003.CMA.S02.G05-07.BE.L07.I04 / Use Measurement Techniques and Tools

04. Solve problems involving proportional relationships and scale factors; e.g., scale models that require unit conversions within the same measurement system.

**Grade 8, Mathematics — Measurement**

*08-10 Benchmark* *E. Estimate and compute various attributes, including length, angle measure, area, surface area and volume, to a specified level of precision.*

Y2003.CMA.S02.G08-10.BE.L08.I03 / Use Measurement Techniques and Tools

03. Use appropriate levels of precision when calculating with measurements.

## Materials

- Computer with Internet connection
- Calculators

## Procedure

Pictures of park visitation are available at www.generationscvnp.org/photos.aspx.

1. Distribute the student handout A Trip to the Park and review it with the class. With younger students, you may want to do one section at a time and explain it as they are ready to do each part.

2. Depending on your preference, students could work with a partner.

3. Things you may need to review:

   a. The Places to Go Web page, as students need to look up costs of different activities at the park.

   b. How to find the cost for meals using the Places to Go Web page or fast food restaurants' Web sites.

   c. Using proportion to figure out a cost for more than one person.

   d. Using the scale on a map to determine the actual length of their trip. (These will not be accurate but should be a good estimate of their travel.)

## Evaluation

The student handout states that the students must convince their parents that their trip is worthwhile. After they have completed all parts of the worksheet, they should write a paragraph to convince their parents that they made wise choices.

### Paragraph Evaluation Rubric

| CATEGORY | 4: Above Standards | 3: Meets Standards | 2: Approaches Standards | 1: Below Standards |
|---|---|---|---|---|
| **Evidence and Examples** | All of the evidence and examples are specific and relevant, and explanations are given that show how each site to visit supports the author's position. | Most of the evidence and examples are specific and relevant, and explanations are given that show how each site to visit supports the author's position. | At least one of the pieces of evidence and examples is relevant and has an explanation that shows how the site to visit supports the author's position. | Evidence and examples are not relevant and/or are not explained. |
| **Audience** | Demonstrates a clear understanding of the potential reader and uses appropriate vocabulary and arguments. Anticipates reader's questions and provides thorough answers appropriate for that audience. | Demonstrates a general understanding of the potential reader and uses vocabulary and arguments appropriate for that audience. | Demonstrates some understanding of the potential reader and uses arguments appropriate for that audience. | It is not clear for whom the author is writing. |
| **Grammar and Spelling** | Author makes no errors in grammar or spelling that distract the reader from the content. | Author makes one or two errors in grammar or spelling that distract the reader from the content. | Author makes three or four errors in grammar or spelling that distract the reader from the content. | Author makes more than four errors in grammar or spelling that distract the reader from the content. |
| **Capitalization and Punctuation** | Author makes no errors in capitalization or punctuation, so the essay is exceptionally easy to read. | Author makes one or two errors in capitalization or punctuation, but the essay is still easy to read. | Author makes a few errors in capitalization and/or punctuation that catch the reader's attention and interrupt the flow. | Author makes several errors in capitalization and/or punctuation that catch the reader's attention and interrupt the flow. |

# A Trip to the Park

It's your birthday and you get to pick where you want to go with your family for a vacation. Your mom looks at your budget and decides you can spend $1,000 on this vacation. Your folks want you to go stay with your old Aunt Nellie. You, of course, want to go where you can fish, hike, ride a train, see a canal, go to a concert, see a play, go to a museum and see the countryside. You've heard about the Cuyahoga Valley National Park and decide that this is where you want to spend your time. Your mom says you must convince her it's worth your time and money to take this trip.

1. Who is going on your trip? You must take your mom or dad or both. You can also take one friend. Your friend can be your partner on this activity.

   Names of who is going _____

   Number going _____ Number of days _____

2. Now you have to decide where to go. On the Internet, visit Places to Go at www.generationscvnp.org to find out the things you can do and see in the park. Make your decisions on where you would like to go and determine how much it will cost you. Your mom says you may stay one to three nights, depending on how much money you spend.

3. List the places where you think you would like to go and why. The places in the list that follows all require you to spend some money. Go to the Web site listed above to determine how much each will cost:

   - Blossom Music Center
   - Boston Mills/Brandywine Ski Resort
   - Cuyahoga Valley Scenic Railroad
   - Hale Farm and Village
   - Porthouse Theatre

4. There are plenty of activities that do not require money, such as hiking and biking on the Towpath Trail, visiting Brandywine Falls, going to the park's visitor center, seeing the Frazee House or Peninsula Historic Village or visiting locks along the canal way. You can find links to these sites on the Places to Go Web page. You must make at least five choices.

## My List of Places to Visit

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

5. Now determine the cost using information from the Places to Go Web page.

| **Places You Want to Go — Admission Costs** | | | | |
|---|---|---|---|---|
| Site | No. of People | Cost for One Person | Cost for All | Total Cost |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | TOTAL | |

6. Select the type of food you want to eat. Use any combination of the prices below:

| Food | | | | |
|---|---|---|---|---|
| **Site** | **No. of People** | **Cost for One Person** | **Number of Days** | **Total Cost** |
| **Fast Food** | | | | |
| Breakfast | | $5 | | |
| Lunch | | $5 | | |
| Dinner | | $7 | | |
| | | | | |
| **Nice Restaurant** | | | | |
| Breakfast | | $9 | | |
| Lunch | | $9 | | |
| Dinner | | $17 | | |
| | | | | |
| | | | | |
| | | | TOTAL | |

7. Now select your choice of lodging. Regardless of the number of people, there will only be one cost for lodging.

| Lodging | | | |
|---|---|---|---|
| **Site** | **Cost Per Day** | **Number of Days** | **Total Cost** |
| | | | |
| Bed and Breakfast | $250 | | |
| Regular Hotel | $125 | | |
| Camping | $35 | | |
| | | | |
| | | TOTAL | |

8. Print out a copy of the map of the Cuyahoga Valley National Park from the Web site, http://www.nps.gov/cuva/index.htm.

9. First mark where you are going, then plan your trip through the park by drawing your route on the map.

10. Determine how far your journey will be. Use the scale at the bottom of your map. Try to stay on the roads or trails as much as possible when figuring your route.

| | **Name the Stop** | **Miles Between Stops** |
|---|---|---|
| Stop 1 | | |
| Stop 2 | | |
| Stop 3 | | |
| Stop 4 | | |
| Stop 5 | | |
| Stop 6 | | |
| Stop 7 | | |
| Stop 8 | | |
| Stop 9 | | |
| Stop 10 | | |
| | | |
| | Total Miles | |

Write a paragraph with at least three sentences that will make your mom think you've made wise choices.

# GENERATIONS

## cuyahoga valley national park

**Preserve and Protect**

# Science

www.generationscvnp.org

Tom Jones

Bruce Winges

# Wildlife Habitats

## Overview

Students will discuss the habitat requirements of white-tailed deer, a native Ohio species with high population densities in Cuyahoga Valley National Park. As a class or in groups, they will visit a nearby habitat and do a scientific investigation of the area to determine if it could be a deer habitat.

## Standards Addressed

**Grade 7, Science — Life Science, Diversity and Interdependence of Life**

*06-08 Benchmark*

C. *Explain how energy entering the ecosystems as sunlight supports the life of organisms through photosynthesis and the transfer of energy through the interactions of organisms and the environment.*

Y2003.CSC.S02.G06-08.BC.L07.I03 / Diversity and Interdependence of Life

03. Explain how the number of organisms an ecosystem can support depends on adequate biotic (living) resources (e.g., plants, animals) and abiotic (non-living) resources (e.g., light, water and soil).

*06-08 Benchmark*

D. *Explain how extinction of a species occurs when the environment changes and its adaptive characteristics are insufficient to allow survival (as seen in evidence of the fossil record).*

Y2003.CSC.S02.G06-08.BD.L07.I04 / Diversity and Interdependence of Life

04. Investigate how overpopulation impacts an ecosystem.

**Grade 8, Science — Scientific Inquiry**

*06-08 Benchmark*

B. *Analyze and interpret data from scientific investigations using appropriate mathematical skills in order to draw valid conclusions.*

Y2003.CSC.S05.G06-08.BB.L08.I03 / Doing Scientific Inquiry

03. Read, construct and interpret data in various forms produced by self and others in both written and oral form (e.g., tables, charts, maps, graphs, diagrams and symbols).

## Procedure

Deer pictures are available at www.generationscvnp.org/photos.aspx.

1. Begin the class by discussing white-tailed deer facts.

2. Use a KWL chart. Ask the students to include physical facts, statistics regarding population, etc., about the animals.

3. Students can either read the White-tailed Deer student handout first and then have a discussion or conversely, have the discussion listed below and check their facts with the student handout.

4. Discuss and/or brainstorm the habitat requirements for white-tailed deer, such as forest, meadows, fields and city parks.

5. Discuss requirements for food. In the summer, they include a variety of leaves, herbs, grasses, corn, acorns, nuts, apples and berries. Food items in the winter might include buds, twigs from trees and shrubs and farm crops such as soy and alfalfa.

6. Review the species' needs for shelter, including tall shrubs, grasses, brushy edges of fields and forests, conifer thickets and even swamps.

7. Do the same for water sources.

8. Discuss signs of deer habitation, including tracks, droppings, rubs, scrapes, feeding activity and bedded areas. The amount and depth of research can vary dependent upon your time allocation.

9. Hand out copies of the White-tailed Deer Habitat Evaluation Worksheet. Ask the students to rate their own community for deer habitation using this sheet. They can do this either individually or as a group. If possible, students might visit Cuyahoga Valley National Park and use the rating tool for this habitat.

10. Continue discussion about problems associated with the present overpopulation of white-tailed deer within Ohio, the Cuyahoga Valley and their own community.

11. Review the fact sheet about white-tailed deer and discuss possible differences in deer management philosophies between the mayor of a community, for example, and the head of a national park. How do these differences affect the deer?

## Evaluation

This activity is meant to foster discussion. You may use the rubric below to evaluate the lesson.

| CATEGORY | 10-8 | 7-6 | 5-3 | 2-0 |
|---|---|---|---|---|
| **Level of Engagement in Class** | Student proactively contributes to class by offering ideas and asking questions more than once per class. | Student proactively contributes to class by offering ideas and asking questions once per class. | Student rarely contributes to class by offering ideas or asking questions. | Student never contributes to class by offering ideas or asking questions. |
| **Listening Skills** | Student listens when others talk, both in groups and in class. Student incorporates or builds off the ideas of others. | Student listens when others talk, both in groups and in class. | Student does not listen when others talk, both in groups and in class. | Student does not listen when others talk both in groups and in class. Student often interrupts when others speak. |
| **Preparation** | Student is almost always prepared for class with assignments and required class materials. | Student is usually prepared for class with assignments and required class materials. | Student is rarely prepared for class with assignments and required class materials. | Student does not engage in activity and/or supplies obvious incorrect answers with no thought process. |
| **Class Task (Evaluation Worksheet)** | Student strives to achieve successful completion of all tasks. | Student completes most of the questions and/or tasks with successful thought. | Student does not engage in thoughtful answers. | Student does not engage in activity and/or supplies obvious incorrect answers with no thought process. |

### Paragraph Evaluation Rubric

| CATEGORY | 4: Above Standards | 3: Meets Standards | 2: Approaches Standards | 1: Below Standards |
|---|---|---|---|---|
| **Evidence and Examples** | All of the evidence and examples are specific and relevant, and explanations are given that show how each site to visit supports the author's position. | Most of the evidence and examples are specific and relevant, and explanations are given that show how each site to visit supports the author's position. | At least one of the pieces of evidence and examples is relevant and has an explanation that shows how the site to visit supports the author's position. | Evidence and examples are not relevant and/or are not explained. |
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# White-tailed Deer

## The National Park Service Organic Act, 1916

The Organic Act of 1916 is an important law to park managers because it established and governs the National Park Service:

> *"… The service thus established shall promote and regulate the use of the federal areas known as national parks, monuments and reservations hereinafter specified by such means and measures as conform to the fundamental purpose of the said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."*

## Background

Cuyahoga Valley National Park has its own law established in 1974 that spells out its mission. The CVNP law prohibits public hunting on park-owned land. Other landowners within the Cuyahoga Valley allow deer hunting to protect natural habitats within various metro parks or agriculture crops on private farms. Different laws and policies apply to different landowners.

Ohio's whitetails, as white-tailed deer are sometimes called, are perhaps the state's best-known wildlife species. The deer are seen in state wildlife areas, parks and nature preserves, as well as in backyards and running across roads. Whitetails have commonly been used by hunters for food and have not always been as abundant as they are today. There was a period of time (1904-1923) when deer hunting was not regulated and the deer were extremely rare. In the 1920s and 1930s, some deer were introduced into the area. Also, deer came into Ohio from neighboring states. Today there are deer in all 88 counties of Ohio.

## Description

Whitetails have two seasonal coats. The spring/summer coat is reddish-tan and short-haired. The winter coat is more grayish, with heavy, long hairs for insulation. White patches are found around the eyes and on the throat, belly, tail and inside of the legs. The deer are especially known for their antlers.

The buck grows its first set of antlers when it is a year old. Each year the antlers begin growing in the early spring. They are covered with a thick, velvety skin that contains nerves and blood vessels. In the fall the blood supply to the antlers ends and the buck rubs them against trees and rocks. The result is a shiny, hard antler. In a sound environment, antlers grow to a massive size. Deer in poor habitat not only appear thin, but also have smaller antlers. In Ohio, bucks shed their antlers in December and January following the fall breeding season.

Adult males weigh between 130-300 pounds and females weigh between 90-210 pounds.

## Habitat and Habits

One reason why the deer population in Ohio has increased is that their preferred habitat has increased. As Ohio land developed, mature forest and extensive wetlands were replaced by today's mix of forest fragments, old fields, suburban lawns and agricultural fields.

Whitetails are most active at night, but they're busy at all times of day. They are not very vocal, but scientists have found that they make about 13 different sounds. Hearing, sight and smell are well developed. These senses go a long way in helping deer survive. Hearing and smell help them determine when other species are around. Smell helps them find food. Being a prey species, their eyes are on the sides of their heads, which allows them to see almost all the way around their body. They flash their white tail to signal danger.

Whitetails like a lot of different foods. Their diet varies throughout the year, depending on what is most abundant. They eat leafy plants, wild fruits, vegetables and some woody plants.

In CVNP, browsing deer have had a major impact on plant diversity, altering the forest ecosystem. The national park has fewer native tree seedlings, shrubs and wildflowers than scientists would expect in a healthy ecosystem.

## Reproduction and Care of the Young

Courtships begin in mid-October. Bucks will chase the does for five or six days before mating and then stay with her for a few days afterward, keeping other males away. Then the male will move on and breed with other does. Does are pregnant for about 200 days. In the spring, does give birth to a single fawn the first time they give birth. After that, most adults have twins and occasionally triplets. Does often return to the same place every year to give birth. Fawns are born with their eyes open and can walk within an hour or two. They nurse two or three times a day. The mother and fawn stay together until the following spring. Young does stay in the general area of their mothers, but young bucks disperse from where they were born in search of mates. Most Ohio deer-vehicle accidents occur from October to December, as morning and evening commuters encounter deer on the move during the mating season.

## Management Plans

White-tailed deer are perhaps the most managed wildlife species in the state. Deer are many things to many people. They are game fare and trophies to hunters, a prized addition to the land by some nature enthusiasts, a threat to crops by farmers and a road hazard to motorists. To better understand CVNP's deer management issues, read the handout Too Many Deer?

*Ohio deer information is adapted from ODNR Division of Wildlife: Life History Notes White-tailed Deer. Publication 101 (R503)*

# White-tailed Deer Habitat Evaluation Worksheet

Name _____

Location _____

Date _____

Weather _____

## A. Habitat Description

1. Habitat type — check all that apply:

| | | | |
|---|---|---|---|
| ___ | Young forest | ___ | Row crop field |
| ___ | Intermediate aged forest | ___ | Pasture field |
| ___ | Mature forest | ___ | Hay field |
| ___ | Pond | ___ | Abandoned field |
| ___ | Stream | ___ | Forested wetland |
| ___ | River | ___ | Wetland meadow |
| ___ | Orchard | ___ | Suburban neighborhood |
| ___ | Mowed lawn | ___ | Suburban park |

2. Brief description of habitat:

## B. Food

1. Abundance of woody browse available (twigs and leaves):

    ____ None or very rare
    ____ Isolated seedlings
    ____ Scattered seedlings
    ____ Abundant seedlings
    ____ Available on all of site

2. Abundance of plants that produce soft mast (berries, fruit):

    ____ None or very rare
    ____ Isolated individuals
    ____ Scattered small patches
    ____ Abundant in patches
    ____ Available at most of site

3. Abundance of trees that produce hard mast (nuts and acorns):

    ____ None or very rare
    ____ Isolated individuals
    ____ Scattered small patches
    ____ Abundant in patches
    ____ Available at most of site

4. Agricultural crops:

    ____ Corn
    ____ Soybeans
    ____ Alfalfa
    ____ Other _____

5. Describe any other sources of food:

## C. Cover

1. List and describe sources of cover for the following:

   Fawn protection _____

   Winter weather _____

   Escape from hunters _____

2. Evergreen cover from both trees and shrubs is extremely important during winter. Record the abundance of both evergreen trees and shrub cover:

   ____ None or very rare

   ____ Isolated individuals

   ____ Scattered small patches

   ____ Abundant in patches

   ____ Available at most of site

## D. Water

1. List the water sources present and describe size (e.g. stream, pond, wetland, vernal pool):

## E. Signs

1. Note all deer signs observed while making habitat evaluation and describe:

   ___ Tracks _____

   ___ Droppings _____

   ___ Rubs _____

   ___ Scrapes _____

   ___ Feeding activity _____

   ___ Other _____

## F. Score

On a scale of 1 to 4, rate the habitat for white-tailed deer:

1: poor — the species would have a difficult time surviving here.

2: fair — habitat provides some of the necessary food, cover, water and space.

3: good — habitat provides almost all of the necessary food, cover, water and space.

4: excellent — habitat provides all the necessary food, cover, water and space.

Habitat score for white-tailed deer: _____

Explain how you arrived at the rating for the habitat that you evaluated:

Name(s) _____

# Deer Management

There are several different philosophies about the management of the deer population. Write what you believe the philosophy of each of these groups would be.

| | |
|---|---|
| **Farmer** | |
| **National Park Biologist** | |
| **Hunter** | |

Write your opinion on this subject below.

If you managed your study site, would you want more or less deer to live there and why?

J.D. Reiser

J.D. Reiser

# Water and Land Reclamation

## Overview

In the first part of this lesson, students will simulate the amount of water on the earth and look at the part of that water that is fresh and available for human use. The second and third parts of the lesson will help students understand water and land reclamation.

## Standards Addressed

**Grade 7, Science — Earth and Space Science, Earth Systems**

*06-08 Benchmark*

*C. Describe interactions of matter and energy throughout the lithosphere, hydrosphere and atmosphere (e.g., water cycle, weather and pollution).*

Y2003.CSC.S01.G06-08.BC.L07.I04 / Earth Systems

04. Analyze data on the availability of fresh water that is essential for life and for most industrial and agricultural processes. Describe how rivers, lakes and groundwater can be depleted or polluted becoming less hospitable to life and even becoming unavailable or unsuitable for life.

**Grade 7, Science — Science and Technology, Understanding Technology**

*06-08 Benchmark*

*A. Give examples of how technological advances, influenced by scientific knowledge, affect the quality of life.*

Y2003.CSC.S04.G06-08.BA.L07.I01 / Understanding Technology

01. Explain how needs, attitudes and values influence the direction of technological development in various cultures.

Y2003.CSC.S04.G06-08.BA.L07.I02 / Understanding Technology

02. Describe how decisions to develop and use technologies often put environmental and economic concerns in direct competition with each other.

## Materials

Water Demonstration:

- Faucet or jug with a pinhole large enough to drip water
- Bucket
- Salt
- Container
- Measuring cup
- Eyedropper
- Globe or world map

Water Reclamation:

- Three clear 2-liter bottles
- Oil
- Liquid soap

## Procedure

### Part 1: Water Demonstration

(adapted from Virginia Department of Education, *Lessons From the Bay*)

1. Set up a demonstration area in the classroom with water containers, salt, an eyedropper and a globe or world map. Fill one container with one liter of water. Write "1 liter = 1000 ml" on the board. With each subsequent step, write the measurements on the board in the form of a mathematical statement, when appropriate. You may choose to ask students to assist in this demonstration.

2. Before proceeding with the demonstration, place a bucket underneath a dripping faucet and note the time. Allow the faucet to leak throughout the lesson; the results will be used at the end of the class. (If a faucet is not available, you can suspend a gallon jug over the bucket. Prick the bottom of the jug with a pin or small nail to allow drops to escape.)

3. Tell students that the one liter of water represents all the water on the earth. Have a student pour 30 ml of the water into a second container. Ask students what they think the remaining 970 ml represents. Pour a tablespoon of salt into the 970 ml of water to help students see that this water represents the oceans. Remind them that ocean water is unfit for human consumption and that the 30 ml of water poured out represents all of the fresh water in the world.

4. From the container holding the 30 ml of water, have another student pour 6 ml into a third container. The 24 ml left represents all of the earth's fresh water that is "locked up" or frozen at the earth's poles and therefore unusable.

5. The third container with 6 ml of water represents the water that is not in the oceans and not part of the ice caps. Ask students if they believe the water represented by the 6 ml is usable. Ask what might make the water unusable. *(Some of it is polluted; some is trapped underground and unreachable.)* Ask students to estimate how much of that 6 ml is actually usable.

6. With the eyedropper, put one drop of water into a fourth container. Explain that the drop represents all the usable water available on earth — 8.4 million liters per person.

7. Next, turn off the dripping faucet (or remove the jug), and record the length of time that the faucet or jug dripped.

8. Measure how much water dripped in the amount of time you designated, and show the students how easily water can be wasted.

## Part 2: Restoring the Cuyahoga River

Cuyahoga River pictures are available at www.generationscvnp.org/photos.aspx.

1. Ask the students what they know about the Cuyahoga River. Expect to get answers about its name and about it catching on fire. Distribute the CVNP handout Cuyahoga River Recovers and the Considering the Cuyahoga student handout.

2. Have the class read Cuyahoga River Recovers. Ask a few students to fill the bottles about half full of water. Talk about the role oil and other pollutants played in the famous 1969 Cuyahoga River fire.

3. Instruct the students to write down on the Considering the Cuyahoga handout what they think would happen if you added one cup of oil to one bottle of the water. (*The oil and water will separate.)* Pour the oil in the water and shake it up. Liquids that don't mix are called *immiscible.*

4. Repeat the process using one cup of liquid soap. Ask the students to write what they think will happen. *(Soap will mix with water, but bubbles will form.)* The water is clear, but is it clean? Liquids that mix with each other are called *miscible*.

5. With the third bottle, prepare to add one-half cup of oil and then one-half cup of liquid soap. Ask the students to write what they think will happen. *The oil will mix with the soap and then with the water. This shows that oil might be present and we wouldn't know. The water is clear, but is it clean?*

6. A 9½-minute video is available at http://wheredoesitgo.org/it.htm that shows what happens to waste water from homes and from the environment.

7. Ask the students to make a list of ways they can protect and conserve water. They could read the CVNP Watershed Stewardship handout and/or visit the following sites:

    a. **Environmental Activities** by the Ohio Environmental Protection Agency: http://www.epa.gov/kids/water.htm

    b. **Global Rivers Environmental Education Network:** http://www.earthforce.org/section/programs/green

## Part 3: Restoring the Land

Krecji Dump pictures are available at www.generationscvnp.org/photos.aspx.

1. Share the following background information with the class:

    **The National Park Service Organic Act, 1916**

    *"…The service thus established shall promote and regulate the use of the federal areas known as national parks, monuments, and reservations hereinafter specified by such means and measures as conform to the fundamental purpose of the said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."*

    Ever since the Apollo space missions so graphically showed us how finite the planet Earth is, people have altered the way they think about our home planet. No more can we take what we want from the land and then, when finished, just leave the debris and scars behind.

2. Explain to the students that they're going to do a simulation to illustrate the concept of "preserve and protect."

3. Distribute the Restoring the Land student handout. Have the students read the introductory paragraphs.

4. Talk about the Krecji Dump site. Show primary source pictures to the class or have students look at them individually on a computer.

5. Discuss what happens to the land when it is used by people and not left alone. Discuss the concept of climax forest as the mature stage of natural forest for its environment. In Ohio, this would be the growth of oak, maple, beech and other large trees.

6. Have the students work with a partner and number the five stages of succession to the climax forest. *The order is 3, 1, 2, 5, 4.*

7. After a few minutes, go over the correct answers. Discuss why this is the order of growth. Compare this natural process to the work Cuyahoga Valley National Park has done to restore the Krecji Dump site. Here, the land was so polluted that most of the soil had to be removed. Eventually, the property will be reshaped and replanted with native vegetation.

8. Ask the students to make a list of ways they can protect land from pollution.

9. As a class, compile a list of ways that students can be more green for both land and water use.

10. Use the Restoring the Land student handout as an activity to foster discussion. Students can use the checklist in the handout to evaluate their work on this topic.

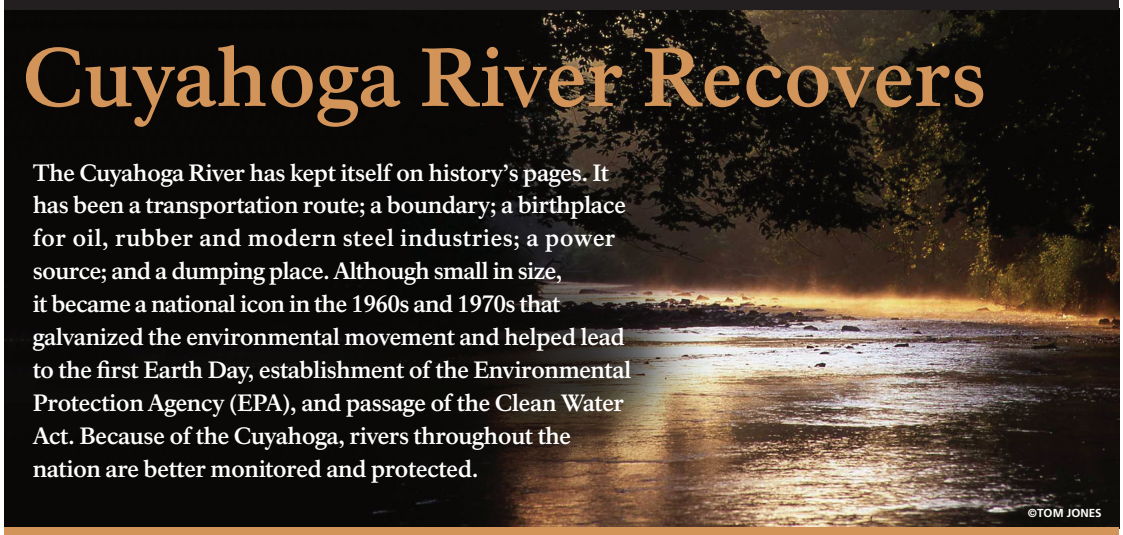
# Cuyahoga Valley

National Park Service
U.S. Department of the Interior

Cuyahoga Valley National Park

# Cuyahoga River Recovers

The Cuyahoga River has kept itself on history's pages. It has been a transportation route; a boundary; a birthplace for oil, rubber and modern steel industries; a power source; and a dumping place. Although small in size, it became a national icon in the 1960s and 1970s that galvanized the environmental movement and helped lead to the first Earth Day, establishment of the Environmental Protection Agency (EPA), and passage of the Clean Water Act. Because of the Cuyahoga, rivers throughout the nation are better monitored and protected.



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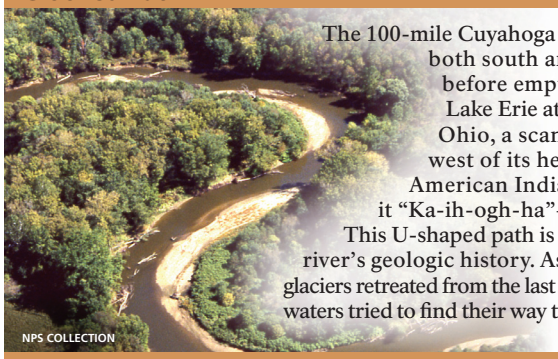
## Crooked Path



NPS COLLECTION

The 100-mile Cuyahoga River flows both south and north before emptying into Lake Erie at Cleveland, Ohio, a scant 30 miles west of its headwaters. American Indians called it "Ka-ih-ogh-ha"—crooked. This U-shaped path is due to the river's geologic history. As melting glaciers retreated from the last ice age, their waters tried to find their way to Lake Erie, wandering south until they hit the north-south continental divide at Akron and then turning sharply north and burrowing into an ancient river bed filled with glacial debris.

Today the river drains 813 square miles of land in portions of six counties. The Cuyahoga has rural beginnings in Geauga County, yet its lower river basin is one of the most densely populated and industrialized urban areas in North America.

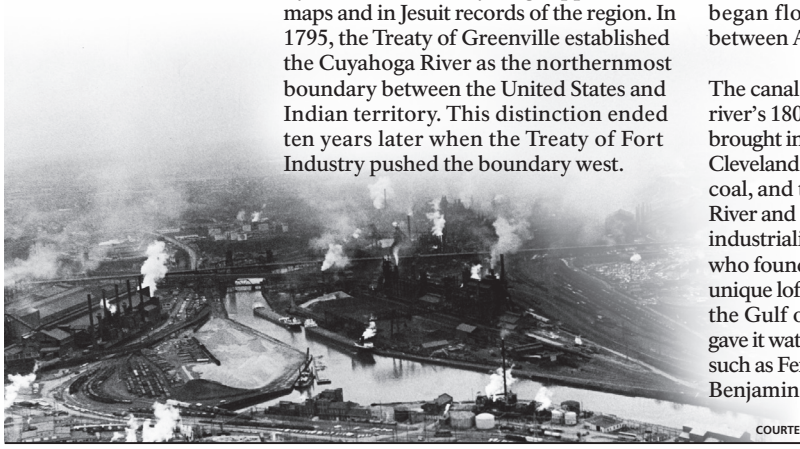
## History of Commerce

The importance of the Cuyahoga River to people begins with the American Indians who used it for thousands of years in their trade routes that reached throughout much of North America. Indians could leave the Cuyahoga River and portage eight miles overland on the old Portage Path through Akron to connect to the Tuscarawas watershed, the Ohio River, and the Mississippi River.

By the 1600s, the Cuyahoga appeared on maps and in Jesuit records of the region. In 1795, the Treaty of Greenville established the Cuyahoga River as the northernmost boundary between the United States and Indian territory. This distinction ended ten years later when the Treaty of Fort Industry pushed the boundary west.

As the young nation expanded, settlers moved to the lands known as the Western Reserve which surrounded the river. Living here was initially a challenge because it was hard to move people and goods, and malaria was common. Men of vision foresaw the vast Ohio country's potential, if only transportation could be improved. The river, falling some 395 feet in 38 miles, was unsuitable for transportation, but its water could be used to fill a more reliable system: the Ohio & Erie Canal. Cash and commerce began flowing when the canal opened between Akron and Cleveland in 1827.

The canal's unique location alongside the river's 180-degree turn and rapid fall soon brought industrialization to Northeast Ohio. Cleveland was at the crossroads of iron ore, coal, and the confluence of the Cuyahoga River and Lake Erie, making it attractive to industrialists such as John D. Rockefeller who founded Standard Oil there. Akron's unique lofty position on the divide between the Gulf of Mexico and the Great Lakes gave it water power that brought industries such as Ferdinand Schumacher's oats and Benjamin F. Goodrich's rubber.



COURTESY/CLEVELAND PRESS COLLECTION

## Flames Spark a Movement

1952 blaze.
COURTESY/CLEVELAND PRESS COLLECTION

Industrialization came at a cost. The Cuyahoga River began to transport industry's waste and the growing cities' sewage. As early as 1863, the river was recorded as muddy and murky in Cleveland. The Cuyahoga is now famous as the river that burned, but few realize how early and often it did so: in 1868, 1883, 1887, 1912, 1922, 1936, 1941, 1948, and 1952. The latter caused nearly $1.5 million in damage.

However, it was the June 22, 1969 fire that helped galvanize the national environmental movement. Ironically, this fire was modest in scale and initially attracted little attention. A railroad trestle near the river's mouth caused debris such as floating logs and picnic benches to pile up. A passing train with a broken wheel bearing likely provided the spark that ignited both the debris and the oil floating on the water. The fire burned only 24 minutes—too quick for the Cleveland *Plain Dealer* to get a photograph. Fame came later when *Time* magazine ran an article about the incident in its August 1 issue, widely read because of the cover story on the Chappaquiddick scandal. The article described the Cuyahoga as the river that "oozes rather than flows" and in which a person "does not drown but decays." This, coupled with an oil spill in California that year, became rallying cries for America to protect its waterways.

The event helped spur an avalanche of pollution control activities resulting in the Water Quality Improvement Act of 1970, the Clean Water Act of 1972, the Great Lakes Water Quality Agreement, and creation of state and federal Environmental Protection Agencies. The fire helped inspire the first Earth Day. The historical significance of the Cuyahoga River was recognized in 1998 when it was designated an American Heritage River.

## The Cuyahoga's Comeback

©SARA GUREN

NPS COLLECTION

©TOM JONES

The Cuyahoga is making a comeback. Its first 25 miles are biologically rich and designated as a state scenic river. Recreational opportunities are available in Cuyahoga Valley National Park (CVNP), state and county parks, and the Ohio & Erie Canalway. Communities are removing obsolete dams to improve oxygen levels and fish movement. Several stretches between Akron and Cleveland—the most polluted section—have met some or all of the goals set by the Clean Water Act. Industries and cities discharge far fewer toxins into the river. Within CVNP, nesting bald eagles have returned to Cuyahoga County after over 70 years, a potent symbol of renewal.

However, the region still needs to better manage the quality and quantity of storm water pulsing down the watershed into the river. Some cities have older storm drains that empty into their sewage system. During heavy rains, treatment plants cannot handle the volume and must discharge into the river before sewage is fully treated. This happens just upstream from CVNP. The city of Akron and the Northeast Ohio Regional Sewer District plan to spend more than $1.3 billion to correct this, but that may take decades. The U.S. Geological Survey and the National Park Service are studying new methods of rapidly assessing the amount of sewage-related bacteria in the water, so CVNP can say when the river is safe for recreation.

Another problem is pesticides, fertilizers, oils, soil, and debris washing off built areas into nearby creeks and eventually the river. Channelization, urban sprawl, and the loss of wetlands and headwater streams have diminished the watershed's natural ability to slow and filter polluted storm water.

Damage from recent floods has caused CVNP, nearby communities, and others to work together to find solutions. Watershed planning partnerships are forming. The Cuyahoga River's Remedial Action Plan (RAP), created as part of a bi-national effort to restore the Great Lakes, and other organizations are educating residents on how to be more effective watershed stewards. Within CVNP over 3,500 students per year participate in the residential program at the Cuyahoga Valley Environmental Education Center, spending four days learning about watersheds and sustainable practices.

Once a source of shame, the Cuyahoga is now an inspiration, demonstrating how people can heal a damaged river.

Cuyahoga Valley National Park

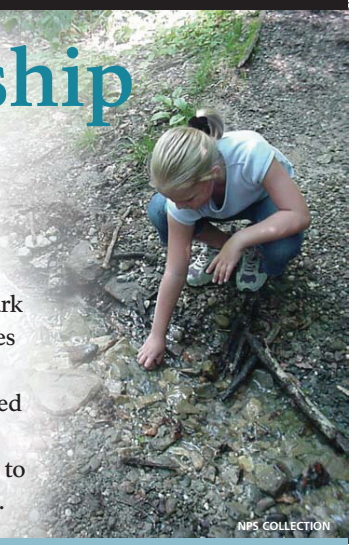
www.nps.gov/cuva
www.dayinthevalley.com

# Cuyahoga Valley

National Park Service
U.S. Department of the Interior

Cuyahoga Valley National Park

# Watershed Stewardship


NPS COLLECTION

"The need for better care of our watersheds is becoming increasingly apparent to both citizens and public officials," notes Cuyahoga Valley National Park (CVNP) Superintendent John Debo. "Control of flooding and improving water quality will improve everyone's lives." Forty-four communities impact streams flowing into CVNP; more impact the river. Park scientists have documented how upstream development puts park resources at risk. The July 2003 flood caused over $3 million in damages to CVNP's railway, Towpath Trail, and other historic structures. Others also experienced dramatic losses. This and subsequent floods have focused attention on the need for better cooperation among communities and government agencies to better steward local watersheds. The following are strategies to achieve this.

## Form Watershed Planning Partnerships


NPS COLLECTION

A watershed is the area drained by a stream, river, or lake. Its boundaries cross political boundaries. Actions upstream greatly affect those downstream.

Effective storm water management takes regional cooperation in the form of watershed planning partnerships. Communities taking part in watershed partnerships benefit from greater access to technical assistance, research data, and state incentives. They also develop solutions unique to their distinct circumstances. Watershed partnerships should be locally led, have a wide range of public participation and support, and involve local policy makers. Examples include the partnerships formed in Chippewa Creek, Brandywine Creek, and Yellow Creek watersheds.

## Protect Streams and Wetlands


©BRUCE WINGES

Although the population of Northeast Ohio has changed little in decades, fewer people live in cities and more live in what was once the countryside. People have expanded human infrastructure, such as roads, housing developments, and shopping plazas, at the expense of nature's *green infrastructure*, such as streams, wetlands, and rivers. Protecting green infrastructure is less expensive than replacing it with costly storm drains, culverts, and retention basins that have long-term maintenance costs and are less effective in slowing and filtering storm water especially during peak flows.

First, communities can **preserve headwater streams**, the little waterways high up in the watershed that represent about 80% of Ohio's streams. These are the capillaries of nature's circulatory system. Because they are small (typically draining less than one square mile), may dry out in summer, and are usually not protected by regulation, headwater streams are often ditched, channelized, moved, or buried in pipes. When headwater streams are damaged, water flows quicker and with more force downstream.

The second is to protect riparian corridors, the strips of forest and wetland along streams and rivers that ideally stretch from headwaters to mouth. Riparian plants perform a variety of jobs: reducing bank erosion, filtering pollutants, providing wildlife habitat, cooling water so it holds more oxygen, and reducing flood damage by slowing storm water. Communities can **pass riparian setback ordinances** that place zoning restrictions on the types of development permitted in riparian corridors. Necessary setback distances vary according to the drainage area of the stream. Property owners can help by limiting mowing within setbacks.

Third, communities can **pass wetland setback ordinances** to ensure that areas adjacent to all wetlands are not developed in harmful ways. Ideal setback distances vary according to wetland quality. Wetlands occur where excess water naturally pools. Their special plants and soils absorb, slow, and filter storm water while acting as a nursery for wildlife.


## More Open Space, Less Pavement

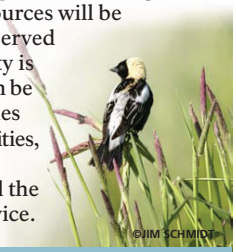
Natural, open spaces are attractive, provide wildlife habitat, and act as sponges to absorb rainwater and limit flooding. Development usually leads to more impervious surfaces—areas that water cannot infiltrate such as buildings, parking lots, roads, and sidewalks. CVNP research shows that areas with higher imperviousness have decreased watershed quality. Other scientific data show increases in storm water runoff, erosion, sedimentation, stream channelization, and degradation of stream habitat and biodiversity accompany greater imperviousness.

One solution for community planners is **compact development**: development concentrated in certain areas to relieve pressure on open space elsewhere. Compact developments can create attractive living spaces for community growth but with less environmental harm. These are best suited for places targeted for redevelopment or near existing development.

**Conservation development** is another option. It tries to maximize open space and protect resources within a given development without decreasing the number of housing units. Smaller lot sizes and more natural area reduces the impervious "footprint." Conservation developments tend to have high property values, as residents are willing to pay more to enjoy both the scenic and recreational value of open space. Many communities have experimented with open space design through regulations that lack specific requirements for the open space configuration. To be more effective, the zoning should include specific standards, including at least a 40% open space requirement emphasizing large blocks of quality habitat, and defined permitted uses.

**Low-Impact Development** (LID) is a toolbox of techniques to better manage water onsite by mimicking the water retention of natural areas. LID tools can be used by any land owner, at any scale. They include pervious paving, bioretention cells, rain gardens, and landscaping with native plants. Communities can encourage or require through ordinance that developers incorporate LID principles into their required storm water management plans.

Lastly, individual property owners can establish **conservation easements**, legal agreements that allow them to maintain ownership while ensuring that the property's resources will be protected and preserved even if the property is sold. Easements can be held by many parties including communities, non-profit land conservancies, and the National Park Service.




## Local Wetland Mitigation


When construction damages a wetland, the contractor has to build or improve wetlands somewhere else. Mitigation projects are best done locally but often are not. Encourage or require developers to coordinate with local entities to identify nearby mitigation projects.

CVNP has a variety of wetland and stream mitigation project opportunities.

To learn more about all these topics, visit www.nps.gov/cuva/naturescience and click on Watershed Stewardship. Here you will find links to other resources.

Cuyahoga Valley National Park

www.nps.gov/cuva
www.dayinthevalley.com

Name_____

# Considering the Cuyahoga

At a Kent State University symposium in 1969, researchers described the Cuyahoga River in Cleveland as follows:

> "The surface is covered with the brown, oily film observed upstream as far as the Southerly Plant effluent. In addition, large quantities of black, heavy oil floating in slicks, sometimes several inches thick, are observed frequently. Debris and trash are commonly caught up in these slicks, forming an unsightly floating mess."

> "The lower Cuyahoga has no visible signs of life, not even low forms such as leeches and sludge worms that usually thrive on wastes."

| Added to Water | What I Think Will Happen | What Actually Happened |
|---|---|---|
| Oil | | |
| Liquid soap | | |
| Oil and soap | | |

List at least five ways you can help protect our rivers and streams.

# Cuyahoga Valley

National Park Service
U.S. Department of the Interior

Cuyahoga Valley National Park

## Krejci Dump: A Story of Transformation


NPS Photo.


NPS Photo.

Have you ever been past the area fenced with signs indicating toxic materials along Hines Hill Road? If you have, what you noticed is the site of the Krejci Dump.

During peak operation, the Krejci Dump contained among the nation's most toxic materials, including polychlorinated biphenyls (PCB's), polycyclic aromatic hydrocarbons (PAH's), arsenic, and other carcinogenic wastes. In addition to being as serious concern to human health, these materials pose a serious threat to the surrounding resources in a national park setting.

Efforts are being made to complete a full remediation of the Krejci Dump. Clean-up and transformation of this site shows the importance Cuyahoga Valley National Park (CVNP) places on resource protection and stewardship.

### History

Krejci Dump, operated by the Krejci family as a salvage yard and a dump, accepted municipal and industrial wastes from 1948 until 1980. In 1985, the National Park Service (NPS) gained control of the site and invited the U.S. Environmental Protection Agency (EPA) to conduct a detailed analysis of the waste materials. In May of 1986, CVNP closed the site to the public to ensure visitor safety and to help prevent further damage to the natural resources.


NPS Photo.

The U.S. EPA initiated the first action towards site clean-up in 1987; CVNP took over the process in 1988. Past cleanup efforts have primarily dealt with removing the on-site exposed wastes and barrels.

In 1997, the National Park Service initiated efforts in accordance with the Comprehensive

| | | |
|---|---|---|
| | Environmental Response, Compensation and Liability Act (CERCLA) to file litigation on behalf of the Department of the Interior | against the potentially responsible parties to fund the clean-up. |
| Current Cleanup Efforts | In September 2005, the removal of all remaining contaminated materials and soils commenced to ensure that the National Park Service resource protection standards are met. After 2 years of work, the initial excavation and removal of 234,213 tons of contaminated soil was completed in September 2007. Cleanup | verification sampling of the soil is currently underway to assess whether remediation goals have been met and to determine if further excavation is necessary. Ford Motor Company is coordinating the clean up and paying most of the costs as a result of a legal settlement with the NPS. |
| Future Prospects | Instead of seeing a contaminated dump closed to the public or a grass-covered cap that would need to be mowed forever, think of what it might be like to visit a place that has been transformed into a wetland or a forest. Such a place will be the Krecji Dump site in the future. In order to achieve this result, careful grading and re-vegetation will occur using native plants. In addition, surface water and ground water sources will be monitored for at least two years. | Once the area returns to a natural setting, imagine all the ways this place will be able to be appreciated. To some it may serve as an important study area for researchers or classes with school children. Others may appreciate this place as a natural area blending in with the other natural settings in Cuyahoga Valley National Park. However you choose to enjoy this site in the future, it will be preserved and protected by the National Park Service for the appreciation of future generations. |
| | Cuyahoga Valley National Park (CVNP) encompasses 33,000 acres along the Cuyahoga River between Cleveland and Akron, Ohio. Managed by the National Park Service, CVNP combines cultural, historical, recreational, and | natural activities in one setting. For more information call (216)524-1497 or (800)445-9667 or visit www.nps.gov/cuva or www.dayinthevalley.com. |

Cuyahoga Valley National Park

EXPERIENCE YOUR AMERICA™

Name(s) _____

# Restoring the Land

If left untouched, much of the land in northeast Ohio would be forested. The "climax forest" represents the mature stage of natural forest specific to a certain region. In Ohio, the predominant vegetation is oak, maple and beech trees. Most of Ohio's mature forest was cut in earlier centuries so that the land could be used for agriculture, industry and housing. Even in Cuyahoga Valley National Park, most of the forest is secondary growth, meaning that the trees have grown back on land that was once cleared.

Succession is a natural process by which one community of plants replaces another over time. If forested land has been cleared and then left alone, pioneer species are the first to grow back. In time, taller plants shade out the shorter ones. Number in order the stages of forest succession, starting from bare ground to the climax forest. The beginning vegetation should be #1.

Land has no vegetation.

_____Small shrubs are growing.

_____Grasses and other non-woody plants are growing.

_____Seeds dispersed by wind and animals begin to grow.

_____Main vegetation is oak, beech, maple and other trees.

_____Small, sun-loving trees are growing.

Climax forest for northeast Ohio is growing.

## Krejci Dump

Sometimes people pollute the land as they use it. In the early years of Cuyahoga Valley National Park, the National Park Service bought lots of land to create the new park. Some of these properties needed to be cleaned up before visitors could enjoy them. One such property was the Krejci Dump.

The Krejci family owned and operated a salvage yard and a dump on Hines Hill Road from 1948 until 1980. During this time, the dump accepted municipal and industrial wastes. In 1985 the national park gained control of the site and invited the Environmental Protection Agency to conduct an analysis of it. What they found was shocking. During peak operation, the Krejci Dump contained among the nation's most toxic materials, including polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), arsenic and other carcinogenic wastes. In addition to being a serious concern to human health, these materials posed a serious threat to surrounding natural resources. In 1986, CVNP closed this site to the public to ensure safety.

The first steps in restoring the land involved removing barrels and other waste laying on the surface. After that was gone, the land was still polluted. By 2007, 234,213 tons of contaminated soil was removed. More soil removal needs to happen until tests show that the property is clean again. Once that work is complete, crews will carefully reshape the landscape and replant native vegetation, transforming the site into a wetland or a forest. Over time, natural processes such as succession can occur again.

By restoring damaged land and water, CVNP is living up to its mission to preserve and protect.

With a partner, list at least three ways you can be more green by protecting land from pollution.

Check the boxes that tell how you arrived at ways you can help protect the land.

| | | |
|---|---|---|
| **Background Research** | | I used a variety of helpful resources. |
| | | I found recent materials so my information is up to date. |
| | | I used only reliable resources. |
| | | I used resources that listed facts. |
| | | I collected enough information to get a good understanding of my topic. |
| | | I wrote down where I got each piece of information. |
| | | I correctly cited all resources used in the final project. |
| **Relating Concepts** | | I know how this project relates to what we are studying. |
| **Partner Work** | | I worked well with my partner. |
| | | I showed respect and support for my partner. |
| | | I listened to my partner's ideas. |
| | | I did my share of the work. |
| | | I contributed both time and effort. |




# GENERATIONS

## cuyahoga valley national park

**Preserve and Protect**

# Social Studies

www.generationscvnp.org

Ted Toth


Lynette Spraque-Falk

# Cuyahoga Valley National Park's Towpath Trail

## Overview

Students will learn about the Towpath Trail, which follows the Ohio and Erie Canal through Cuyahoga Valley National Park. They also will learn about primary and secondary sources of research materials.

## Standards Addressed

**Grade 6, Social Studies — Skills and Methods**

*06-08 Benchmark* — *B. Organize historical information in text or graphic format and analyze the information in order to draw conclusions.*

Y2003.CSS.S07.G06-08.BB.L06.I02 / Thinking and Organizing

02. Analyze information from primary and secondary sources in order to summarize, make generalizations and draw conclusions.

Y2003.CSS.S07.G06-08.BB.L06.I03 / Thinking and Organizing

03. Organize information using outlines and graphic organizers.

**Grade 8, Social Studies — Geography**

*06-08 Benchmark* — *B. Define and identify regions using human and physical characteristics.*

Y2003.CSS.S03.G06-08.BB.L08.I01 / Places and Regions

01. Compare places and regions in the United States as they existed prior to 1877 with the same places and regions today to analyze changes in land use and population, political, social and economic characteristics.

## Materials

- Computers with Internet access

## Procedure

Pictures of the Towpath Trail, canal and Valley Railroad are available at www.generationscvnp.org/photos.aspx.

1. Introduce the concept of primary and secondary sources:
   - **Primary Source:** A document, recording or other source of information that was created at the time being studied by an authoritative source, usually one with direct personal knowledge.
   - **Secondary Source:** A document or recording that relates or discusses information originally presented elsewhere.

2. Show some examples of primary source material:
   - **Born in Slavery:** http://memory.loc.gov/ammem/snhtml
   - **Ohio Memory** http://www.ohiomemory.org

3. Use the following information to introduce the students to the Towpath Trail:

   The Towpath Trail follows the Ohio and Erie Canal through Cuyahoga Valley National Park. Horses and mules used to travel the trail as they pulled the canal boats from place to place. It is now used by people as a means for recreation and exercise. People ride bikes, walk, jog and enjoy nature along the trail. Along the way they can learn about the history of the area by looking at the old locks of the canal system, reading outdoor exhibits or visiting the many historical sites along the way.

4. Distribute the Towpath Sites chart.

5. Have students work with a partner. They need to find information about the past and the present of the Frazee House and Valley Railroad.

6. Using the Internet and available resources, have students find the necessary information to fill out the Towpath Sites chart.

7. Depending on the amount of time available for this lesson, you could have students share their information with the class in multiple ways. If you have the time, students could produce PowerPoint presentations with the information and pictures.

**Enrichment:** The best way to end the lesson would be to take the students on the Towpath Trail to several of the locations they researched.

## Evaluation

Depending on how much time you spent on this lesson, you could use the Towpath Sites chart as an evaluation. If you had students do presentations of any kind, those could be evaluated as well.

### Towpath Sites Rubric

| CATEGORY | 4: Above Standards | 3: Meets Standards | 2: Approaches Standards | 1: Below Standards |
|---|---|---|---|---|
| **Evidence and Examples** | All of the evidence and examples are specific and relevant, and explanations are given that show how each site to visit supports the author's position. | Most of the evidence and examples are specific and relevant, and explanations are given that show how each site to visit supports the author's position. | At least one of the pieces of evidence and examples is relevant and has an explanation that shows how the site to visit supports the author's position. | Evidence and examples are not relevant and/or are not explained. |
| **Grammar and Spelling** | Author makes no errors in grammar or spelling that distract the reader from the content. | Author makes one or two errors in grammar or spelling that distract the reader from the content. | Author makes three or four errors in grammar or spelling that distract the reader from the content. | Author makes more than four errors in grammar or spelling that distract the reader from the content. |
| **Capitalization and Punctuation** | Author makes no errors in capitalization or punctuation, so the essay is exceptionally easy to read. | Author makes one or two errors in capitalization or punctuation, but the essay is still easy to read. | Author makes a few errors in capitalization and/or punctuation that catch the reader's attention and interrupt the flow. | Author makes several errors in capitalization and/or punctuation that catch the reader's attention and interrupt the flow. |

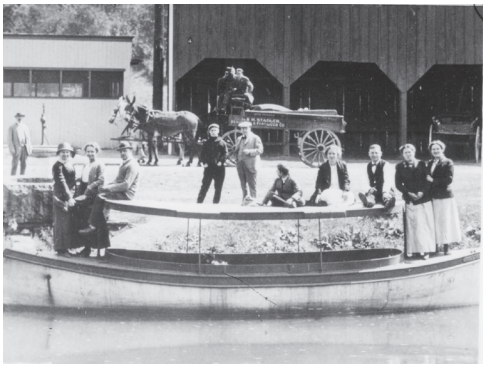
Names _____



# Towpath Sites

Find information about the past and present of the Valley Railroad Frazee House and record your research on the chart below. You may want to look at the primary sources at www.generationscvnp.org for help.

| Site Name | Location | Historical Information<br>Primary Source | Present-Day Information |
|---|---|---|---|
| | | | |
| | | | |



NPS Collection

NPS Collection

# The Ohio and Erie Canal

## Overview

This lesson will provide a historical overview of the importance of the Ohio and Erie Canal. It will give students an idea of what Ohio was like before and after the canal was constructed.

## Standards Addressed

**Grade 6, Social Studies — Geography**

*06-08 Benchmark* *B. Define and identify regions using human and physical characteristics.*

Y2003.CSS.S03.G06-08.BB.L06.I03 / Places and Regions

03. Explain the distribution patterns of economic activities and how changes in technology, transportation, communication and resources affect those patterns, including agriculture.

*06-08 Benchmark* *C. Explain how the environment influences the way people live in different places and the consequences of modifying the environment.*

Y2003.CSS.S03.G06-08.BC.L06.I05 / Human Environmental Interaction

05. Describe ways human settlements and activities are influenced by environmental factors and processes in different places and regions, including bodies of water.

**Grade 8, Social Studies — Geography**

*06-08 Benchmark* *C. Explain how the environment influences the way people live in different places and the consequences of modifying the environment.*

Y2003.CSS.S03.G06-08.BC.L08.I02 / Human Environmental Interaction

02. Analyze how physical characteristics of the environment influenced population distribution, settlement patterns and economic activities in the United States during the 18th and 19th centuries.

## Materials

- 3 x 5” index cards
- Computer with PowerPoint capabilities

## Procedure

1. Open the PowerPoint presentation "Bringing Ohio to the Nation" to Slide 1.

2. Divide student into cooperative groups of three or four students each. Go to Slide 2 and have the groups discuss the scenario.

3. Have a short class discussion about this scenario. Then show students Slide 3 and discuss what life was like during the frontier period of Ohio's history.

4. Show Slide 4. Have the student groups answer the questions on the Bringing Ohio to the Nation student handout. Each group can report their answers to the class. Answers can be recorded for the class to see.

   *Answers:*

   a. What makes this a primary source? *It is from a journal written by a person who is experiencing the trip.*

   b. Describe the writer of the text. *Answers will vary. Look at spelling and grammar. Look at the activities he's doing.*

   c. What does this tell you about the trip down the canal? *Answers will vary, i.e., "It would have been a hard trip" or "land would have been forest."*

   d. *Yes, it is a primary source. Answers will vary, but the picture shows how the animals pulled the canal boats using the Towpath Trail.*

5. Using Slides 5 and 6, have students answer the questions either in small groups or as a class. They should discover that when the goods travel by boat north to Lake Erie, they can move on to Buffalo, the Erie Canal and the Atlantic Ocean. The goods heading south can travel to the Ohio River, then to the Mississippi River, and ultimately to the Gulf of Mexico.

6. Before changing to Slide 7, have students discuss how they think the Ohio and Erie Canal would change the lives of the same family from the original scenario.

7. Show Slide 7 and discuss the drastic changes in the lives of Ohioans after the completion of the canal.

8. Ask the class if Slide 8 could be a primary source. Ask them to describe the advertisement to you. How would it have been distributed? What is the most amazing fact about the ride? *The canal boat goes 307 miles in 80 hours, or less than 4 miles per hour.*

9. **Enrichment Activity:** Distribute the Effects of the Canal handout. Ask students what the chart shows them. With a partner, students can make a graph showing either one of the commodities carried on the canal or all of the commodities. They might use Excel or Create a Graph (https://nces.ed.gov/nceskids/createagraph) for this activity.

10. For an extension, you could discuss the different northeast Ohio industries that were started in part because of the influence of the canal. These include the steel industry in Cleveland and the oat business (ultimately, the Quaker Oats Company) in Akron.

## Evaluation

Toward the end of the class, hand out the index cards to all the students. Instruct them to write one or two items they learned about the importance of the Ohio and Erie Canal to Ohio's early economy. Have them give you the index cards as they exit the room at the end of the class. The cards could be placed on the board so that students could review the information that they learned.

# Bringing Ohio to the Nation PowerPoint Presentation

## The Ohio & Erie Canal: Bringing Ohio to the Nation

Slide 1

## Ohio Frontier Scenario

- You are a farmer near present-day Peninsula, Ohio. The year is 1810. You moved to Ohio from New England in search of fertile soil, which you found. You and your family grow corn and raise pigs. You have plenty to eat, but because Ohio is still a frontier, you don't have anyone to whom you can sell your products. Your family is extremely poor.
- **Discuss the following**: Could you transport your goods using your small wagon and horse? How much could you carry and how long would it take? Could you send your goods along the Cuyahoga River? Why or why not?

Slide 2

## Frontier Ohio

- The few roads that existed were muddy and had ruts.
- While American Indians navigated the Cuyahoga River and other Ohio rivers by canoe, farmers found them challenging due to unpredictable water levels.
- Having to go upstream against the current also slowed river travel.
- Farmers bartered with other nearby farmers for necessities.
- Most farmers lived at or below poverty levels.

Slide 3

## Primary Source — From "Emily Nash: A Girl's View of Growing Up on the Frontier, 1812-1820." Published in *Visions of the Western Reserve*, Robert A. Wheeler, editor. Columbus: The Ohio State University Press, 2000. Pages 127-137.

- **Emily Nash was born in 1806. She started her diary in 1812 when she left Massachusetts for the Western Reserve. She settled in Geauga County. Although this isn't in the Cuyahoga Valley, her experience is very reflective of what happened in the valley. Punctuation and spelling has been corrected.**
- **"There was no road, only marked trees. He drove over big logs. It seemed most impossible to get along with the sled."**
- **"For instead of finding the land flowing with milk and honey we found it flowing with all sorts of wild animals such as bears, wolves, wild cats and snakes of every kind and size, but we are hoping for better times soon. "**
- **"…Mother bought the cow of John Ford and [is] going to pay in spinning and weaving."**

Slide 4

## The Ohio & Erie Canal
**Completed in 1832**


Slide 5

## Where Could the Goods Go?

- Using the Ohio & Erie Canal to take goods north to Lake Erie, where could they go from there?
- Using the Ohio & Erie Canal to take goods south to the Ohio River, where could they go from there?

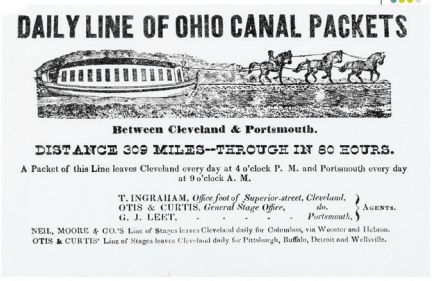
Slide 6

## Ohio After the Completion of the Canal

- The price of wheat near Akron went from $.20 or $.30 per bushel to $.75 by 1833.
- Nails, glass, cloth, salt, coffee and tea from eastern ports were available in the wilderness.
- Ohio's population rose from 580,000 in the 1820s to over 2 million by 1850.
- Farmers and traders in central Ohio could reach markets in New York City on the east coast and New Orleans on the Gulf Coast.

Slide 7

## Primary Source - Advertisement for trip on the canal.




Slide 8

**Names** _____

# Bringing Ohio to the Nation

Read the statement below and answer the three questions listed. The statement is from a speech by attorney Wolsey Wells to welcome Governor Allen Trimble to Akron for opening of the Ohio and Erie Canal on July 3, 1827:

> *"The very spot where your excellency now stands, less than two years ago, was a thick forest. Now, sir, you may here behold comfortable, nay elegant dwellings, large stores and ware-houses, filled with the merchandise of foreign climates and the productions of our own …. and to complete and animate the picture, a busy population industriously pursuing all the various vocations of civilized life – and this interesting scene owes its very existence to the almost magic influence of yonder great work – internal improvement."*

a. What makes this a primary source?

b. Describe the writer of the text.

c. What does this tell you about the trip down the canal?

d. Is this picture a primary source? What does the picture show you?

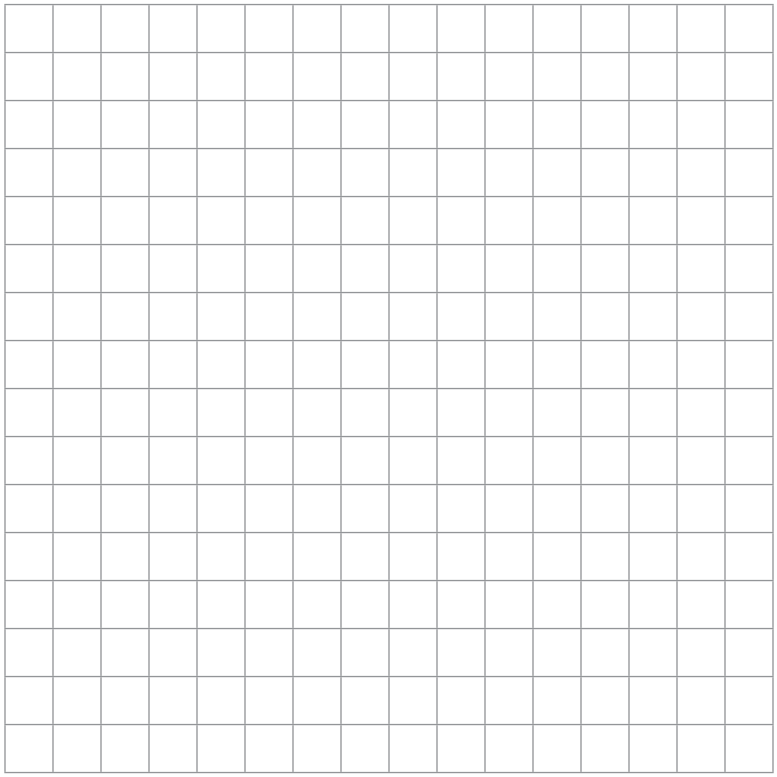
Names _____

# Effects of the Canal

**Commodities arriving in Cleveland via the Ohio and Erie Canal. Excerpted from *Ohio Canal Era: A Case Study of Government and the Economy, 1820-1861*, by Harry N. Scheiber. Athens: The Ohio University Press, 1987.**

| Year | Wheat Bushels | Flour Barrels | Corn Bushels | Coal Bushels |
|---|---|---|---|---|
| 1832 | 289,000 | 54,000 | Not available | 13,000 |
| 1835 | 387,000 | 132,000 | 53,000 | 50,000 |
| 1838 | 1,229,000 | 287,000 | 107,000 | 73,000 |
| 1841 | 1,564,000 | 441,000 | 245,000 | 478,000 |
| 1844 | 977,000 | 494,000 | 264,000 | 540,000 |
| 1847 | 2,196,000 | 657,000 | 1,382,000 | 1,213,000 |
| 1850 | 1,192,000 | 368,000 | 832,000 | 2,348,000 |

Make a graph below using the data from the primary source above. Put the year on the x-axis and the crop on the y-axis.



On the back of this paper, write three sentences that tell about your graph. Tell how you believed the canal impacted the growth of Ohio and the growth of the nation.




# GENERATIONS

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# Language Arts

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# A Trip on the Ohio and Erie Canal

## Overview

Either the entire class or teams of students will work cooperatively to write a play about one day in the life of a boy or girl who is either on a journey or living on a canal boat.

## Standards Addressed

**Grade 7, Language Arts — Writing Process**

*05-07 Benchmark* *A. Generate writing topics and establish a purpose appropriate for the audience.*

Y2003.CEW.S01.G05-07.BA.L07.I01 / Prewriting

01. Generate writing ideas through discussions with others and from printed material, and keep a list of writing ideas.

Y2003.CEW.S01.G05-07.BA.L07.I02 / Prewriting

02. Conduct background reading, interviews or surveys when appropriate.

*05-07 Benchmark* *D. Use revision strategies to improve the overall organization, the clarity and consistency of ideas within and among paragraphs and the logic and effectiveness of word choices.*

Y2003.CEW.S01.G05-07.BD.L07.I06 / Drafting, Revising and Editing

06. Organize writing with an effective and engaging introduction, body and a conclusion that summarizes, extends or elaborates on points or ideas in the writing.

Y2003.CEW.S01.G05-07.BD.L07.I12 / Drafting, Revising and Editing

12. Add and delete information and details to better elaborate on a stated central idea and to more effectively accomplish

*05-07 Benchmark* *G. Apply tools to judge the quality of writing.*

Y2003.CEW.S01.G05-07.BG.L07.I16 / Drafting, Revising and Editing

16. Apply tools (e.g., rubric, checklist and feedback) to judge the quality of writing.

*05-07 Benchmark* *H. Prepare writing for publication that is legible, follows an appropriate format and uses techniques such as electronic resources and graphics.*

Y2003.CEW.S01.G05-07.BH.L07.I17 / Publishing

17. Prepare for publication (e.g., for display or for sharing with others) writing that follows a format appropriate to the purpose, using such techniques as electronic resources, principles of design (e.g., margins, tabs, spacing and columns) and graphics (e.g., drawings, charts and graphs) to enhance the final product.

## Procedure

Photos about canal life are available at www.generationscvnp/photos.aspx.

1. Have the students do a freewrite about the daily life of a boy or girl who lived from 1825-1840 and took a journey on the canal. The students can create their own scenarios for why they were making this journey.

2. Share the freewrites. Discuss and list on the board similarities and differences between daily life now and in the 1800s.

3. Challenge the groups or entire class to create an outline or skeleton of a prose story based on the freewrites. Guide them in the following:
   - Creating at least four characters
   - Developing a believable setting (time and place)
   - Creating and resolving a simple problem using facts gathered previously

4. Once story skeletons have been completed, brainstorm and record on the board the differences between writing prose and writing scripts. If possible, make available to students a copy of each. Be sure to talk about the importance of dialogue and stage directions.

5. Share copies of the Playwriting Checklist. Depending on the ability level of the students, you may need to have one or more lessons about writing plays. The Western Reserve Public Media Web site ***One State, Many Nations*** offers tips for writing plays at www.WesternReservePublicMedia.org/onestate/lp2tips.htm.

6. To help the students through the process of writing a play, distribute the following student handouts to each group (or do this together as a class):
   - Fact Sheet: Information You Might Use in Your Play
   - The Playwriting Process
   - Developing Characters
   - The Setting, the Plot and the Solution
   - Playwriting Checklist

7. Explain to students that in a script, you first give the speakers name and then what he/she says. You also write any stage direction, such as the setting, the movement on the stage, etc.

8. If time permits, it is great to actually have the students act the plays out. If the plays are not acted out, there should be some sharing process where each group tells the story they have written.

## Evaluation

The final products may be evaluated in a variety of ways. If time permits, the plays can be acted out for an audience. Plays may be presented by reading the scripts rather than acting them out.

The following rubric also may be used.

| Category | 4 | 3 | 2 | 1 |
|---|---|---|---|---|
| **Characters** | Four characters are named and clearly described. Most readers could describe the characters accurately. | Four characters are named and described. Most readers would have some idea of what the characters looked like. | Fewer than four characters are named. The reader knows very little about the characters. | Fewer than four characters are named and no descriptions are given. |
| **Setting** | Many vivid, descriptive words are used to tell when and where the story took place. | Some vivid, descriptive words are used to tell the audience when and where the story took place. | The reader can figure out when and where the story took place, but the author didn't supply much detail. | The reader has trouble figuring out when and where the story took place. |
| **Problem/ Conflict** | It is very easy for the reader to understand the problem the main characters face and why it is a problem. | It is fairly easy for the reader to understand the problem the main characters face and why it is a problem. | It is fairly easy for the reader to understand the problem the main characters face, but it is not clear why it is a problem. | It is not clear what problem the main characters face. |
| **Factual Information** | Many facts about the canal are used, and the information is accurate. | Some facts about the canal are used, and the information is accurate. | Few facts about the canal are used, or the information is inaccurate. | Few facts are used about the canal are used, and the information is inaccurate. |
| **Creativity** | The story contains many creative details and/or descriptions that contribute to the reader's enjoyment. The author has definitely used his or her imagination. | The story contains a few creative details and/or descriptions that contribute to the reader's enjoyment. The author has used his imagination. | The story contains a few creative details and/or descriptions, but they distract from the story. The author has tried to use his or her imagination. | There is little evidence of creativity in the story. The author does not seem to have used much imagination. |

# Freewrite

Think about what you do on a typical day. Wake up? Get dressed? Eat? Go to school? Play? Do homework and chores? Talk on the phone? Watch television?

What kinds of tools do you use to help you on a typical day?

In this freewriting exercise, write about some of the tasks that you do during the day. How do you think your day is different from that of a person of your age who lived in the early 1800s? Think about a young person who might have a reason to be using the canal for transportation.

# Ohio and Erie Canal Fact Sheet

## Canal Boats

1. Three kinds of canal boats traveled the Ohio and Erie Canal: freight, passenger and state maintenance boats.

2. A team of three horses or mules pulled canal boats. Mule skinners had the job of managing the team. They walked alongside the team to make sure the animals kept going. Freight boats often carried an extra team of mules in their middle cabins.

3. The captain usually owned the canal boat and often lived aboard with his family. A 9x12-ft. cabin, located near the stern of the boat, served as the family's home. Captains often could be distinguished from the rest of a crew by appearance, as they sometimes wore military-style jackets and stovepipe hats. Mothers and daughters often performed the domestic activities of the boat such as preparing meals or washing clothes in the canal.

4. Young males often served as mule skinners. Parents tied the youngest children to a post located in the center of the boat to prevent them from falling into the canal.

5. Outgoing freight boats carried farm products and raw materials that often eventually reached markets in the eastern United States. Freight included wheat, corn, flour, whiskey, pork, coal and timber. Incoming boats carried manufactured goods and consumer products such as nails, glass, cloth, salt, coffee and tea.

6. Passenger boats, also called packet boats, transported 40 to 60 passengers. The boats were enclosed and generally possessed a row of windows along each side of the boat. If you spent the night on a passenger boat, your bed was a berth attached to the cabin wall that was stacked three beds high.

7. For navigational and safety purposes, canal boats carried large oil lamps to illuminate the deck after dark.

8. Canal boats measured 14 feet in width and stretched up to 80 feet in length.

9. While traveling through the town of Peninsula, Ohio, aboard a canal boat, one may have caught a glimpse of Robert Andrew in a boatyard as he put the final coat of paint on a recently completed canal boat. Painters brushed the traditional white colored paint on the boat's hull and cabins. The colors red, green or black generally were reserved for the boat's trim and decorations.

## Laws Along the Canal

1. Canal owners avoided speeding fines by traveling slower than the 4-mph speed limit enacted by the State of Ohio to protect the canal banks from erosion.

2. Boat owners proudly displayed their boats' names on their stern. The practice involved more than an owner's pride, however, and actually was required by law. According to Ohio law, a boat was required to have its name and home port "painted in some conspicuous and permanent part of the outside of the boat, in letters of at least four inches in height." Examples of boat names that traveled the Ohio Canal are *State of Ohio*, *St. Helena*, *Two Sisters* and *Monticello II*.

## Locking Through

1. Traveling the section of the Ohio and Erie Canal between Akron and Cleveland required boats to pass through 44 locks. Locks raised or lowered the canal boats from one level of the canal to another. The steersman had the job of making sure that the boat did not bump into the walls of the lock, which could have resulted in great damage to the canal boat or the lock's masonry.

2. In November 1834, President John Q. Adams wrote of the experience of "locking through" on the Ohio and Erie Canal: "The most uncomfortable part of our navigation is caused by the careless and unskillful steering of the boat in and through the locks, which seemed to be numberless, upwards of 200 of them on the canal. The boat scarcely escapes a heavy thump on entering every one of them. She strikes and grazes against their sides, and staggers along like a stumbling nag."

3. Boats traveled north and south along the canal; however, only one boat could pass through a lock at any one time. This meant that people often had to wait to move through a lock. According to Ohio law, the upstream boat had the right-of-way into locks. Canal owners, however, did not always respect the right-of-way. Competitions for the right-of-way sometimes occurred among mule skinners, who grabbed long poles called pikes and climbed atop the lock gates for a joust. The skinner remaining atop the lock gates won both the competition and first access to the lock.

## Accounts of Traveling on a Packet Boat

1. Here is one passenger's description of a trip aboard a boat, which had a gentlemen's cabin, a ladies' cabin and dressing room, a barroom and a kitchen: "Into this space were stowed 35 men, 19 women and 10 children. ... During the day, the beds, consisting of mattresses, sheets, pillows and cotton quilts, were pile one above another. ... The smell of animal effluvia, when they were unpacked, was truly horrid ... they were saturated with the perspiration of every individual who had used them since the commencement of the season." Excerpted from *Ohio and Its People*, George W. Knepper, Ohio: Kent State University Press, 1989, pg. 155.

2. After a trip aboard a packet boat, American author Nathaniel Hawthorne wrote in *The Canal Boat* about experience. He described time aboard the boat as being "so tiresome … that we [the passengers] were driven to the most childish expedients for amusement."

3. One event that Hawthorne found humorous enough to mention was the story of Anon, a Virginian schoolteacher. Anon failed to duck when the captain warned about an upcoming low bridge. In Hawthorne's words, Anon "was saluted by the said bridge on knowledge box." After the passengers discovered no harm had been done, Hawthorne remembered that they "exchanged glances and laughed quietly."

4. Hawthorne described the sleeping quarters for passengers aboard a packet boat in the following passage: "The crimson curtain being let down between the ladies and gentlemen, the cabin became a bed-chamber for 20 persons, who were laid on shelves, one above another. For a long time, our various incommodities kept us all awake, except for five or six, who were accustomed to sleep nightly amid the uproar of their own snoring, and had little to dread from any species of disturbance."

5. Hawthorne described the bunk in which he slept as "hardly so wide as a coffin. I turned suddenly over during the middle of the night and fell like an avalanche on the floor, to the disturbance of the whole community of sleepers."

6. Canal workers waited for their boats to be raised or lowered by locks. Stores and taverns sprang up near locks. The building that is now Canal Visitor Center, located near Lock 38, served as a tavern and store. Members aboard boats took advantage of the opportunity to restock on food and other supplies, as mule skinners took a rest from a long day of walking.

## General Information About Life at This Time

1. Ohio became a state in 1803.

2. Prior to settlement, the land was generally forestland. Many settlers came to Ohio as farmers and had to clear trees to build houses and create fields.

3. Settlements grew around the canal. They included canal-related businesses such as boat-building yards in the villages of Boston and Peninsula.

4. The canal changed economic conditions for farmers. Before the canal, they mostly lived in log cabins. Poor transportation made access to markets to buy and sell goods difficult. People grew or made much of what they needed, or they bartered for necessities. With the canal, people could more easily ship their farm products to market, as well as buy consumer goods.

5. Life expectancy was much shorter than ours. Diseases were common. Malaria, a disease spread by mosquitoes, posed one of the most serious of threats. Those who contracted the disease often noted symptoms of severe chills and high fevers.

6. Deaths of children were common, too, touching many families. Most people died at home rather than in hospitals.

# The Playwriting Process

The first step that you need to know about writing a play is that it truly is a process of discovery. You can't possibly imagine how your play is going to turn out before you write it. In fact, if you choose real-life characters based on people you know, or through research, they will actually write part of the play for you.

All you need to do is put these characters "on stage," give them a problem to overcome and then watch and listen to what they say and do. You become as much a reporter taking notes and recording conversations as a struggling playwright. Remember this as you write your play.

**Setting:** Describe where and when the story takes place.

**Main problem:** What is the main problem faced by the characters in the play? What do they have to do to overcome this problem?

**Complication:** What complication or added problem makes it difficult for the characters to find a solution to the main problem? How can this complication help you to add humor or suspense to your play? What can your characters do or say to help solve or further complicate the situation?

**Solution:** How do the characters finally solve the problem and bring the play to an end?

**Message:** What, if anything, does your play have to "say" about life to your audience? Is there a moral, a lesson, a point?

## Play Structure

A play should begin with a dramatic situation that is so strained and unstable that it leads to action. This action either progresses, delays or reverses the events. Either way, it presents a new situation that is often less stable than the first. This process repeats itself until certain events result in a stable situation. The following is an outline of plot structure:

1. **Opening situation:** The events at the rise of the curtain, including the exposition that gives the background or reveals what has happened before the curtain rises.

2. **Initial incident:** The first event that suggests there will be a change in the situation; an incident to which you can trace all future action.

3. **Rising action:** Additional events leading to the climax.

4. **Climax:** The highest point of emotional intensity that occurs near the end of the play and to which all action has been leading.

5. **Falling action:** After the climax, the brief events in which the outcome is resolved.

# Developing Characters

1. Character name: _____ Age: _____

   Where does the character live? _____

   Describe the family _____

   Favorite activity _____ Least favorite _____

   What is character proud of? _____

   What is character afraid of? _____

2. Character name: _____ Age: _____

   Where does the character live? _____

   Describe the family _____

   Favorite activity _____ Least favorite _____

   What is character proud of? _____

   What is character afraid of? _____

3. Character name: _____ Age: _____

   Where does the character live? _____

   Describe the family _____

   Favorite activity _____ Least favorite _____

   What is character proud of? _____

   What is character afraid of? _____

4. Character name: _____ Age: _____

Where does the character live? _____

Describe the family _____

Favorite activity _____ Least favorite _____

What is character proud of? _____

What is character afraid of? _____

## Possible Characters

- A family: mom, dad, brothers, sisters, etc.
- A friend or two
- Crew of the canal boat (lived on the canal boat):
  - Hoggee — controlled the team of animals that were pulling the boat
  - Tripper — pushed the boat forward and kept it away from the banks using a long pole
  - Cook — cooked only for the crew of the boat

Name(s) _____

Name of the Play _____

# The Setting, The Plot and the Solution

## The Setting

Describe the time and place of the play.

What props will you need?

## The Plot

What is the main problem faced by the characters in the play?

## The Solution

What do the characters have to do to overcome the problem?

# Playwriting Checklist

1. **Characters**

   Our play has

   _____ described at least three traits of each character.

   _____ used a variety of descriptive words to depict all of the characters.

2. **Setting**

   Our play has

   _____ described the time and place of the play.

   _____ used props or background ideas to indicate the setting and create interest (fact-finding research).

3. **Plot**

   Our play has

   _____ followed a reasonable sequence of events.

   _____ included at least one problem and its solution.

   _____ included a surprising or unique event.

4. **Ending**

   Our play has

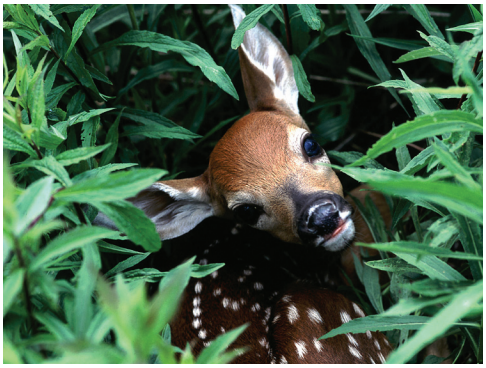
   _____ developed the storyline to an interesting and reasonable conclusion.

   _____ concluded story details so that all events make sense and are complete.

5. **1825-1835**

   Our play has

   _____ shown that we understand what it was like to take a ride down the canal.



Bruce Winges

Ed Toerek

# Writing a Persuasive Essay

## Overview

Clear, thoughtful persuasive discussion is used daily in many different occupations and conversations. This one- to five-day lesson will give students an opportunity for teacher-guided practice and discussion of the persuasive essay. It is based on the management of the white-tailed deer in Cuyahoga Valley National Park.

## Standards Addressed

**Grade 6, Language Arts — Writing**

*05-07 Benchmark* *E. Use persuasive strategies, including establishing a clear position in support of a proposition or a proposal with organized and relevant evidence.*

Y2003.CEW.S02.G05-07.BE.L06.I05

05. Write persuasive essays that establish a clear position and include organized and relevant information to support ideas.

**Grade 7, Language Arts — Writing**

*05-07 Benchmark* *E. Use persuasive strategies, including establishing a clear position in support of a proposition or a proposal with organized and relevant evidence.*

Y2003.CEW.S02.G05-07.BE.L07.I05

05. Write persuasive essays that establish a clear position and include relevant information to support ideas.

**Grade 8, Language Arts — Writing**

*08-10 Benchmark* *E. Write a persuasive piece that states a clear position, includes relevant information and offers compelling evidence in the form of facts and details.*

Y2003.CEW.S02.G08-10.BE.L08.I05

05. Write persuasive compositions that establish and develop a controlling idea, support arguments with detailed evidence, exclude irrelevant information and cite sources of information.

## Materials

- Word processors
- Overhead transparencies for plain-paper copiers

## Procedure

Pictures of deer are available at www.generationscvnp.org/photos.aspx

1. Discuss the meaning of the word "argument," dismissing its negative connotation and establishing it as a word that describes a series of reasons developing to a conclusion.

2. Discuss the many places, occupations and times the ability to make a clear argument may arise in daily life. List examples as a class or in groups that eventually share with the class. The idea is to have students value the art of persuasion and argument rather than see it as an essay they will never write.

3. List as a class or in groups the reasons why arguments or persuasions fail to convince. Make sure students consider faulty facts, overlooked facts, poor presentation and/or poor organization of points, faulty conclusions, lack of factual support and inclusion of unnecessary details. They might also list attributes of the audience such as individual prejudices.

4. In groups, pairs or as a class, read and discuss the Deer in Cuyahoga Valley National Park handout. This fact sheet and writing assignment is set up similar to the Ohio Achievement Test for seventh grade.

5. If you would like, allow time for further research on the topic and have students present what they found.

6. Ask each student to come to a personal conclusion about the management of deer in Cuyahoga Valley National Park. Ask them to put their idea into eight clear words. The number is arbitrary. Often a word limit such as this is helpful because it forces the students to clarify and solidify their thinking. This eight-word phrase should be worked into a thesis statement for the essay.

7. Ask students to identify and write out three supporting reasons that they will be able to discuss in their essays.

8. Survey the class, asking for volunteers to read their belief statement and supporting points. Discuss the appropriateness of the samples as a class.

9. Point out that many students in their age level use hypothetical questions as proof. Use "How would we like it if suddenly the deer bought guns and started shooting us?" as an example. Discuss how questions shift the burden of thought and proof onto the reader, and that they should not be used. Write several examples on the board and practice rewording them as statements. For example, "Would it be kinder to allow the deer to starve slowly?" should be rewritten as "It would certainly not be kinder to allow the deer to starve slowly."

10. Have students write their essays either in class or at home.

11. Encourage peer editing and self-editing as your class has been trained. Hand out copies of the grading rubric so students may evaluate their work.

12. Collect and grade essays. Make overhead transparencies of both good examples and consistent problems for classroom instruction when papers are returned.

## Evaluation

This rubric should be made available to the class members so they can evaluate themselves as they write. If you would like, it can also be used for the final evaluation of the paper if you choose.

| Writing Applications | | | | |
|---|---|---|---|---|
| | **10 points** | **8 points** | **6 points** | **3 points** |
| **Thesis** | Strong, clear, invoking | Strong and clear | Present but poorly stated | Unclear or missing |
| **First Support** | Strong and well discussed | Good with explanation | Present but not developed | Unclear or missing |
| **Second Support** | Strong and well discussed | Good with explanation | Present but not developed | Unclear or missing |
| **Third Support** | Strong and well discussed | Good with explanation | Present but not developed | Unclear or missing |
| **Conclusion** | Strong and uses a comparison | Solid restatement | Present but poorly stated | Unclear or missing |
| **Writing Conventions** | | | | |
| **Syntax** | Varied, solid sentences | Good sentences | Sentence errors | Very few real sentences |
| **Spelling** | Perfect spelling | Good spelling | Poor spelling | Difficult to read due to spelling |
| **Punctuation** | Perfect punctuation | Good punctuation | Poor punctuation | Punctuation hardly used |
| **Grammar** | Perfect grammar | Good grammar | Poor grammar | Grammar impedes understanding |
| **Presentation** | Shows care and pride | Clean work | Some messiness | Sloppy and careless |
| **Totals:** | | | | |
| **Final Grade:** | | | | |

# Deer in Cuyahoga Valley National Park

## General Facts

1. The white-tailed deer reproduces at a relative high rate because it is a prey (not a predator) species.
2. There are very few natural predators of deer in the park. Coyotes only eat young or dead deer. Public hunting is illegal on park property. The law can only be changed through an act of Congress.
3. Current population studies in the park estimate that there are up to 130 deer per square mile in some areas.
4. Deer begin to have a noticeable impact on their surroundings when they reach 10 to 20 deer per square mile.
5. Deer eat native wildflowers, shrubs and tree seedlings in the national park. Their browsing habits allow invasive plants such as garlic mustard to flourish and inhibit the natural forest regeneration.
6. Deer eating the understory vegetation has been linked to fewer ground-nesting songbirds.

## Possible Control Methods

1. No action by the National Park Service — the current situation is allowed to continue.
2. Fencing.
3. Reproductive control.
4. Sharpshooting.
5. Protection of individual plants.
6. A combination of the above.

## Recent Research

1. The research was conducted by The Ohio State University and the National Park Service in Cuyahoga Valley National Park.

2. Scientists wanted to determine the effects of browsing deer on reptiles, amphibians and insects because the deer population is so large.

3. They used 12 fenced sites and 12 unfenced sites of similar qualities.

4. Five one-foot-square wooden boards were placed in each site.

5. Researchers counted vertebrates and invertebrates monthly for two years.

6. Results were surprising and unexpected: three times as many salamanders, nearly six times as many snakes, 11 percent more snails and 14 percent more arthropods (creatures with jointed legs and segmented bodies such as insects and arachnids) were found in the unfenced or deer-grazed sites.

## Considerations

1. Deer might be helpful to some of the populations of vertebrates and invertebrates in the park.

2. Deer droppings may be changing the soil, causing a flourishing of certain plants that attract these insects. The insects themselves may be attracting the salamanders and snakes.

3. The boards in the unfenced/deer-grazed sites may have been the only cover available since the natural plants were eaten more closely, and that could account for the higher numbers of animals found under the boards.

4. Understory vegetation encourages bird populations that feed on the counted species.

5. Controlling the population of the deer may have unseen effects.

6. This is only one study with a small number of study plots. More research would be needed to draw broad conclusions about the impact of deer on other wildlife.

7. The most common species found under boards in unfenced/deer-grazed sites were either exotic, invasive species (e.g., earthworms) or indicators of highly disturbed habitat (e.g., snails, millipedes, sowbugs and garter snakes). These would not be as common in a healthy forest ecosystem. The results could reflect a loss of biodiversity in the study area.

Bruce Winges

Tom Jones

# Writing a Business Letter

## Overview

This one- to three-day lesson will enable students to have teacher-guided practice and review of the formal business letter format.

## Standards Addressed

**Grade 6, Language Arts — Writing**

*05-07 Benchmark*

C. *Produce letters (e.g., business, letters to the editor, job applications) that address audience needs, stated purpose and context in a clear and efficient manner.*

Y2003.CEW.S02.G05-07.BC.L06.I03

03. Write letters that state the purpose, make requests or give compliments and use business letter format.

**Grade 7, Language Arts — Writing**

*05-07 Benchmark*

C. *Produce letters (e.g., business, letters to the editor, job applications) that address audience needs, stated purpose and context in a clear and efficient manner.*

Y2003.CEW.S02.G05-07.BC.L07.I03

03. Write business letters that are formatted to convey ideas, state problems, make requests or give compliments.

**Grade 8, Language Arts — Writing**

*08-10 Benchmark*

C. *Produce letters (e.g., business, letters to the editor, job applications) that follow the conventional style appropriate to the text and include appropriate details and exclude extraneous details and inconsistencies.*

Y2003.CEW.S02.G08-10.BC.L08.I03

03. Write business letters, letters to the editor and job applications that address audience needs, stated purpose and context in a clear and efficient manner; follow the conventional style appropriate to the text using proper technical terms; include appropriate facts and details; exclude extraneous details and inconsistencies; and provide a sense of closure to the writing.

## Materials

- Graded and returned persuasive essays on the management of white-tailed deer in Cuyahoga Valley National Park or, if those aren't available Deer in Cuyahoga Valley National Park fact sheets from previous lesson
- Business envelopes and stamps (or e-mail addresses)
- Word processors
- Overhead transparencies for plain-paper copiers

## Procedure

Pictures of deer are available at www.generationscvnp.org/photos.aspx.

1. Discuss the occasions when a student might write a business letter. Obviously, it will be important in the business realm but with e-mail becoming the norm, business letters may go the way of calligraphy and hand-written letters. They might be used by parents to compliment a teacher, to write letters to editors, to request information or for résumé cover letters. Remind students that until business letters do become obsolete, it is necessary to know the correct format.

2. Discuss the importance of correct format. Students generally think that many of the rules are arbitrary. To counter that assumption, point out a current fashion trend, such as males students not tucking their shirts in. Wearing their shirts tucked in would invite all kinds of humiliation. It is a completely arbitrary and silly fashion rule, but knowing and following it includes and excludes members from the "acceptable" teen group. Compare the fashion rule to the format rules and encourage students to follow them to gain the respect of the group to whom they are writing and thereby lend credence to their requests.

3. Using the supplied Blocked Business Letter example sheet, discuss the various parts of a business letter. Have students take notes or highlight their sheets during discussion.

4. Stress that business letters require a certain tone. Flowery language, sarcastic comments, poetic comparisons and extensive personal feelings or experiences should be left out of this letter. Language should be clear, concise and mature.

5. Business letters should include contact information for the writer.

6. Have students write a letter to the superintendent of Cuyahoga Valley National Park. The letter should be a condensed version of the persuasive essays they wrote regarding the management of white-tailed deer in Cuyahoga Valley National Park. If that topic isn't workable for your classroom, students could write the park requesting information about park careers or other topics of interest. The address for CVNP is: Superintendent, Cuyahoga Valley National Park, 15610 Vaughn Road, Brecksville, Ohio, 44141.

7. If the written work is being completed during class time, help students individually as they write.

8. Encourage peer editing and self-editing as your class has been trained. Hand out copies of the grading rubric so students may evaluate their work.

9. Collect and grade letters. Make overhead transparencies of both good examples and consistent problems for classroom instruction when papers are returned.

10. Suggest papers be reprinted and sent to the national park.

11. Review how to set up, fill and address a business envelope.

## Evaluation

This rubric should be made available to the class members so they can evaluate themselves as they write. It can also be used for the final evaluation of the business letter if you choose.

| Writing applications | | | | |
|---|---|---|---|---|
| | **10 points** | **8 points** | **6 points** | **3 points** |
| **Format** | Perfect format | Good format | Poor format | Unlikely to be read |
| **Focus and Conciseness** | To the point with support | Some wordiness | Unfocused in some areas | Off topic or unclear |
| **Tone and Word Choice** | Perfect for the purpose | Good for the purpose | Poor for the purpose | Silly or immature |
| **Information Presented** | All is topical and correct | Good information | Poor information | False or no information |
| **Business Envelope** | Perfect and neat format | Good format | Poor format | May never be delivered |
| **Writing conventions** | | | | |
| **Syntax** | Varied, solid sentences | Good sentences | Sentence errors | Very few real sentences |
| **Spelling** | Perfect spelling | Good spelling | Poor spelling | Difficult to read due to spelling |
| **Punctuation** | Perfect punctuation | Good punctuation | Poor punctuation | Punctuation hardly used |
| **Grammar** | Perfect grammar | Good grammar | Poor grammar | Grammar impedes understanding |
| **Presentation** | Shows care and pride | Clean work | Some messiness | Sloppy and careless |
| **Totals:** | | | | |
| **Final Grade:** | | | | |

# Blocked Business Letter

- Use Times New Roman in 12-point size.
- Everything lines up on the left margin; nothing is indented.
- Be brief and accurate.
- Realize that your audience is likely to skim. They care only about what you have to say regarding their world.
- If you are too formal, you will alienate your reader. If you are too casual, you will lose credibility.
- The numbers in parentheses indicate how many returns to place after each section.

Your street address
Your city, state and Zip code (4)

January 10, 2009 (2)

Recipient's Name
Recipient's Title
Street Address
City, State  Zip (2)

Salutation with a colon: (2)

The body of the letter comes right to the point by introducing the topic immediately. (2)

Further details can be added then, but they should be crisp and concise. Avoid any tone such as sarcasm or superiority that would make your reader discount and discard your work. Also avoid any sloppiness or casual attitude that would make you impossible to take seriously. (2)

Skipping lines between paragraphs is not only correct format but also helps make the information easier to read. Remember not to indent. (2)

It is wise to close with contact information other than the address typed above. E-mail addresses and phone numbers would go here. (2)

Sincerely, (4)

Your handwritten signature

Type your name after four enters
Your title, if applicable

# GENERATIONS

## cuyahoga valley national park

**Preserve and Protect**

# Art

www.generationscvnp.org

Tom Jones

Bruce Winges

# Contour Line and Tissue Stain Still Life

## Overview

As students become familiar with their natural surroundings, they will learn contour line drawing, a drawing technique designed to increase their observation skills.

## Standards Addressed

**Grades 5-8, Arts, Visual Arts — Connections, Relationships and Applications**

*05-08 Benchmark*

*A. Demonstrate the role of visual art in solving an interdisciplinary problem.*

Y2003.CAV.S05.G05-08.BA.L08.I01

01. Demonstrate different visual forms of representation for the same topic or theme (e.g., expressive, graphic and scientific).

**Grade 7, Science — Life Sciences, Diversity and Interdependence of Life**

*06-08 Benchmark*

*C. Explain how energy entering the ecosystems as sunlight supports the life of organisms through photosynthesis and the transfer of energy through the interactions of organisms and the environment.*

Y2003.CSC.S02.G06-08.BC.L07.I03 / Diversity and Interdependence of Life

03. Explain how the number of organisms an ecosystem can support depends on adequate biotic (living) resources (e.g., plants, animals) and abiotic (non-living) resources (e.g., light, water and soil).

## Materials

- 12x18-in. white drawing paper
- Erasers
- Black Sharpie markers, fine and ultra-fine
- Natural objects such as leaves, pinecones, rocks, sticks
- Art tissue in a variety of colors, precut into approximately 3x3-in. squares
- Water in containers such as large margarine tubs
- Medium paintbrushes
- Markers or watercolors to color the drawing (optional)

## Background

Just as naturalists venture into Cuyahoga Valley National Park and sketch on site, the students will get an opportunity to draw objects in nature found near their school building. When students actively study their physical environment and the myriad of natural objects to be observed, they are more likely to develop a sense of responsibility toward their natural world. It is hoped that this drawing activity will foster appreciation through observation.

When practicing contour line drawing, the artist focuses on the outer edges of an object and while visually following the outside shape, the artist draws one long outline on the paper. For this project, it is not necessary that the outline be continuous; drawing details of the interior of the object is encouraged. There are times when a blind contour (drawing without looking away from the object being drawn) can be useful as a practice for drawing more accurately. For this lesson, blind contour offers a great warm-up exercise. The tissue staining of the drawing will lend a colorful spontaneity to the artwork, adding to the success of the project no matter the skill level of the student.

In this lesson, students will accomplish the following:

- Arrange a still life from natural materials including a variety of sizes and shapes as well as the use of overlapping
- Demonstrate good observation skills through contour line drawing
- Demonstrate the use of careful page design with a drawing that is large enough to run off the edge of the paper, includes interesting negative spaces, and shows attention to details in areas of emphasis
- Follow directions for the successful application of transparent colored tissue to the drawing
- Be able to identify three natural materials found in our local environment

## Procedure

1. Have ready in the classroom collections of natural materials and a finished example of a contour line drawing.

2. Discuss and demonstrate contour line drawing of plants, leaves, etc. If at all possible, take a walk outside — even a short walk around the building. Have students bring a paper and flat surface to draw on with their pencil.

3. Instruct them to look for natural objects to practice drawing using a contour line, paying close attention to the edges of the shape. They will then add some details of the interior. They should not fill in or sketch with short lines, as this is to be contour only. Note: Students are not to damage or remove natural materials.

4. Back in the classroom, students can select items from the previously collected natural materials. They should arrange an individual or collaborative still life that includes a variety of sizes, overlapping of materials and interesting negative spaces.

5. Instruct the students to practice drawing their still life first with the blind contour technique. The artwork usually turns out hilarious-looking. This is a terrific way to reduce the uneasiness that students may feel as they learn to draw, while at the same time improving their observation skills.

6. Students then draw their still life with a regular contour, concentrating on the outer edge of each object as well as some interior details. Encourage drawing largely enough on the page to allow some areas to run off one edge. Remind students to add more detail to the area of emphasis they have chosen for their drawing.

7. Students trace their pencil drawing with black Sharpies, fine or ultra-fine as they choose. Stray pencil lines are erased.

8. Demonstrate and discuss the application of tissue paper to the drawing:
    a. Wet the paper with a brush and water in a small (palm-sized) area.

b. Tear or cut various colors of tissue to overlap (no more than three in one spot).

c. Place the tissue on the wet area and then brush water over the tissue to ensure the transfer of color to the paper.

d. The tissue should dry enough within one hour to fall off and leave a colorful stain on the artwork.

9. Show how colors will mix when overlapped and how those that are opposite on the color wheel create some dull browns and grays, which may or may not be desirable, depending on the student's vision for the project. Have students consider a background color scheme that will contrast with the foreground objects.

## Evaluation

| Task | Score 1-10 |
|---|---|
| Student arranged still life with variety of sizes and overlapping. | |
| Student demonstrated good observation skills through contour line drawing. | |
| Drawing demonstrates thoughtful page design, including interesting negative spaces, details in an area of emphasis and part of the drawing running off edge of paper. | |
| Student carefully followed tissue application procedure and use of color transparency. | |
| Student can verbally identify three natural materials found in our local environment. | |
| **TOTAL** | |

Jim Schmidt

Steve Paddon

# Wild Ohio Animals in Chalk and Glue

## Overview

Students will choose an animal commonly found in Cuyahoga Valley National Park and create a chalk-and-glue drawing of it.

## Standards Addressed

**Grades 5-8, Fine Arts, Visual Arts — Connections, Relationships and Applications**

*05-08 Benchmark*

*A. Demonstrate the role of visual art in solving an interdisciplinary problem.*

Y2003.CAV.S05.G05-08.BA.L08.I01

01. Demonstrate different visual forms of representation for the same topic or theme (e.g., expressive, graphic and scientific).

**Grade 7, Science — Life Sciences, Diversity and Interdependence of Life**

*06-08 Benchmark*

*C. Explain how energy entering the ecosystems as sunlight supports the life of organisms through photosynthesis and the transfer of energy through the interactions of organisms and the environment.*

Y2003.CSC.S02.G06-08.BC.L07.I03 / Diversity and Interdependence of Life

03. Explain how the number of organisms an ecosystem can support depends on adequate biotic (living) resources (e.g., plants, animals) and abiotic (non-living) resources (e.g., light, water and soil).

## Materials

- Books, magazines, printed animal imagery
- 12x18-in. black construction paper
- Elmer's Glue-All
- Color artist's chalks
- Lamination materials

## Optional Materials

- Try a white background paper for a white glue line. When the glue dries to transparency, whatever the background paper color is, that is the color the outlines will remain.

## Background

Students are introduced to the wide variety of animal life found within Cuyahoga Valley National Park. With teacher assistance, they do their own research into the animals and their habitats within the park. A question-and-answer session about the interdependency of animals and plant life within Cuyahoga Valley National Park should be encouraged.

Once students have chosen their favorite animal, they use two challenging media: chalk and glue, to draw it on a black piece of construction paper. Elements of design are reviewed and required. Students are asked to draw their animal largely enough to fill most of the page with an asymmetrical layout. Details of the environment are added, but since glue will be used over the pencil lines, objects must be kept fairly large and simple.

Once the drawing is finished, students carefully trace over their pencil lines with Elmer's Glue-All. Allowed to dry, the glue becomes a plastic outline ready to be filled with colorful chalk. Students are taught how to blend colors of chalk solidly and brightly, and how to create textures for fur, feathers and scales. Once the page is filled with chalk, the glue line emerges as an uneven black outline of the animal and its environment. Laminating the artwork allows the chalk and glue drawing to be safely displayed.

The students will accomplish the following:

- Research and render a wild Ohio animal
- Use the elements of design for drawing and coloring
- Include some details of the environment for the animal chosen
- Carefully follow directions for gluing
- Use chalk solidly and blend at least two colors per area

## Procedure

Lists of animals living in Cuyahoga Valley National Park are available online at http://www.nps.gov/cuva/naturescience/animals.htm. Pictures are also available at www.generationscvnp.org/photos.aspx.

1. Have ready reference materials for student research.

2. Discuss the wild animals of Ohio, focusing on those that can be found in Cuyahoga Valley National Park. Discuss with questions and answers how animals survive within their habitat, and the various ways animals interact and depend upon plant life within the park.

3. Allow students to brainstorm and research on their own with the materials in the art room. Demonstrate drawing animals with geometric shapes or through observations of contours.

4. Students then draw their animal and its environment with pencil on the black construction paper.

5. Demonstrate tracing the pencil lines with white glue. (Students may practice on scrap paper.) The glue bottle tip must be closed down somewhat and touch the paper as it is drawn over the pencil lines. Students should not try to wipe off a mistake; rather, advise them to turn it into something else (possibly with teacher help).

6. Once glue has dried (at least overnight), chalking is possible. Demonstrate chalking in small areas made by the glue using at least two colors blended together (not overlapped) where the colors meet.

7. Fill the entire paper until the only black showing is that which is showing through the now-transparent glue lines.

8. Demonstrate how additional patterns and textures may be added to a solid area of color.

9. Stress the importance of controlling the airborne chalk dust by either tapping off excess or blowing it off away from others. (Advise the students to be mindful of those around them when blowing chalk dust.)

10. Students need to write their names with white chalk on the back of the artwork.

11. Plan on laminating the artwork for the students so that their colorful masterpieces may be safely displayed.

## Evaluation

| Task | Score 1-25 |
|---|---|
| Student researched and rendered a wild Ohio animal. | |
| Student incorporated elements of design for drawing and coloring. | |
| Student demonstrated knowledge of the animal's habitat by including details of the appropriate environment. | |
| Student followed gluing and chalking directions carefully. | |
| **TOTAL** | |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