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ABSTRACT

Kentucky's Mammoth Cave National Park is important because of its diversity of life on the surface and underground. Some of the plants in the park include trees such as oaks, hickories, tulip poplars, sycamores, and many types of bushes. The animal population is also very diverse and includes bats, squirrels, deer, raccoons, opossums, chipmunks, and many birds. The main rocks found in the park are limestone, sandstone, shale, and gypsum. The most important link that ties it all together is the water, the Green River on the surface and the groundwater in the cave. This multidisciplinary activity guide for Mammoth Cave National Park contains activities for students in grades K-3. All the activities in the guide provide detailed instructions for student implementation. The guide consists of three parts: (1) "Subject Chart"; (2) "Setting Chart"; and (3) "KERA Goals Chart." It also included ten activities: (1) "Park Puzzle"; (2) "Mammoth Cave Mobile"; (3) "Nature/Unnature Walk"; (4) "Shapes of the Season"; (5) "Tasty Trees"; (6) "Squirrels Need a Home or Bats Need a Cave"; (7) "A Place Protected"; (8) "Clay Caves"; (9) "Webbing the Wonders"; and (10) "Card Conclusion." (BT)

MAKING CONNECTIONS

A curriculum and activity guide to Mammoth Cave National Park

Gr K-3

The National Park Service

ParkNet

2002

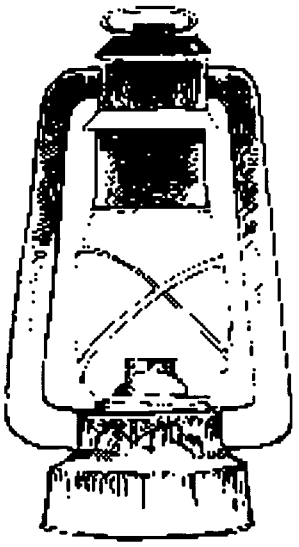
National Park Service
1849 C Street NW
Washington, DC 20240
Phone: (202) 208-6843

www.nps.gov/maca/learnhome/curricula.htm

FREEMAN TILDEN

IF WE CANNOT INTEREST WITH OUR TREASURES THOSE CAREFREE YOUNG PERSONS WHOSE MINDS ARE AT THE HEIGHT OF RECEPTIVITY, HOW CAN WE HOPE TO INTEREST THOSE ADULTS WHO ARE INEVITABLY FOGGED AND BESET BY THE PERSONAL AND SOCIAL WORRIES OF AN UNEASY WORLD?

– FREEMAN TILDEN,
NATIONAL PARK SERVICE



CONTENTS

Subject Chart

Subject ⇩ *Lesson No.* ⇨	1	2	3	4	5	6	7	8	9	10
Art		■		■	■		■	■		■
Career Education	■									
Government							■			
Health										
Language Arts		■			■		■	■	■	■
Mathematics	■	■	■	■	■					
Music										
Physical Education						■				■
Science	■	■	■	■	■	■	■	■	■	■
Social Studies	■									

Setting Chart

Setting ⇩ *Lesson No.* ⇨	1	2	3	4	5	6	7	8	9	10
Indoors	■	■	■	■	■	■	■	■	■	■
Outdoors	■	■	■			■	■	■		■

KERA Goals Chart										
Academic ⇩ *Lesson No. ⇨* Expectations	1	2	3	4	5	6	7	8	9	10
1	■	■	■	■	■	■	■	■	■	■
1.1									■	■
1.2										■
1.3			■	■		■		■		
1.4							■			■
1.5				■						
1.6										
1.7	■	■		■	■			■	■	
1.8				■	■					
1.9										
1.10			■	■					■	
1.11		■			■		■	■		
1.12										■
1.13		■		■						
1.14										
1.15										
1.16										
2	■	■	■	■	■	■	■	■	■	■
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2.2				■		■			■	
2.3										■
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2.31										

KERA Goals Chart										
Academic ⇩ *Lesson No. ⇨* Expectations	1	2	3	4	5	6	7	8	9	10
2.32										
2.33										
2.34										
2.35										
2.36	■									
2.37										
2.38										
3		■		■	■		■	■		■
3.1										
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3.3										
3.4		■		■	■		■	■		
3.5										■
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3.7										
4	■			■	■	■		■	■	■
4.1										■
4.2					■				■	■
4.3								■		■
4.4				■	■			■		■
4.5										
4.6										
5	■	■	■	■	■	■	■	■	■	■
5.1								■		■
5.2			■	■	■		■			
5.3				■	■	■	■	■	■	■
5.4	■	■	■	■					■	■
5.5			■							■
6	■	■	■	■	■	■	■	■	■	■
6.1										
6.2			■			■		■		
6.3	■	■	■	■	■	■	■	■	■	■

LYNDON B. JOHNSON

IF FUTURE GENERATIONS ARE TO REMEMBER US MORE WITH GRATITUDE THAN SORROW, WE MUST ACHIEVE MORE THAN JUST THE MIRACLES OF TECHNOLOGY. WE MUST ALSO LEAVE THEM A GLIMPSE OF THE WORLD AS IT WAS CREATED, NOT JUST AS IT LOOKED WHEN WE GOT THROUGH WITH IT.

PARK PUZZLE

SUBJECTS: Science and Math

GRADES: K-3

KERA GOALS: Meets KERA goals 1, 2, 4, 5 and 6.

ACADEMIC EXPECTATIONS: visualizing, space and dimensionality, becoming a productive group member, decision making, and expanding existing knowledge.

DURATION: One 20-30 minute period

GROUP SIZE: One classroom of students (approximately 24-32 students)

SETTING: Indoors or Outdoors

KEY VOCABULARY: National park, plants, animals, people, rocks

ANTICIPATORY SET: "Has anyone ever been to a National Park before? What parks have you visited?"

OBJECTIVES: The students will be able to: 1) visualize symbols of the National Park Service; 2) become a productive group member while identifying the components of a national park.

MATERIALS:

- Two jigsaw puzzles- one Stetson hat and one Arrowhead
- Four signs saying- plants, animals, people, and rocks
- Two pictures, one of a Stetson hat and one arrowhead (to be acquired from the Environmental Education Coordinator at Mammoth Cave National Park)

BACKGROUND: The first national park, Yellowstone, was established in 1872. This was the first national park in the world. Today there are over 380 different national parks in the United States. This idea, that was born in America, has since spread throughout the world. National parks were developed to protect and preserve both natural and cultural aspects for future generations. They were also established to provide enjoyment to the visiting public. In 1916 the National Park Service was established as a federal agency. For over eighty-five years the American public has fallen in love with its ideals and traditions.

PARK PUZZLE

PROCEDURE:

1. The teacher asks, "When you think of a national park, what things do you think about?" The students may respond with things like: animals, trees, plants, rangers, etc. The teacher many need to encourage them to think about the hat rangers wear and the patch. The teacher shows the students pictures of the ranger's hat and patch. These are symbols that stand for the National Park Service. The teacher should write the students' responses on the blackboard.

2. The teacher asks, "Why are national parks special?" The students should be able to answer, "To take care of animals and plants." The instructor may need to help with the concept that parks take care of the rocks or land found within their boundaries. Rangers help to take care of people that visit the park. Rangers also talk about the people that are important to that park, such as Abraham Lincoln at Abraham Lincoln Birthplace National Historic Site.

3. The teacher reinforces the idea that parks take care of people, plants, animals, and rocks. The teacher explains that these four things are all pieces of what makes up our national parks.

4. The teacher now passes out pieces of wood (parts of the puzzle) to each student. The teacher has the students look at their pieces to see which category (people, plants, animals, and rocks) is on their piece. The teacher places signs in four areas of the room (plants, animals, people, and rocks). The instructor tells the students to go stand next to the sign that matches their picture.

5. The teacher now tells the students that they are holding a piece to one of the symbols. They may have a piece that belongs to the hat or a piece that belongs to the patch (arrowhead). They need to find other people that have pieces like them (similar color) and then put their pieces together with their pictures (of rocks, plants, animals and people) showing.

6. The teacher then talks about how all these things go together to form a symbol of the National Park Service. The students now take apart their puzzle and flip their pieces over. This time put the puzzle together again to see their symbol more clearly.

7. The students return to their seats with their puzzle piece. The class reviews what is protected in a national park and that it is important to take care of them. The teacher collects their puzzle pieces.

CLOSURE: Today we talked about the four reasons that we protect national parks. It is because of these special things that parks are popular throughout the country.

EVALUATION: The teacher is able to evaluate the students as they move to their category and then interact with their group.

EXTENSIONS:

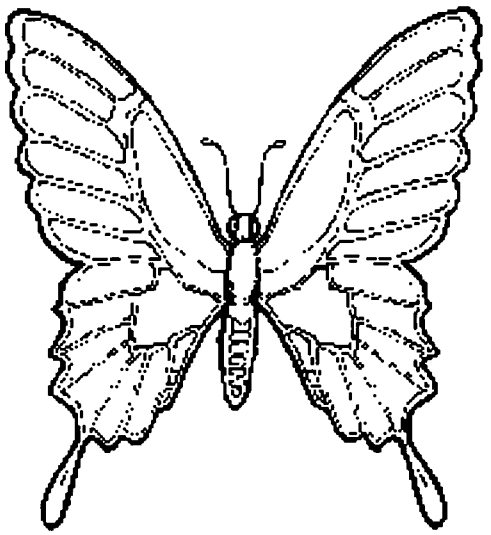
1. Take a look at a U.S. map and talk about parks found in other states. (Ask the Environmental Education Coordinator for a U.S. Map with national parks highlighted.)

2. Write to the national parks in your state and make a classroom display with the information you get in the mail.

3. Find symbols for other jobs within your community and make a chart of them.

RACHEL CARSON

IF A CHILD IS TO KEEP
ALIVE HIS INBORN SENSE
OF WONDER ... HE NEEDS
THE COMPANIONSHIP OF
AT LEAST ONE ADULT
WHO CAN SHARE IT,
REDISCOVERING WITH
HIM THE JOY,
EXCITEMENT AND
MYSTERY OF THE WORLD
WE LIVE IN.



MAMMOTH CAVE MOBILE

SUBJECTS: Science, Math, Language Arts, and Art

GRADES: K-3

KERA GOALS: Meets KERA goals 1, 2, 3, 5, and 6.

ACADEMIC EXPECTATIONS: visualizing; writing; visual arts; space and dimensionality; resourcefulness and creativity; decision making; and expanding existing knowledge.

DURATION: One 30-40 minute period

GROUP SIZE: One classroom of students (1-35)

SETTING: Indoors or Outdoors at tables

KEY VOCABULARY: Mammoth Cave National Park, plants, animals, people, rocks

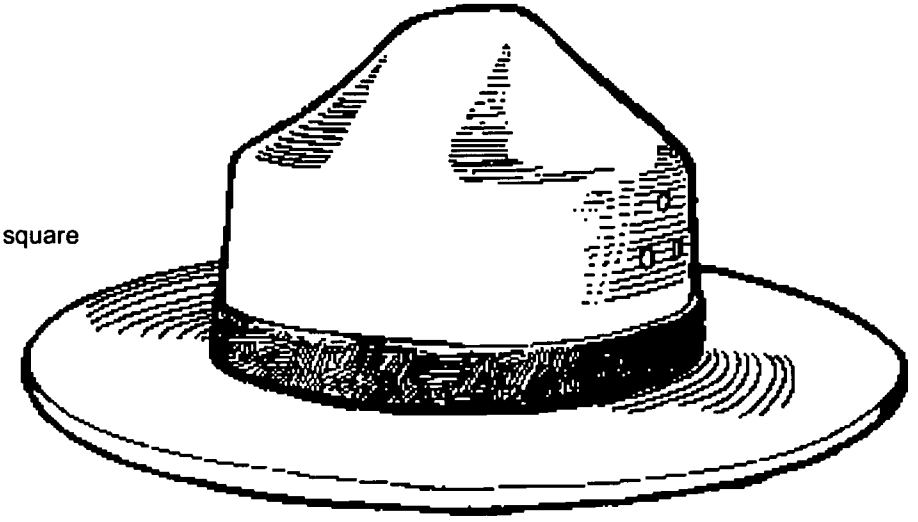
ANTICIPATORY SET: "Does anyone remember what it takes to make a national park?"

OBJECTIVES: The students will be able to: 1. identify the components of a national park and relate them to Mammoth Cave National Park; 2. match pictures with their appropriate titles.

MATERIALS: Each student will need:
- 2 drinking straws (or sticks)
- 6 twelve-inch pieces of string
- a piece of tape,
- a Mammoth Cave Mobile Sheet
- hole punch
- scissors
- crayons
- pencil
- one National Park Service symbol square

BACKGROUND: National parks are established to protect the resources found within their boundaries. These resources include plants, animals, rocks and the land, and people. People include visitors and the people that are important in the parks' history. Each park has significant resources that have helped to establish it as a national park.

Mammoth Cave National Park is important because of its diversity of life on the surface and underground. Some of the plants in the park include trees such as oaks, hickories, tulip poplars, and sycamores. Shrubs commonly found in the park include papaws and the spice bush. Common wild flowers include thistle, bluets, jack-in-the-pulpit, and bloodroot. The animal population is also very diverse. It includes animals such as bats, squirrels, deer, raccoons, opossums, chipmunks and many birds, including wild turkeys. The main rocks found in the park are limestone, sandstone, shale, and gypsum. Some of the people at Mammoth Cave National Park include rangers, visitors, explorers, guides, miners, and prehistoric Indians. These are just a few examples of the many resources in the park that help to make it unique. The most important link that ties them all together would be water-- the Green River on the surface and the groundwater at work in the cave. For more examples or information on these resources, feel free to contact the Environmental Education Coordinator at the park.



MAMMOTH CAVE MOBILE

PROCEDURE:

1. The teacher asks the students to recall what makes national parks important. The teacher writes the categories *plants, animals, rocks,* and *people* on the blackboard.

2. The teacher asks the students to think of a few animals that might be found in Mammoth Cave National Park. The teacher writes their answers under "animals," then does the same thing for each of the remaining categories. The teacher may need to tell the students answers for some of the categories. (It is best to use the answers from the mobile sheet as examples.)

3. The teacher passes out the mobile sheets to the students. They read the directions together. The students need to fill in the blanks on their sheets.

4. The teacher passes out the other supplies that are needed for the project. **Directions:** The students can color their squares and begin to assemble their mobiles. The two straws are crossed in the center and taped together. Glue or tape two pictures from the same category back-to-back. Hang a different category square to each end of a straw. To hang squares, punch a hole in each card so the string can be tied through it (or the string can be taped on). Hang the National Park Service symbol square from the center of the crossed straws.
5. The final step is to hang the mobile in your classroom to decorate the room.

CLOSURE: Today we talked about some of the things that make Mammoth Cave National Park important. As we continue to study about Mammoth Cave National Park we will learn more and more about what makes it very special.

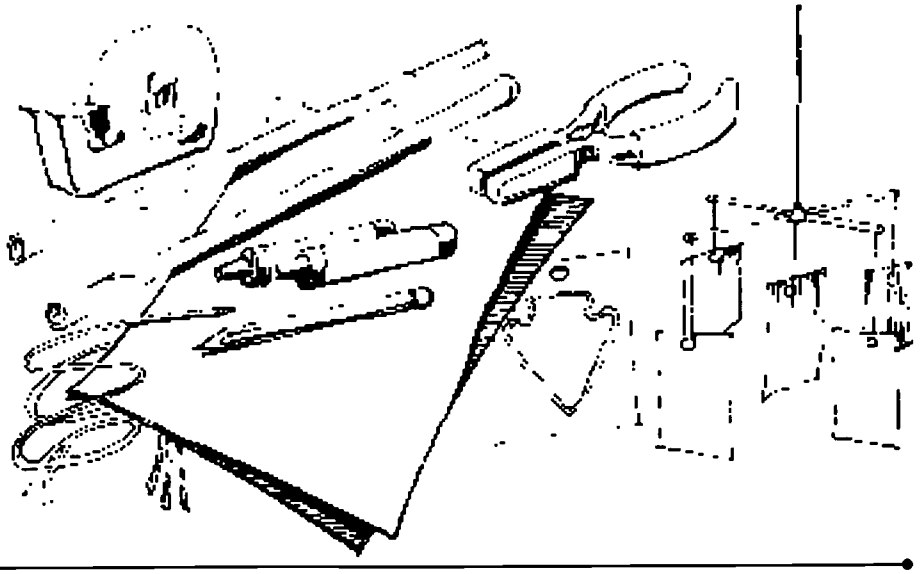
EVALUATION: The teacher is able to evaluate the students by seeing how they label the parts of their mobile.

EXTENSIONS:

1. Instead of using our mobile sheet, have the students draw pictures of plants, animals, rocks, and people that make Mammoth Cave National Park a special place.

2. Make one large classroom mobile with students' drawings of the many different resources found in Mammoth Cave National Park. The class could have more than one of each item under each category.

3. Make a class field guide that has pictures/drawings and names of the plants, animals, rocks and people that might be found in Mammoth Cave National Park. The students could pick just one category or they could do all four. They could be put together in a book to be used during a visit to the park.



DID YOU KNOW THESE FUN FACTS ...

ABOUT PLANTS?

- There are about 900 species of plants identified in Mammoth Cave National Park
- Twenty-one of these plants are listed as endangered, threatened, or of special concern.

ABOUT ANIMALS?

- There are over 200 species of animals found inside Mammoth Cave. Twelve of these species are eyeless, and have no coloration or pigment.
- Three animals are federally endangered species – Kentucky cave shrimp, Indiana bat, and gray bat.
- The Green River on the surface has an unusual diversity of fish, five of which are found nowhere else in the world.

ABOUT PEOPLE?

- Prehistoric people first explored Mammoth Cave around 2,000 to 4,000 years ago.
- In the late 1790s, white settlers rediscovered Mammoth Cave.
- Mammoth Cave has been used by miners, visitors, doctors, explorers, and others for around 200 years.
- Today, Mammoth Cave National Park has around 2.5 million visitors per year.

ABOUT ROCKS?

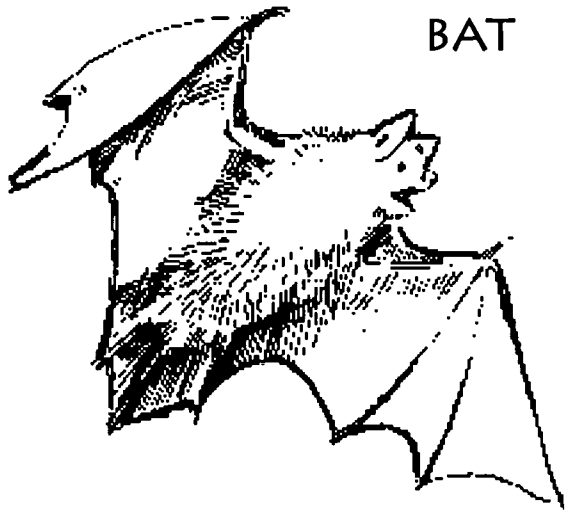
- Limestone is made up of the shells of animals that lived in an ocean millions of years ago.
- Sandstone is made up of sand grains brought into this area by an ancient river.
- The limestone rock found in Mammoth Cave National Park is about 350 million years old. It is older than the dinosaurs.

MAMMOTH CAVE MOBILE

Directions: Choose a word from the list below and use it in the blanks in the picture squares.

ANIMALS PLANTS PEOPLE ROCKS

BAT



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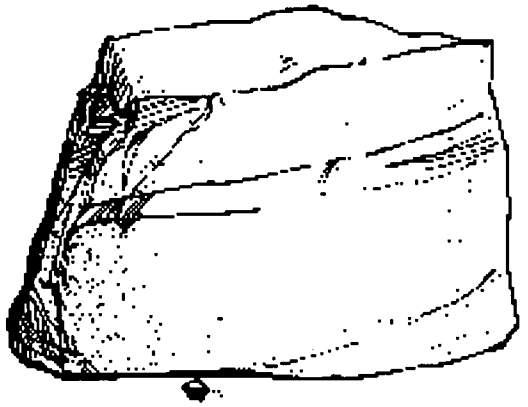
RANGER

_ _ _ _ _ _ _

SANDSTONE



_ _ _ _ _

IRIS

_ _ _ _ _ _

MAMMOTH CAVE MOBILE

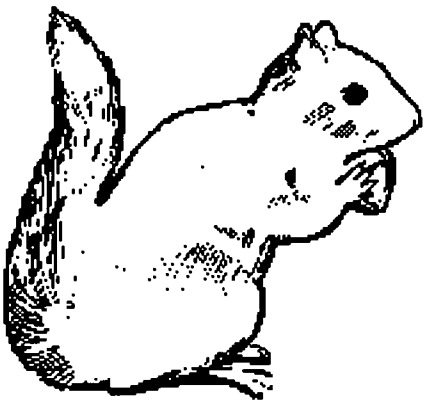
Directions: Choose a word from the list below and use it in the blanks in the picture squares.

ANIMALS PLANTS PEOPLE ROCKS

KIDS

_ _ _ _ _ _

SQUIRREL



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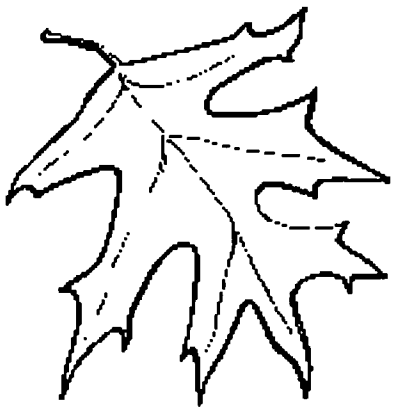
OAK LEAF



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LIMESTONE

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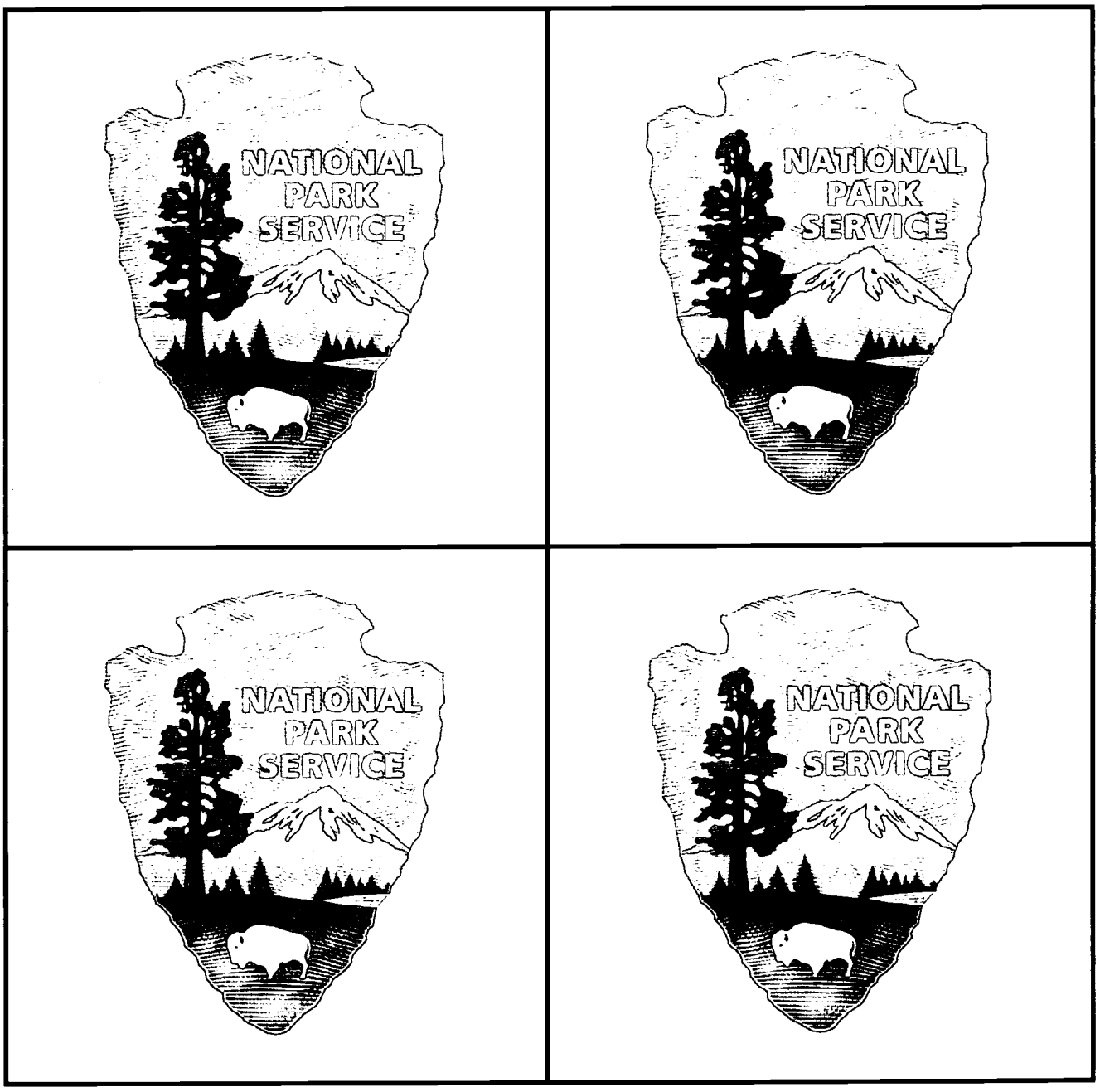
NATIONAL PARK SERVICE SYMBOL SHEET

Each student receives one square.

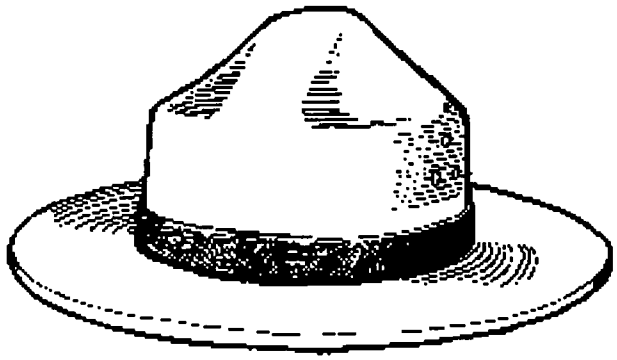


NATIONAL PARK SERVICE SYMBOL SHEET

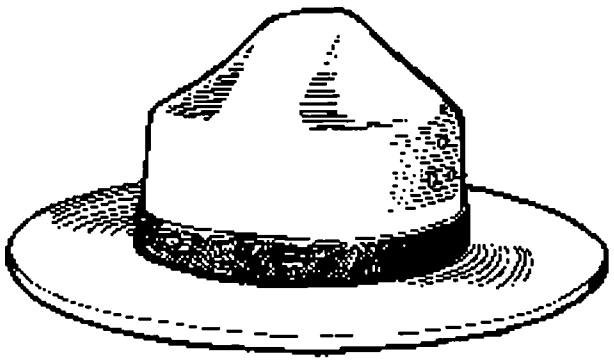
Each student receives one square.

MAMMOTH CAVE
NATIONAL PARK

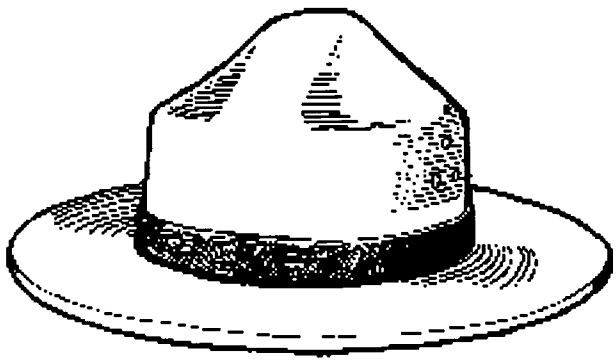
MAMMOTH CAVE
NATIONAL PARK



MAMMOTH CAVE
NATIONAL PARK



MAMMOTH CAVE
NATIONAL PARK



NATURE/UNNATURE WALK

SUBJECTS: Science and Math

GRADES: K-2

KERA GOALS: Meets KERA goals 1,2, 5, and 6

ACADEMIC EXPECTATIONS: application of basic communication and math skills, observing, classifying, thinking and problem solving, decision making, developing new knowledge, and expanding existing knowledge.

DURATION: One 20-40 minute period

GROUP SIZE: One classroom of 25-35 students (or fewer)

SETTING: Indoors or Outdoors

KEY VOCABULARY: nature, natural, un-nature, un-natural

ANTICIPATORY SET: Today we are going to go on a walk. While we are on our walk we will need to keep our eyes open for all the different things we will see!

OBJECTIVES: The students will be able to: 1) make observations of natural and un-natural items; 2) classify items into the categories of what is natural and un-natural.

MATERIALS:
- 6-9 natural items
- 6-9 un-natural items
- a bag to put the items in

BACKGROUND: For this activity it would be good to use items that are found locally. Some natural items you may wish to use would be things like birds' nests, feathers, snail shells, acorns, pine cones, leaves, antlers, animal skulls, turtle shells and others. Some common un-natural items to use could be cans, bottles, newspapers, shoes, balloons, plastic bowls and other man-made items.

PROCEDURE:

This involves going on a short nature walk. Just before the walk begins the instructor places items along the trail. The instructor puts out 12 to 18 items. Remember you can also use items naturally found along the trail. This game develops the idea of what is natural in our world and what is man-made or added by people.

1. To begin the walk with the students the teacher explains that some things are found in nature and some things are not. If we find something that is found in nature then it is a "thumbs up," (make the thumbs up sign with your hand) like a leaf or a flower. If it is something that is un-natural or not found in nature then it is a "thumbs down," (make a thumbs down sign with your hand) like a bottle or litter.

2. The walk now begins. The group makes their way out along the trail. As students find something it is pointed out. The students silently make a decision and hold out their thumbs. Then as a group, they discuss why it is "thumbs up" or "thumbs down" and continue down the trail. This is done for each item found along the trail.

3. At the end of the walk sometimes it is nice to select a student and ask whether people are "thumbs up or thumbs down." Then explain that if people take care of nature they are "thumbs up" and if they don't they are "thumbs down."

This activity can be adapted to a classroom by taking an imaginary walk and pulling different items out of a bag or box. The instructor can set the stage by making it into a story format while pulling items out of the bag, for example "then we continued down the hot trail and behind a tree we saw a. . . ."

NATURE/UNNATURE WALK

CLOSURE: On our walk we talked about things that are found in nature. "Who can show me the sign for things we find naturally outside?" They are good so they are "thumbs up." "What about the other things we found outside. What were they?" They were not supposed to be there so they are "thumbs down."

EVALUATION: The teacher is able to evaluate the students in the field by watching for the appropriate signs (thumbs-up or thumbs-down).

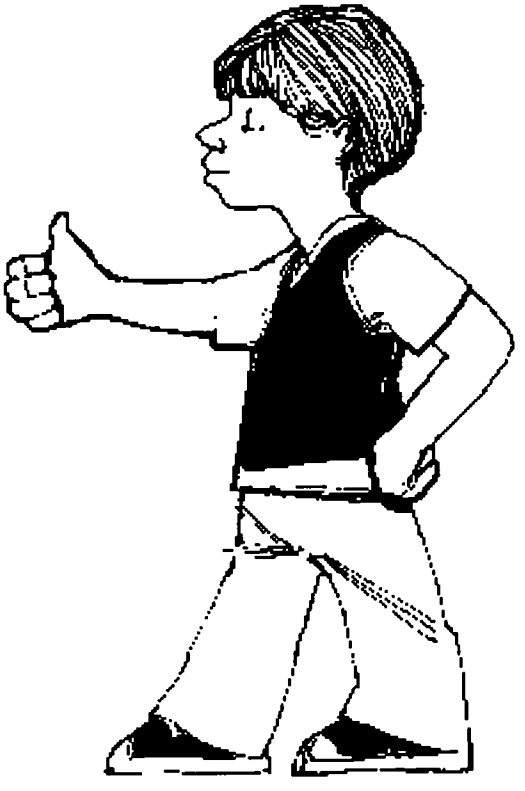
EXTENSIONS:

1. As long as the teacher explains that any thing found in a national park should be left where it is found, the teacher may want to "recollect" the items they found along the trail. The teacher should explain that this is okay for the class today. By using two boxes the student could sort the items into one box for natural items and use the other box for un-natural items.

2. The students could cut out pictures from magazines and make a collage of natural things, un-natural things, or both.

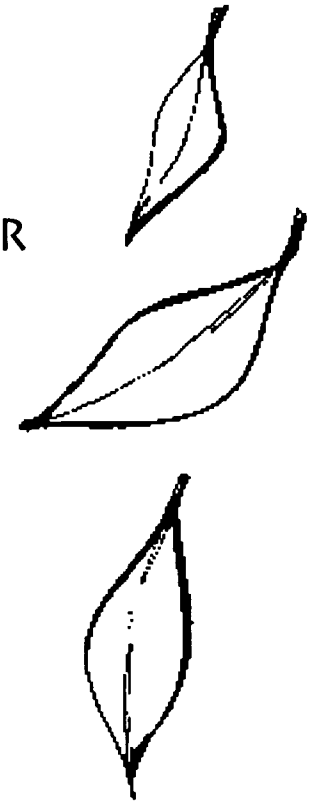
3. The students may want to draw a picture of a natural item and of an un-natural item. These pages could be collected and put in a book for the class to pass around and share during free time or indoor recess.

*This activity was adapted from *Sharing Nature with Children* by Joseph B. Cornell

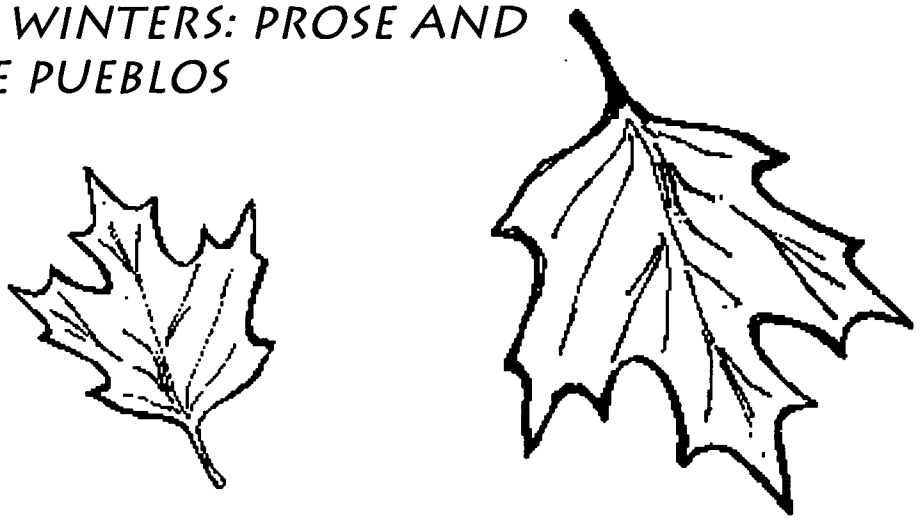


YOU SHALL ASK

YOU SHALL ASK
WHAT GOOD ARE DEAD LEAVES
AND I WILL TELL YOU
THEY NOURISH THE EARTH.
YOU SHALL ASK
WHAT REASON IS THERE FOR WINTER
AND I WILL TELL YOU
TO BRING ABOUT NEW LEAVES.
YOU SHALL ASK
WHY ARE THE LEAVES SO GREEN
AND I WILL TELL YOU
BECAUSE THEY ARE RICH WITH LIFE.
YOU SHALL ASK
WHY MUST SUMMER END
AND I WILL TELL YOU
SO THAT THE LEAVES MAY DIE.



– FROM *MANY WINTERS: PROSE AND POETRY OF THE PUEBLOS*



SHAPES OF THE SEASON

SUBJECTS: Science, Math, and Art

GRADES: K-3

KERA GOALS: Meets KERA goals 1, 2, 3, 4, 5 and 6

LEARNER OUTCOMES: observing, quantifying, visualizing, measuring, classifying, visual arts, patterns, change, resourcefulness and creativity, rights and responsibilities for self and others, creative thinking, conceptualizing, and expanding existing knowledge.

DURATION: One hour-long session, or two 30-minute sessions

GROUP SIZE: One classroom of 25-35 students (or fewer)

SETTING: Indoors

KEY VOCABULARY: Oak, maple, tulip poplar, seasons, graph

ANTICIPATORY SET: Fall is a season full of shapes and color. Today we are going to look at a few shapes and colors that come from trees

OBJECTIVES: The students will be able to: 1. use basic math skills to observe, visualize, and measure leaf shapes; 2. develop their creativity using their knowledge of patterns and shapes.

MATERIALS:

- The students will need to bring in 3 leaves each (if possible try to have at least two different kinds of leaves)
- bar graph activity sheets
- leaf shape activity sheets
- wax paper
- tissue paper - shades of yellow, red, orange, and brown (cut into small pieces)
- string
- small bowls (old margarine tubs, etc)
- white glue
- water

BACKGROUND: Mammoth Cave National Park has a variety of plants on the surface. A few of the most common trees include oaks, maples, and tulip poplars. These trees, like any other deciduous tree, lose their leaves in the fall. A common use for oak trees by Indians and pioneers was grinding the acorns to make flour. Today these trees are used for building sturdy furniture. Not all oaks are alike. The white oak has rounded leaves and the red oak has pointed leaves. Maples trees are used to make maple syrup and furniture. Tulip poplars were often used for log cabins and floors in homes. All of these trees provide homes and food for countless animals, birds, and insects. These trees are found commonly in Kentucky and have been used and enjoyed by many generations.

In the fall you may notice that oaks tend to turn shades of reds and browns. Maples change to various shades of reds, yellows, and a few shades of orange. Tulip poplars tend to turn a bright yellow.

PROCEDURE:

1. The students get out the three leaves they were asked to bring to school. The teacher asks the students to look at their leaves.

2. The teacher holds up drawings (copies of the four activity sheets) of the oaks, maple, and tulip poplar leaves. The teacher asks the students to see if any of their leaves match the pictures of the oaks. If it does then they can put their leaf in the oaks pile. Then they do the same thing for the maple leaf and the tulip poplar.

3. The teacher asks if anyone has any leaves that did not match. The students put the remaining leaves in the "other" leaves pile.

4. The teacher puts the students into small groups and has them count the number of leaves in each pile. The teacher writes the numbers on the blackboard.

5. The teacher, along with the students, counts out bars to make a vertical bar graph on the blackboard. (The teacher can use the bars found at the back of this lesson.)

6. From the bar graph the students should be able to understand which tree is most common. You may find that there are not as many tulip poplars as there are oaks and maples. The teacher may want to talk about why it is important to have a national park nearby to protect these plants that are not found as easily near our homes.

7. The teacher explains that we are going to make leaves that match the shape of the four leaves we just talked about. The instructor may ask, "Did anyone notice anything about our leaves? What color are the oak leaves ?" The teacher may want to write "oak" and the colors the students have observed on the board. Then do the same for the maple and poplar.

8. The teacher then asks the students to pick one leaf that they would like to make. The instructor passes out a leaf shape sheet to each student (Note: there are 4 leaves they can choose from so they either receive a red oak, white oak, maple, or poplar leaf.)

9. Now each student needs a piece of wax paper, a piece of string (roughly 3.5 feet), white glue diluted with water, and tissue paper (that has been cut into small pieces) in the color or colors of their leaf.

10. The student should place the wax paper over their leaf shape sheet (It may help to tape the shape sheet to the wax paper). Then the students are to dip the string in the glue mixture and get it coated with the mixture. Beginning at the stem, they place the string on the wax paper, outlining the leaf with their string. They bring the end around to touch the stem again. Students can also use smaller pieces of string to outline the veins of the leaf (Extra string can extend off to the side and be cut off when it dries).

11. The students then take small pieces of the tissue paper that matches the color of their leaf and dip them one or two at a time into the glue mixture and then place them on the inside of their string. The entire inner surface area should be covered and it is **very important** that the edge pieces of tissue touch the string. Excess tissue will be trimmed later. The string acts as a frame to support the tissue on the inside.

12. When the students are finished they can place their pieces of wax paper on a table, window sill or the floor to dry. It usually takes over night to dry. When the leaves are dry they can carefully be pulled off the wax paper and hung on a window to allow the light to shine through them.

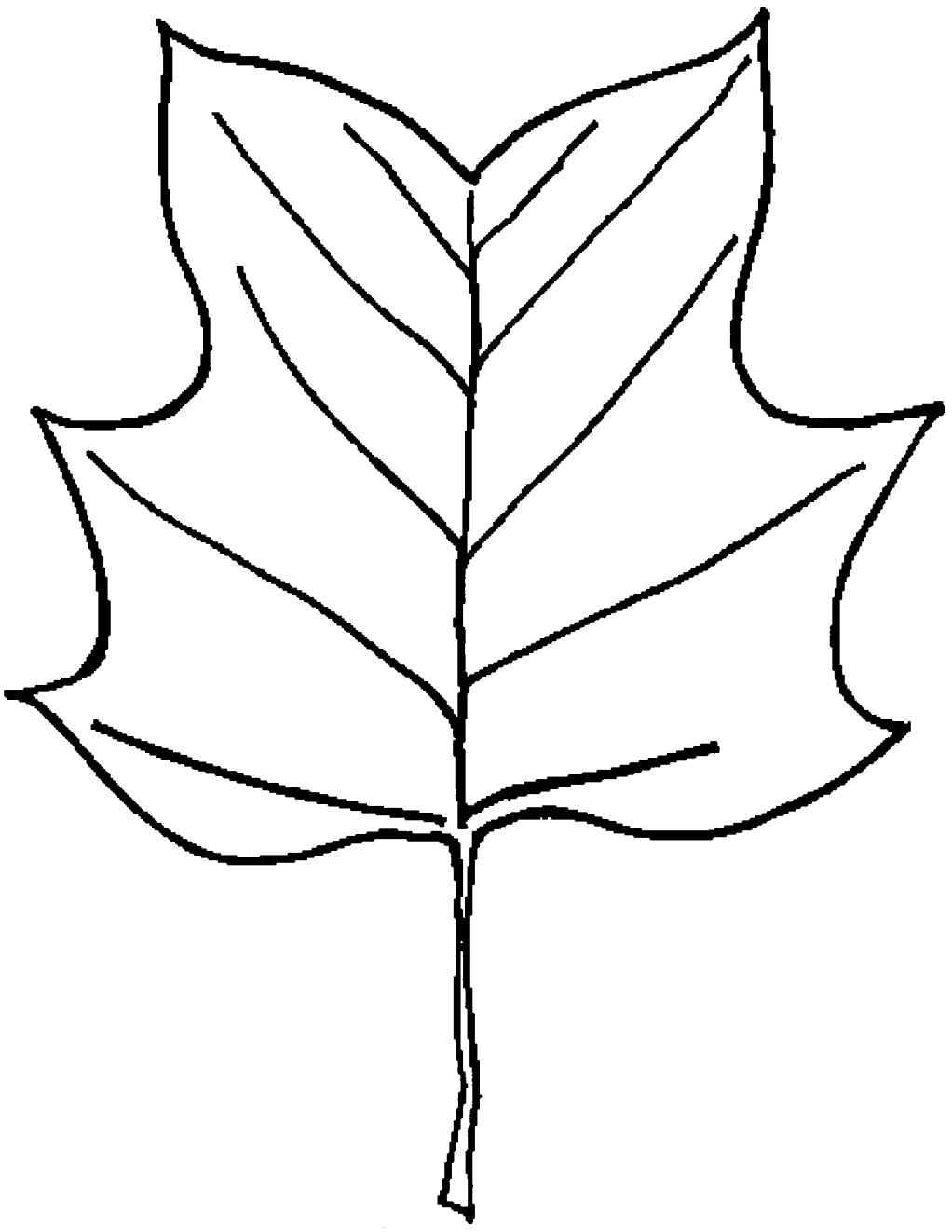
CLOSURE: Today we have taken a look at a few common leaf shapes. Who can name one of those leaves for me? Maybe the next time we go outside for recess we can look around the playground to see if we can find any of these leaves.

EVALUATION: The teacher is able to evaluate the students as they separate their leaves into categories and as they pick the shape they would like to make.

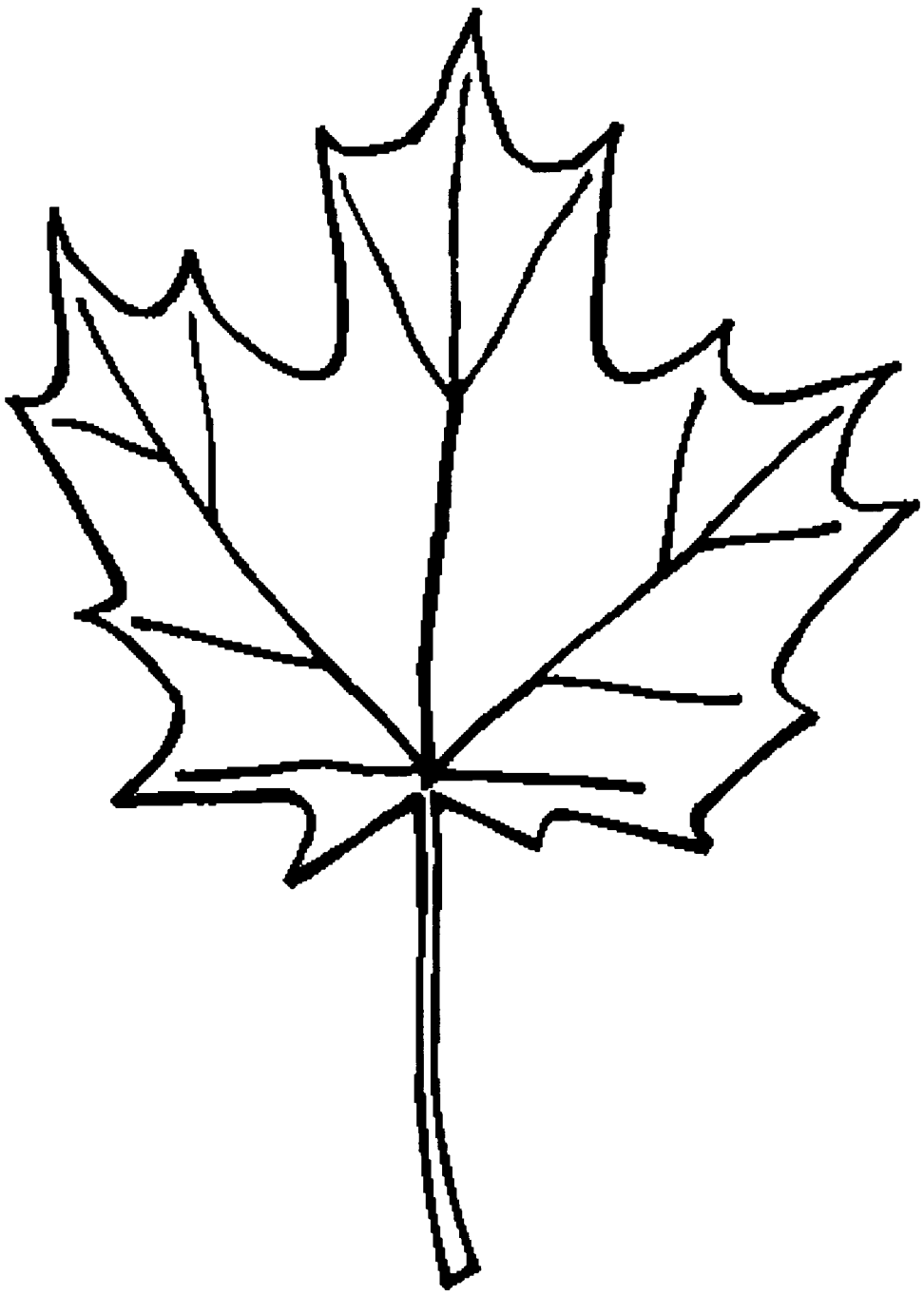
EXTENSIONS:

1. One follow-up activity may be to sort the leaves the students made into the three different kinds of leaf shapes and make a bar graph showing how many students chose to make a certain leaf. Or you may want to put the leaves in piles according to color and make a bar graph related to the colors found in fall leaves.
2. Go on a fall walk and look at the different leaves outside to observe different colors during the fall season.
3. The class could go out into the school yard and see if they can find any oak, maple or tulip poplar leaves.

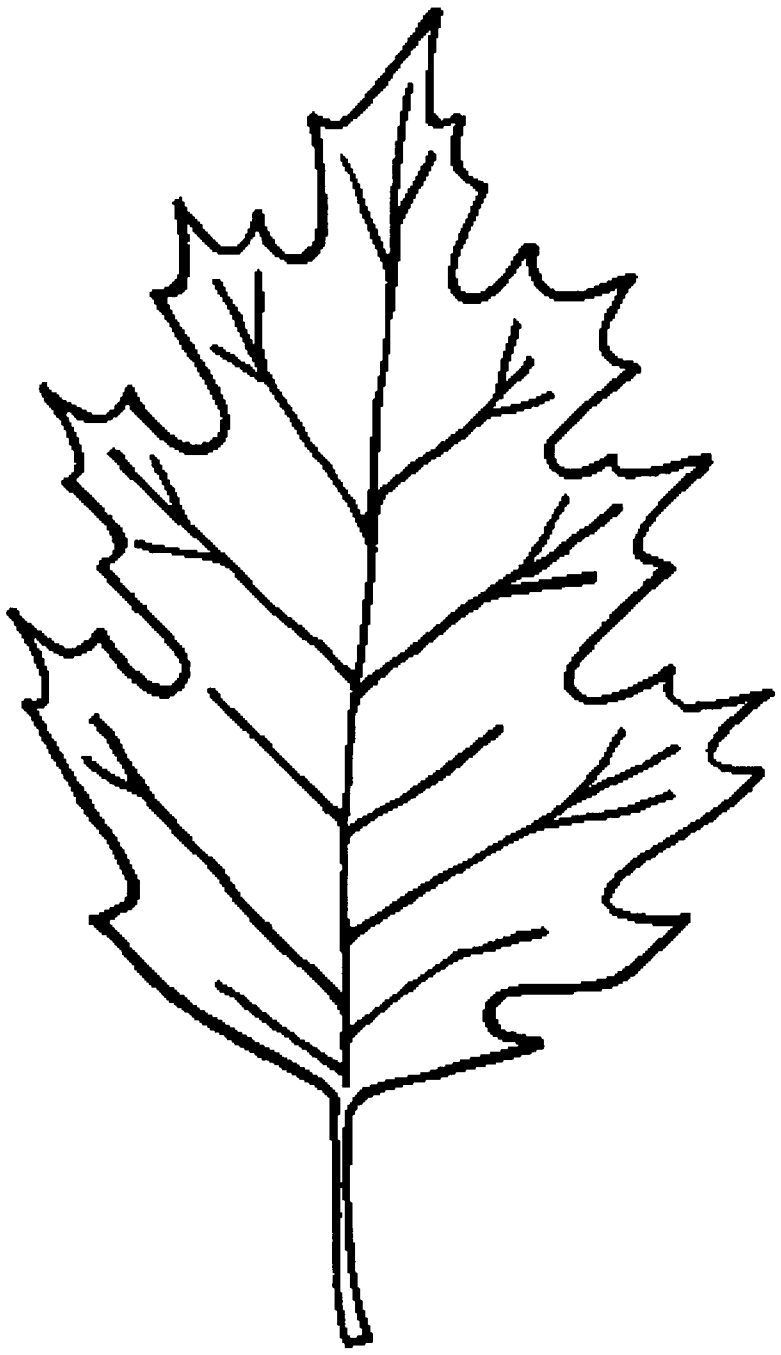
TULIP POPLAR LEAF



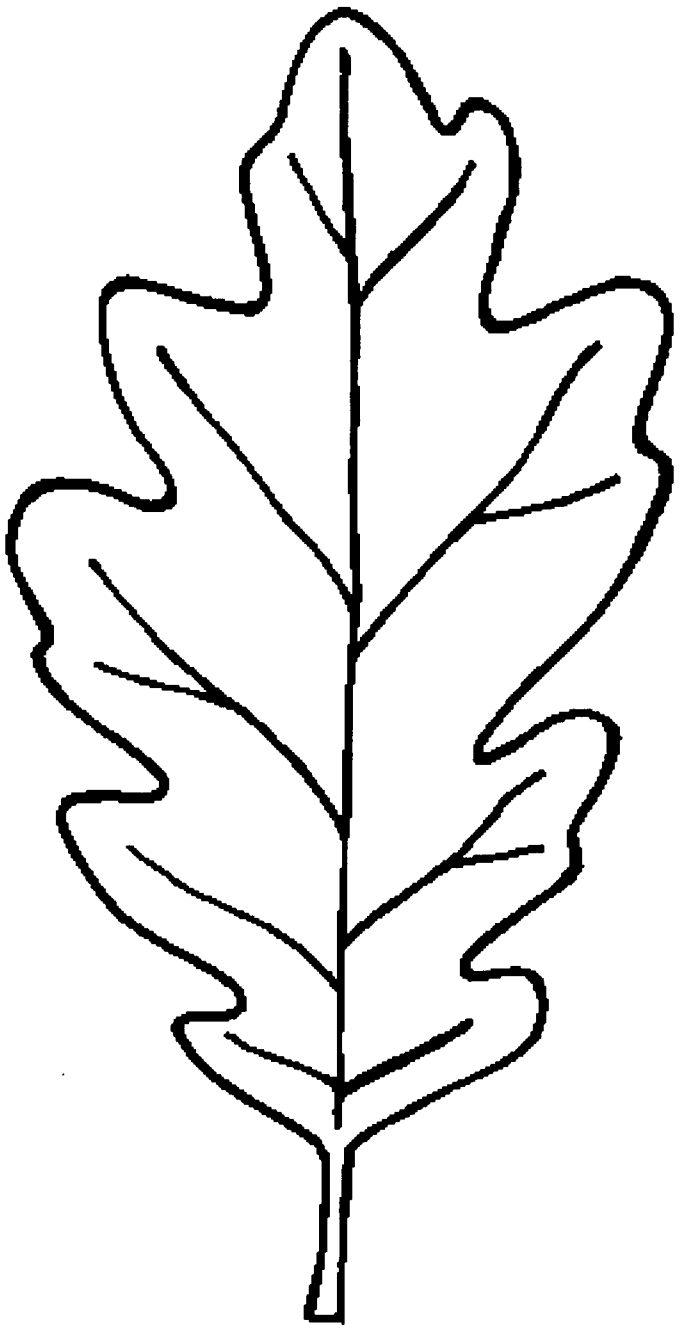
MAPLE LEAF



RED OAK LEAF



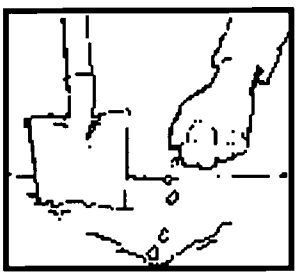
WHITE OAK LEAF



BAR GRAPH ACTIVITY SHEET

10 LEAVES	10 LEAVES
9 LEAVES	9 LEAVES
8 LEAVES	8 LEAVES
7 LEAVES	7 LEAVES
6 LEAVES	6 LEAVES
5 LEAVES	5 LEAVES
4 LEAVES	4 LEAVES
3 LEAVES	3 LEAVES
2 LEAVES	2 LEAVES
1 LEAF	1 LEAF

RACHEL CARSON



IF FACTS ARE THE SEEDS THAT LATER PRODUCE KNOWLEDGE AND WISDOM, THEN THE EMOTIONS AND THE IMPRESSIONS OF THE SENSES ARE THE FERTILE SOIL IN WHICH THE SEEDS MUST GROW.

THE YEARS OF EARLY CHILDHOOD ARE THE TIME TO PREPARE THE SOIL. ONCE THE EMOTIONS HAVE BEEN AROUSED, THEN WE WISH FOR KNOWLEDGE ABOUT THE OBJECT OF OUR EMOTIONAL RESPONSE. ONCE FOUND, IT HAS MORE LASTING MEANING.

– *A SENSE OF WONDER*

TASTY TREES

SUBJECTS: Science, Math, Art, and Language Arts

GRADES: K-3

MEETS KERA GOALS: Meets KERA Goals 1, 2, 3, 4, 5, and 6

ACADEMIC EXPECTATIONS: Visualizing, measuring, writing, nature of scientific activity, measurement, resourcefulness and creativity, productive team membership, rights and responsibilities for self and others, creative thinking, conceptualizing, and expanding existing knowledge.

DURATION: One 20-35 minute period

GROUP SIZE: One classroom of 25-35 students (or fewer)

SETTING: Indoors

KEY VOCABULARY: sun, water, soil, trees, flowers, forest, habitat, recipe

ANTICIPATORY SET: Today we are going to get into small groups to make a forest. What kind of things do we find in the forest?

OBJECTIVES: The student will be able to: 1) work in small groups to make a dough forest; 2) use a recipe and measure ingredients to make dough.

MATERIALS:
- 2 cups of peanut butter
- 2 cups of corn syrup
- 2-4 cups of powdered milk
- 10 plastic bowls (butter containers, etc.)
- 10 spoons
- 10 pieces of wax paper
- 2-4 1/4 cup measuring cups
- soap and water
- Tasty Trees Activity Sheet

BACKGROUND: All plants need sunlight, water, and soil to grow. Plants start as seeds and grow to maturity. In a forest we find many different kinds of plants such as trees, flowers, ferns, and grasses. Without the three main ingredients our forest could not survive.

PROCEDURE:

1. The teacher asks the students if they know what a recipe is. The students respond. The teacher then asks "What if we were going to make a recipe for a forest? What would we need?"

2. The teacher writes the students' responses on the blackboard. The teacher encourages the students to think of ingredients like sunlight, water, soil, and seeds. The teacher reminds the students of how important it is to have all of the ingredients for a recipe to work.

3. The teacher explains that they are going to mix ingredients to make a special dough to create a forest. The students are split into groups of three and take turns measuring out the ingredients. One student from each group measures 1/4 cup of peanut butter which represents soil. Another student from each group measures 1/4 cup of corn syrup which represents water. The last student measures 1/4-1/2 cup of powdered milk which represents sunlight. The group mixes their ingredients with a spoon in a plastic bowl.

4. The students divide their dough into three equal pieces. The students take their dough and roll it into a ball. The teacher explains that the ball is like a seed. All seeds need water, sunlight, and soil to grow. Since our seed is a mixture of all of these ingredients it can grow into a plant.

5. The students take their dough and shape it into a forest plant and then place it on their wax paper. Each group makes a list of words or writes a story to describe their forest.

6. The students share their words/story with the class. Everyone now eats his or her plant!

CLOSURE: We mixed together important ingredients and made plants. If plants do not get sunlight, water, and soil they are unable to grow. Plants need natural places like national parks to grow.

EVALUATION: The teacher is able to evaluate the students as they work together to make the recipe and model. They are also evaluated on the list of words or the story they create.

EXTENSIONS:

1. The students plant real seeds and watch them grow. Grass seed works well and its growth could be measured.

2. The students could plant real seeds and perform an experiment. One seed they would not give water, one they would not give any sunlight, one seed would have no soil, and one seed would get everything. The students could note the difference in growth between the plants.

3. Go for a walk in a forest and note all the different kinds of plants they see like ferns, flowers, grass, and trees. The students may also want to draw pictures of the plants they see.

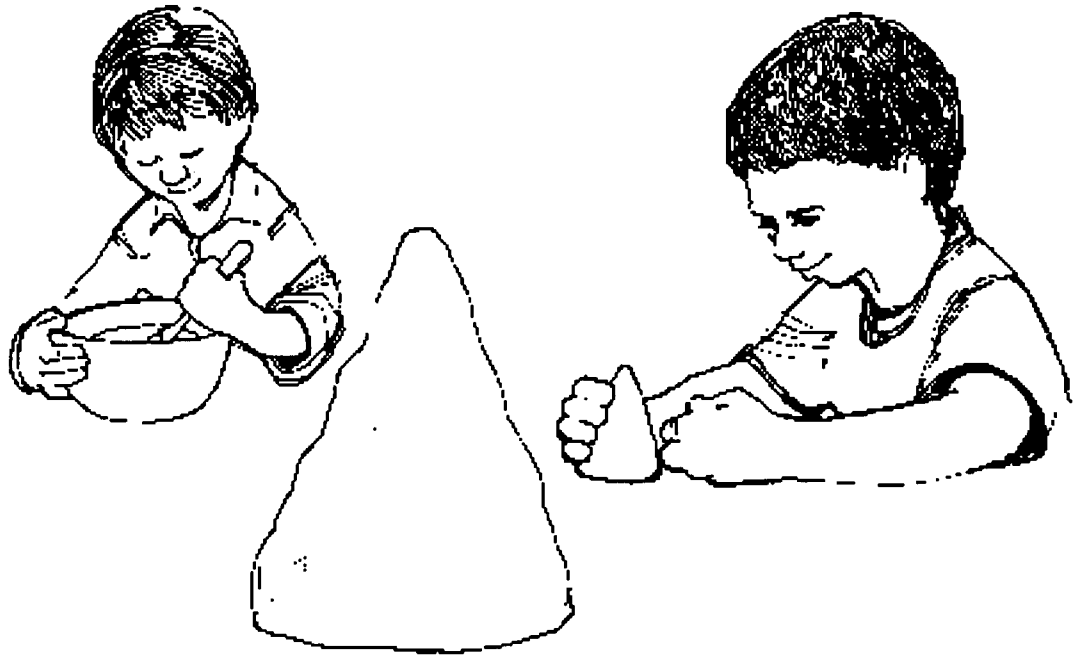
Tasty Trees Recipe

Peanut Butter Play Dough

Stir Together: 1 cup peanut butter
1 cup corn syrup
1-2 cups powdered milk
Add this milk as you need it. This is to make the mixture less sticky.

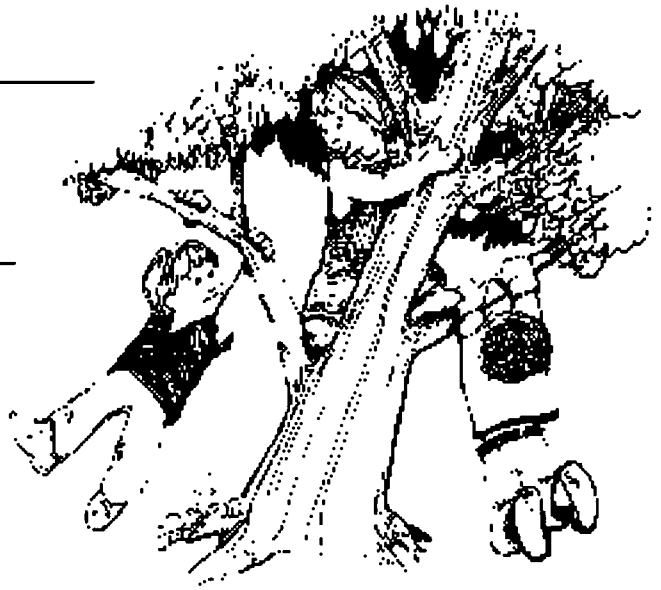
For the classroom mixture we cut the recipe down to 1/4 for each group. This makes appropriate size balls of dough for each student.

Note – if you refrigerate the dough for a little while it takes away some of the stickiness, but this is not necessary.



OUR FOREST

NAMES: DATE:



SQUIRRELS NEED A HOME OR BATS NEED A CAVE

SUBJECTS: Science and Physical Education

GRADES: K-3

KERA GOALS: Meets Kera goals 1, 2, 4, 5, and 6

ACADEMIC EXPECTATIONS: observation, seeing patterns, becoming a productive group member, conceptualizing, expanding existing knowledge, and developing new knowledge.

DURATION: One 20-35 minute period

GROUP SIZE: One or two classrooms (at least 15 students)

SETTING: Outside or Indoors in a gym

KEY VOCABULARY: home, habitat, squirrels or bats, "Bat Friendly Gate"

ANTICIPATORY SET: We are going to play a game that talks about an animal. This animal lives in the forest, eats nuts, and has a long bushy tail. Does anyone know what this animal might be?

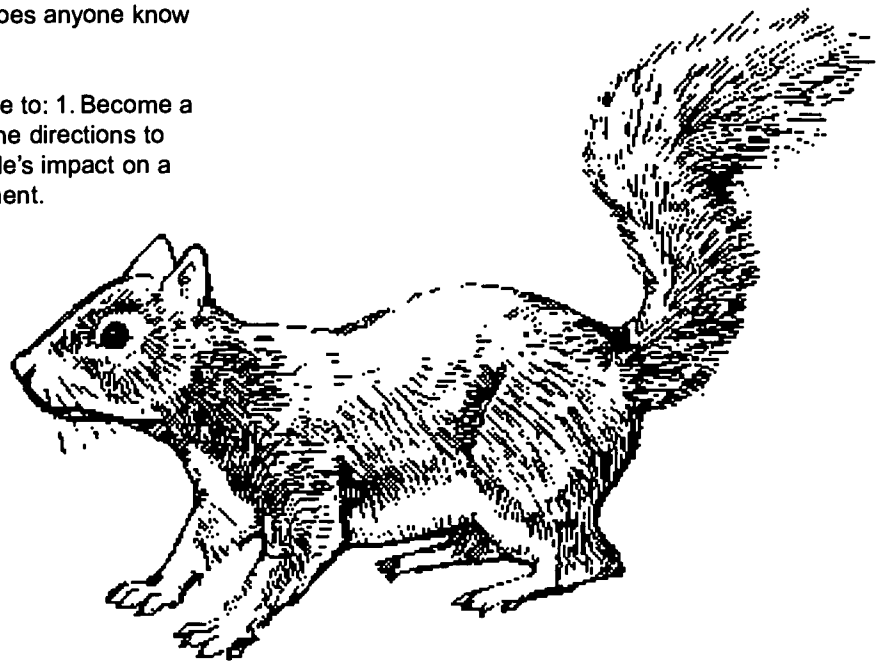
OBJECTIVES: The students will be able to: 1. Become a productive team member by following the directions to the activity; 2. Conceptualize how people's impact on a forrest (or cave) changes that environment.

MATERIALS: None are needed

BACKGROUND:

This game teaches the concept that animals need a place to live. It also illustrates the importance of people making appropriate choices when wildlife habitat is involved. This activity develops the concept that squirrels need a tree to live in and when the tree is taken away
squirrels can be left homeless.

Sometimes the game is played as bats needing a cave. The change used with bats is boarding entrances to cave vs. using a "Bat Friendly Gate." It can be explained that sometimes people need to protect their cave from trespassers. The cave could be vandalized and people could also be injured. Many times people board up the entrance ways to keep people out. The only problem is, it also keeps bats out. The other alternative is using a "Bat Friendly Gate" over the entrance. This keeps people out, but the squares of the gate are large enough to allow bats to fly in and out freely.



SQUIRRELS NEED A HOME OR BATS NEED A CAVE

PROCEDURE:

1. The instructor explains that it is important for all animals to have a place to live. The instructor asks, "Where do squirrels live?" The students should answer, "trees". The instructor then explains that some of the students will be trees and some of the students will be squirrels. They also state that each squirrel will need a tree to live in.

2. The instructor counts the children into groups of three, making two students join both hands facing each other, and then puts the third child in the middle to be the squirrel. After all the children are arranged into groups of three, the game is ready to begin. If you have one extra student- they can be a squirrel looking for a home, or if you have two you can have an extra tree or two squirrels that need homes.

3. The instructor now explains that it is time for the squirrels to look for a new home. When it is time to move, the instructor will say "Squirrels need a new home." The trees will raise their branches (arms) to let the squirrels run to find a new tree. The trees will keep their branches raised until a new squirrel moves in. Then they will lower their branches to protect the new squirrel. Remember only one squirrel per tree.

4. Several rounds (at least 3) are played, trading off the squirrels with half of the tree until all have had a turn. The next round the instructor can bring up the idea that people want to move into the area and they need to cut a tree down to build their home. The instructor "cuts down" a tree. The squirrel inside now needs a home. The "tree" becomes two new baby squirrels (this can be justified by saying it is spring) who also need homes. * The instructor announces, "Squirrels need a new home." At the end of the round there should be several squirrels without a home. The instructor might ask how these squirrels will live and how they are to survive?

5. The instructor can continue to cut down trees to build a house. The instructor can plant new trees as they desire. In the next round the class may discuss how people need to have shade around their home. For shade they plant a tree. The instructor takes two squirrels and turns them into a tree. Five to Seven rounds (total) is usually the maximum for this game depending on the students and their age.

6. At the end of the game the instructor should talk about how important it is for people to think about animals and their homes when they build in an area.

*Note "Cave" can be substituted for "Tree" and "Bat" can be substituted for "Squirrel" in the above instructions. In this situation the teacher boards off the cave and two baby bats are born.

CLOSURE: We have played a game about squirrels and their homes. "What do people need to do before we cut down trees or change an area?" The students should be able to answer, "People need to think about the animals before they make changes to the land."

EVALUATION: The teacher is able to evaluate the students during the game's discussions.

EXTENSIONS:

1. The students could make posters telling people to think about the animals before they make any decisions that might effect the animals' homes.

2. The students may want to draw a picture of another animal that might be effected by cutting down trees.

3. The students could make a squirrel feeder and observe squirrel activity around the school.

4. The students could write another Government Agency, The U.S. Forest Service, and request posters dealing with trees and their inhabitants.

A PLACE PROTECTED

SUBJECTS: Language Arts, Art, Government, and Science

GRADES: K-3

KERA GOALS: Meets KERA Goals 1, 2, 3, 5, and 6

ACADEMIC EXPECTATIONS: Writing; listening; nature of scientific activity; change; resourcefulness and creativity; creative thinking; conceptualizing; expanding existing knowledge.

DURATION: One 20-30 minute period

GROUP SIZE: One or more classrooms (or fewer)

SETTING: Indoors or Outdoors (with clipboards)

KEY VOCABULARY: home, habitat, protect, endangered species

ANTICIPATORY SET: "How many of you have been to a zoo? How many of you have been to a national park?"

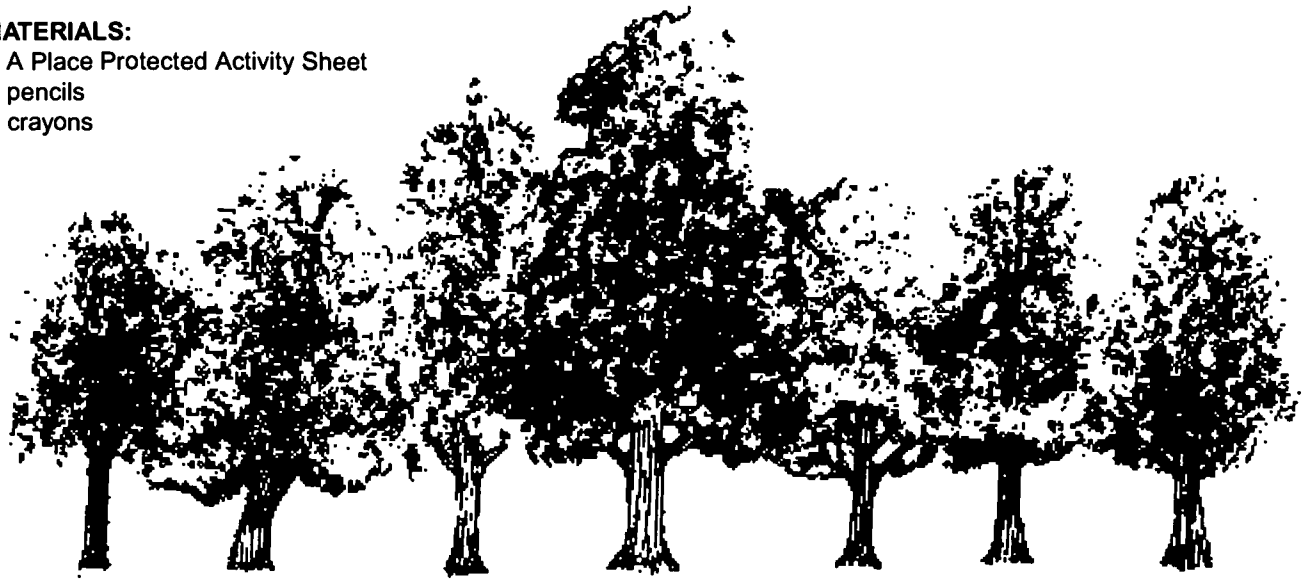
OBJECTIVES: The students will be able to: 1) express the importance of protecting animals in places like national parks; 2) expand their existing knowledge of the park wildlife and its habitats.

BACKGROUND: Zoos, aquariums, and botanical gardens help to manage and protect endangered species of plants and animals. They recreate the habitat in which these plants and animals are found. These facilities help to ensure that important gene pools are still in existence. Often these refuges protect exotic animals from all around the world.

On the other hand, national parks protect the species of plants and animals that are native to a specific area. Parks help to keep the gene pool alive in its natural environment rather than trying to replicate one. Parks in the United States have preserved the wildlife and the habitat upon which it depends for survival.

There are many animals within Mammoth Cave National Park. They can be as small as snails or as large as deer. Some animals found in the forest include deer, raccoons, squirrels, snakes, wild turkeys, chipmunks, birds, coyotes, and foxes. Animals found in the river include turtles, beavers, fish, otters, and mussels. A few animals found in the cave include bats, cave crickets, salamanders (near the entrance), eyeless fish, and eyeless crayfish. All of these animals, as well as the homes they occupy, are important.

MATERIALS:
- A Place Protected Activity Sheet
- pencils
- crayons



A PLACE PROTECTED

PROCEDURE:

1. The teacher writes the words ZOO, NATIONAL PARK, ALIKE and DIFFERENT on the blackboard. The teacher asks the students to name things that are alike or the same about zoos and national parks.

Alike	National Park	Zoo
	• Protects animals	• Protects animals
	• Provides homes for animals	• Provides homes for animals
	• Place for people to see animals	• Place for people to see animals
	• Saves animals from extinction	• Saves animals from extinction

2. The teacher asks the students to name things that are different between zoos and national parks. The teacher writes their responses on the blackboard.

Different	National Park	Zoo
	Protects animals in their natural home	Creates a man-made home
	Protects the plants and the home environment they need	Supplies all of the animals needs
	Animals live on their own. They do not need people.	Animals need people for survival

3. The teacher explains that it is important to keep animals in their natural homes and national parks are able to do that. The teacher asks the students what kind of animals they think they would find in Mammoth Cave National Park. The teacher lists these animals on the board.

4. The teacher passes out A Place Protected Activity Sheet to each student and explains that the students are to draw a picture of an animal found in Mammoth Cave National Park. They are to draw it in the home it lives in; this could be a cave, forest, or field. Any animals and their homes can be drawn for this activity.

5. When the students finish their activity sheets they can share them with the class.

CLOSURE: Today we talked about some of the things that are alike and different with zoos and national parks. Both places are important, but it is very important for us to have national parks that protect not only the animals but their natural home.

EVALUATION: The teacher is able to evaluate the students through class discussion, their drawings, and sharing their activities.

EXTENSIONS:

1. To follow up this lesson the teacher could bind the students' activity pages in a booklet for the students to read and enjoy together.
2. The students could create a bulletin board with their pictures to remind them of the animals at Mammoth Cave National Park.
3. The students could take a trip to a national park and/ or a zoo to compare the two areas.

DRAW AN ANIMAL AND ITS HOME

NAME: DATE:

W. BEEBE (1877-1972)

...WHEN THE LAST
INDIVIDUAL OF A RACE
OF LIVING THINGS
BREATHES NO MORE,
ANOTHER HEAVEN AND
ANOTHER EARTH MUST
PASS BEFORE SUCH A ONE
CAN BE AGAIN."

CLAY CAVES

SUBJECTS: Science

GRADES: K-2

KERA GOALS: Meets KERA goals 4, 5, and 6

ACADEMIC EXPECTATIONS: Becoming a productive group member; consistent, responsive, and caring behavior; rights and responsibility of self and others; conceptualizing; critical thinking; developing new knowledge; and expanding existing knowledge

DURATION: One 25-40 minute period

GROUP SIZE: One classroom of 25-35 students (or less)

SETTING: Indoors or Outdoors

KEY VOCABULARY: sandstone, limestone, water, time, ocean, shells, dissolved

ANTICIPATORY SET: Today we are going to make caves. Our caves will be models of limestone caves, like the ones found at Mammoth Cave National Park. Does anyone know what special ingredients it takes to make a cave in this area?

OBJECTIVES: The students will be able to: 1) work productively in small groups to make a cave; 2) conceptualize how water carves or creates Mammoth Cave

MATERIALS:
- Modeling clay (4 oz. per student or group)
- Sugar cubes (3-6 per cave)
- Warm water
- See-through bowls (1 per student or group)
- Copies of Clay Caves Activity Sheet

BACKGROUND: The two basic rocks found in the Mammoth Cave area are limestone and sandstone. Limestone is the "soft" rock (more water soluble) that is dissolved more easily by water. Sandstone and shale are the rocks that are on top of the cave. They are "harder" (less water soluble) and don't let the water soak into the cave.

The limestone was laid down in this part of Kentucky around 270-350 million years ago. At that time Kentucky was further south, close to the equator. A shallow, warm inland sea covered the land. As the animals that lived in that sea died, their hard bodies (shells) fell to the bottom of the ocean. With time and pressure the shells compacted together to form limestone. The limestone in this area is between 700-1200 feet thick. After many years of deposition the sea receded, as the continent slowly drifted north.

The next major geological period to affect the Mammoth Cave area was a glacial period. Glaciers were found to the north of Kentucky. These large glaciers began to melt and formed rivers, which flowed south. This part of Kentucky became the river's delta. The river left behind additional sand, silt, and sediment it carried with it. This sand and silt became our caprock or the layers of sandstone and shale.

Mammoth Cave was formed when water seeping through cracks in the sandstone formed underground rivers. These rivers eventually carved large cave passageways in the limestone. It has taken a lot of water and a lot of time to create Mammoth Cave.

CLAY CAVES

PROCEDURE:

1. The teacher asks the students what it takes to make a cave. The teacher writes the student's answers on the blackboard (rocks, water, time, etc.).

2. The teacher then explains that there are two types of rock that make up Mammoth Cave. The one that is softer and easily dissolved by water is called limestone. The second is harder and is on top of the limestone. Since it is harder it is a good roof to Mammoth Cave, protecting it. This harder rock is sandstone and shale. It takes a lot longer for water to dissolve this sandstone caprock.

3. The teacher passes out a lump of clay to each student (or each group of students, approximately 4 oz.) The clay will be the sandstone in our model. The teacher also passes out 3 or 6 sugar cubes, to make different sized caves. The sugar cubes will be the softer limestone in our model.

4. The students flatten their clay out into a "pancake." Then they should place the sugar cubes on the clay, so that each cube touches the other, and with at least one cube touching the edge of the clay. Then the students wrap the clay around the sugar cubes, forming a ball. The students need to make sure that at least one sugar cube is exposed. (See attached "Making of the Caves" instruction sheet.)

5. "Now that we have our rock layers, what do we need to turn it into a cave?" The students should respond, "water." Each student or group should have a small see-through bowl, (cutting the top off 2 liter bottles works well). Instruct the students to put their cave in the water. The students should observe what happens.

6. The students may observe: 1) That nothing is happening. 2) The cave may bubble for a minute or so until the sugar starts to dissolve. (This reinforces the idea that it takes some time for a cave to form.) 3) The sugar will begin to dissolve leaving a hole behind. The students can remove their cave from the water and look at it.

7. The class groups back together and notes their observations on the board. The teacher asks the students to fill out their Clay Cave activity sheet.

CLOSURE: We have made models of a limestone cave. For natural places like caves to form we know it takes a long time and the right ingredients. That is why we need to take care of our special natural places.

EVALUATION: The teacher is able to evaluate the students during their class discussion and by reading over their activity sheets.

EXTENSIONS:

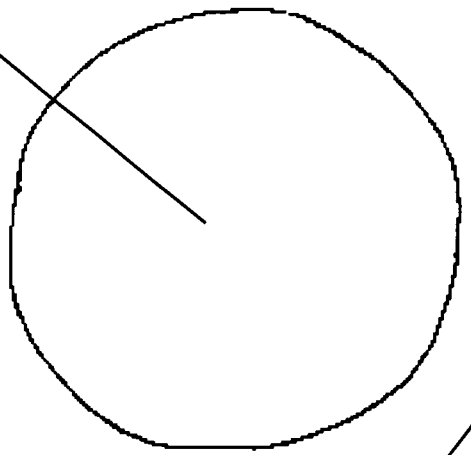
1. A follow-up activity could be to make rock candy and talk about how that relates to the formations found inside the cave.

2. The class may want to visit a cave within the Mammoth Cave region to identify the differences between the sandstone and limestone while being in the field.

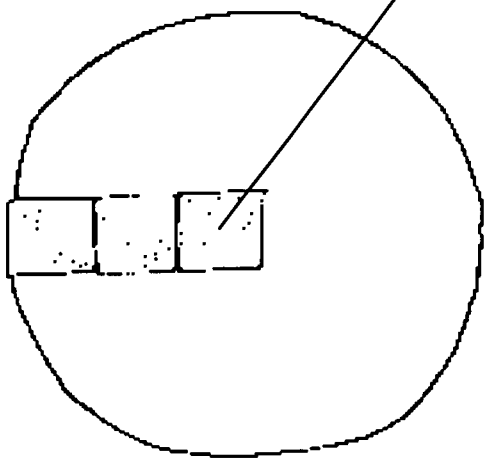
3. The students could find other items that would dissolve in water, that could act as models for the limestone, and other items that do not dissolve that could be models for the sandstone.

MAKING THE CAVES

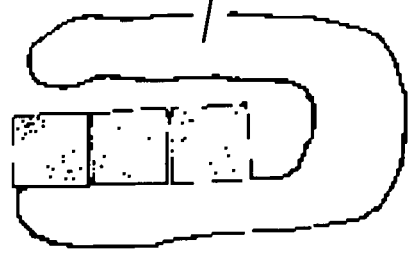
1. Flatten the clay into a pancake shape.



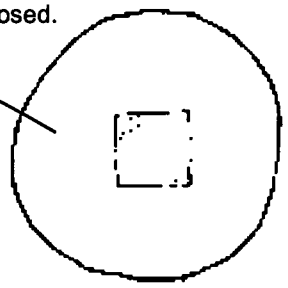
2. Place the sugar cubes on the clay, all touching each other. Make certain that at least one cube is at the edge of the clay.



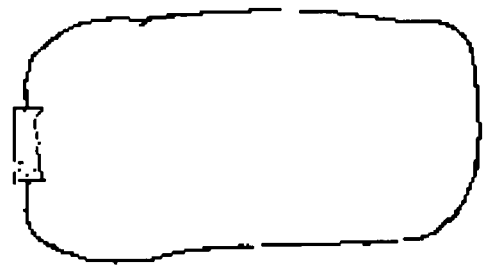
3. Wrap the clay around the sugar cubes...



4. ...forming a ball. Make certain that at least one sugar cube is exposed.



5. When the ball of clay is placed in the water, the sugar will dissolve, leaving a "limestone cave" behind.



CLAY CAVES

Fill in the blanks by using these words:

LIMESTONE
DISSOLVE
TIME
SANDSTONE
WATER

1. The clay in our model is _____ rock.

2. The sugar cubes in our model are _____ rock.

3. It takes _____ and _____ to make a cave.

4. Limestone is the softer rock that can _____.

Observations

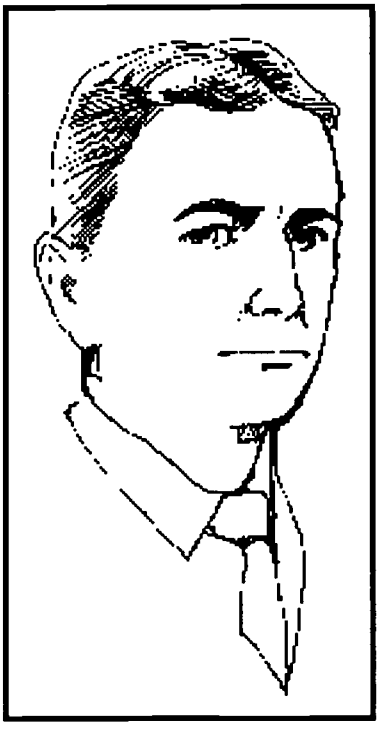
1. What do you see happening right away?

2. What happens next?

3. What do you have left in the end?

BILLY SUNDAY, EVANGELIST

I FELT SMALLER TODAY THAN I EVER DID IN MY LIFE FOR I'VE RETURNED FROM EXPLORING CAVERNS... SCOOPED OUT UNDERNEATH THE GREEN HILLS OF KENTUCKY. THERE IS ONLY ONE WORD IN THE LANGUAGE TO DESCRIBE MAMMOTH CAVE, AND THAT IS "MAMMOTH."



WEBBING THE WONDERS

SUBJECTS: Language Arts and Science

GRADES: K-3

KERA GOALS: Meets KERA goals 1, 2, 4, 5 and 6

ACADEMIC EXPECTATIONS: The application of basic communication skills; accessing information and ideas; visualizing; classifying; patterns, models and scale; productive team membership; decision making; conceptualizing; expanding existing knowledge

DURATION: One 30-45 minute period

GROUP SIZE: One classroom of 20-30 students (or less)

SETTING: Indoors

KEY VOCABULARY: sandstone, limestone, water, time, acid, surface, silt

ANTICIPATORY SET: Does anybody know what a web is? Today we are going to make a web that includes what it takes to make a cave. The cave we are going to talk about is Mammoth Cave

OBJECTIVES: The students will be able to:
1. Classify the elements in creating a cave; 2. Make decisions using cave vocabulary

MATERIALS:
- Webbing The Wonders Activity Sheets (the teacher will need to cut out the circles prior to the lesson)
- string
- tape
- magnets or clips
- scissors

BACKGROUND: The basic elements needed to make Mammoth Cave include rocks, water, and time. The two most common rocks are limestone and sandstone. Limestone is the "soft" rock (more water soluble) that is dissolved more easily by water. It is grey in color and has a smooth texture. This rock is the older of the two rocks and is made from shells and bones of animals that once lived in an ancient sea. The cave is found in the dissolved limestone rock. Sandstone is found on top of the cave, making it the younger rock. It is made from sand and silt that was left behind by historic rivers. Since the rock is made of sand it has a rough texture, feeling much like sandpaper. This rock is red or brown in color. Sandstone is "harder" (less water soluble) and does not let water soak into the cave.

Water can be found in many forms such as snow and rain. Water in the Mammoth Cave area can be found in surface rivers and surface streams. Surface streams normally occur after a heavy rain and then disappear. These waters disappear into holes and cracks in the rock.

When the water hits the surface it runs over dead plant material. From this decaying vegetation it picks up carbon dioxide to make carbonic acid. The water holds the acid. This acid dissolves limestone but runs off the sandstone. This carbonic acid is the same acid that is found in carbonated drinks.

Time is also an important ingredient in making a cave. It has taken millions of years. Long before the dinosaurs roamed the earth the rock that makes up the cave was being put in place.

WEBBING THE WONDERS

PROCEDURE:

1. The teacher asks the students if they remember what it takes to make a cave. The teacher writes the student's answers on the blackboard (rocks, limestone, sandstone, water, acid, time, etc.).

2. The teacher will pass out a circle to each student. The circles are found on Webbing the Wonder Activity Sheets.

3. The teacher asks, "Who has the circle that we need to start with? The circle with our main idea?" The student with the Mammoth Cave circle should be the one to go first. They tape or clip their circle to the board. (Note- If you have under 30 students in your class, the teacher may wish to place the Mammoth Cave circle on the board. There may be a need for the teacher to place several circles or for several students to have more than one circle.)

4. The teacher asks, "Does anyone remember the three big things that it takes to make a cave?" The students with rock, water, and time should be the next students to tape or clip their circles to the board. The students draw a line from Mammoth Cave to their word.

5. The teacher asks, "Who has the two rocks found at Mammoth Cave?" The students with limestone and sandstone will be next. The students hang them close to the rock sign and draw a line from the word "rock" to each rock name.

6. The students with rock descriptors need to decide where they belong. Then they can place their circle on the board, and draw their lines. The class with the teacher reads the circles to make sure they have been placed with the correct rock. Any adjustments are made.

7. The students with water and time descriptors decide and place their circles on the board. They need to draw lines from their topic to their descriptor. The class with the teacher reads the circles to be sure that they have been placed correctly. Any adjustments are made.

8. Together the teacher and students review the results of the web by reading it.

CLOSURE: Today we have webbed what it takes to make Mammoth Cave. All of these things are important in making our web strong. If we lost a piece to our web we would not have Mammoth Cave.

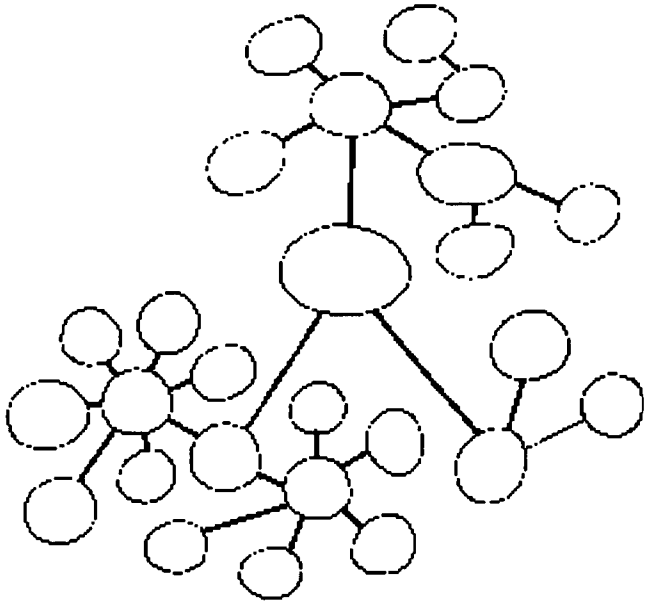
EVALUATION: The teacher is able to evaluate the students as they place their pieces of the web on the board. They can also be evaluated while reviewing the web results.

EXTENSIONS:

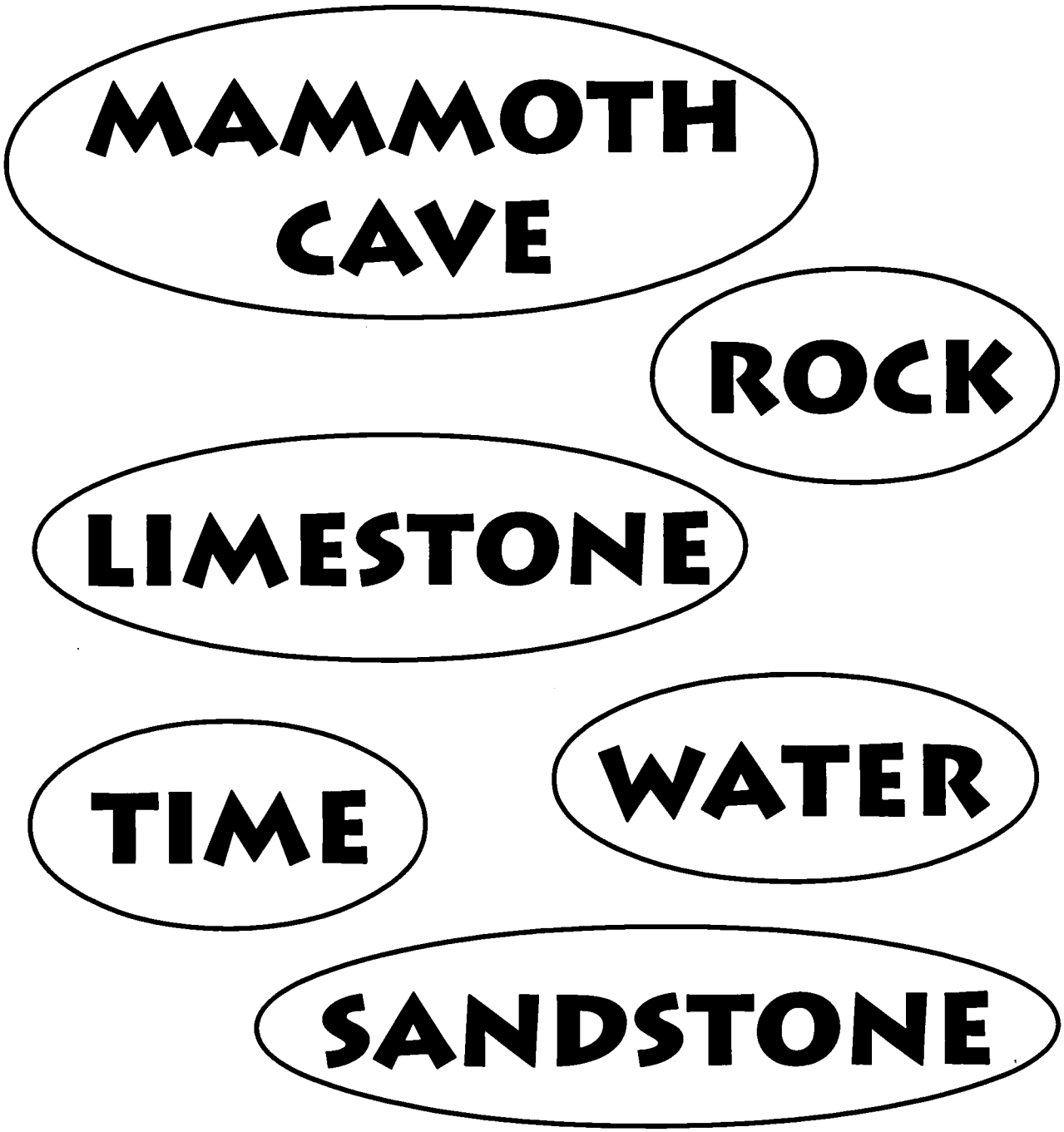
1. This activity could be done on a bulletin board, using string for lines. This project could be displayed for several days or during the unit to reenforce the concept taught in this lesson.

2. The class may wish to web animals and plants found within Mammoth Cave National Park. This could be done by using words or pictures.

3. The students may wish to draw their own web on a piece of paper with Mammoth Cave National Park as the center topic.



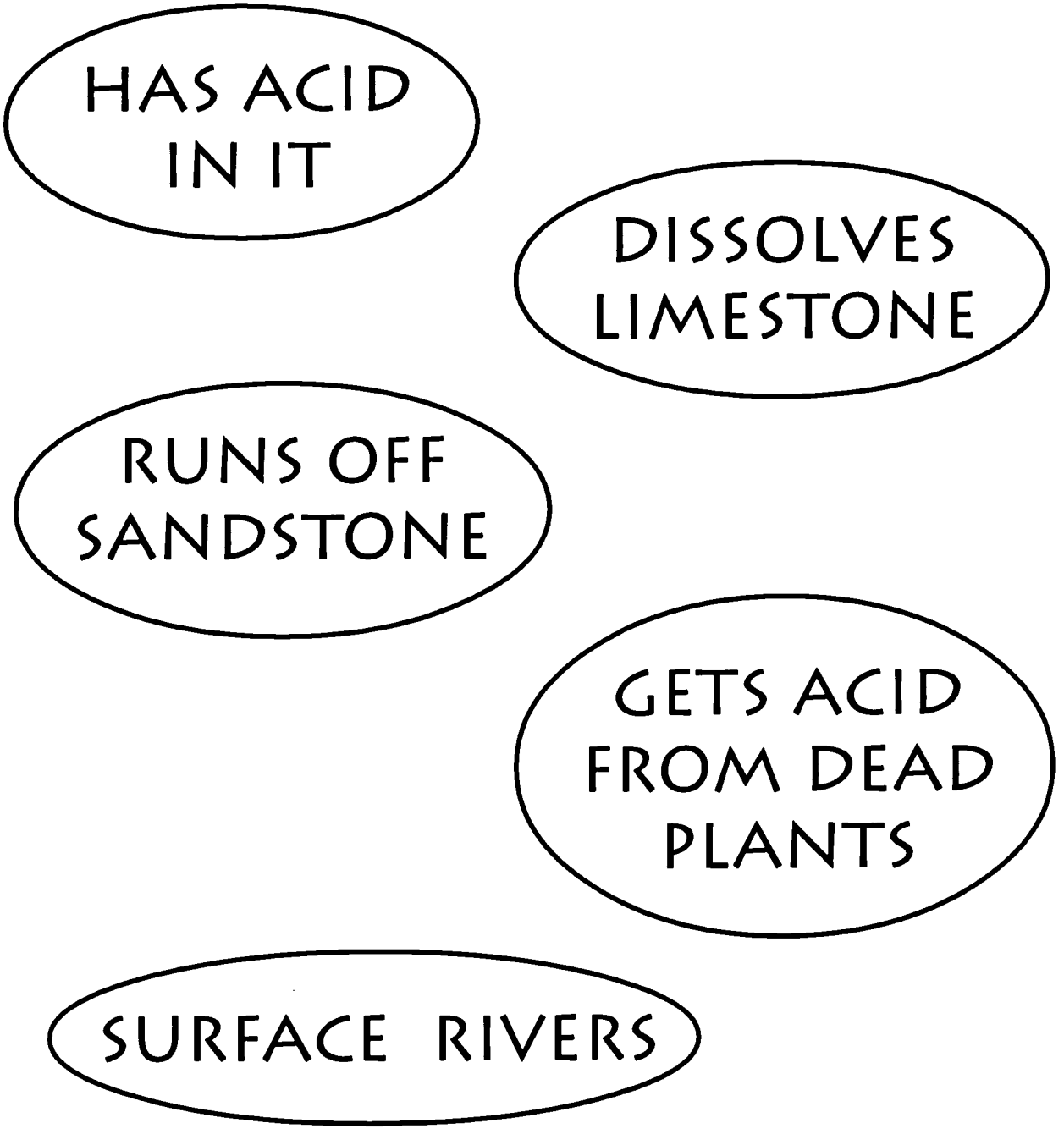
MAJOR TITLES



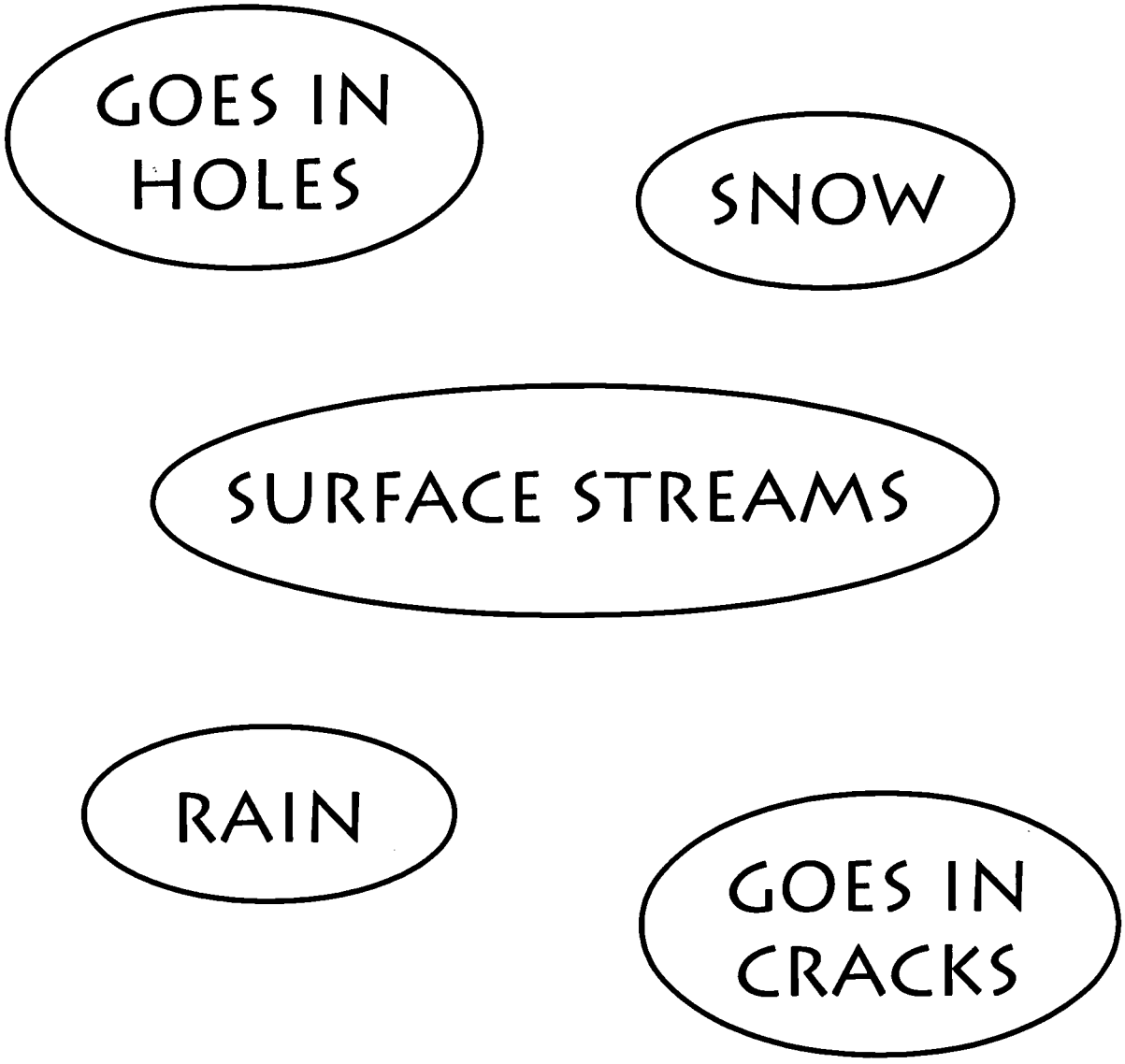
LIMESTONE WORDS

SANDSTONE WORDS

WATER WORDS


HAS ACID IN IT
DISSOLVES LIMESTONE
RUNS OFF SANDSTONE
GETS ACID FROM DEAD PLANTS
SURFACE RIVERS

MORE WATER WORDS



TIME WORDS

CARD CONCLUSION

SUBJECTS: Science, Language Arts, Art, and Physical Education

GRADES: K-3

KERA GOALS: Meets KERA goals 1, 2, 3, 4, 5, and 6

ACADEMIC EXPECTATIONS: Accessing information and ideas; reading; listening; speaking; systems and interactions; constancy; self-control and self-discipline; interpersonal skills; productive team membership; consistent, responsive, and caring behavior; rights and responsibilities for self and others; critical thinking; conceptualizing; decision making; problem solving; and expanding existing knowledge

DURATION: One 25-45 minute period

GROUP SIZE: One classroom of 25 to 35 students (or less)

SETTING: Indoors or Outdoors

KEY VOCABULARY: people, plants, animals, rocks, pollution, ranger hat, arrowhead, cards

ANTICIPATORY SET: Today we are going to play a card game! How many of you have ever played the card game "Old Maid?"

OBJECTIVES: The students will be able to:
1) Work productively in small groups to collect all of the cards needed to make a park; 2) Make appropriate decisions to collect the needed cards.

MATERIALS:
- 36 cards, total:
  - 6 people cards
  - 6 rock cards
  - 6 plant cards
  - 6 animal cards
  - 6 arrowhead cards
  - 5 ranger hat cards
  - one pollution card

Cards can be made from the examples found with this lesson by gluing them to 3" X 5" index cards. You may want the children to color the cards as an art lesson the day before you play the game.

BACKGROUND: National parks were established to protect the resources found within their boundaries. These resources include plants, animals, rocks and the land, and people. People include persons important in the park's history, visitors, and park staff. Each park has significant resources that have helped to establish it as a national park.

CARD CONCLUSION

PROCEDURE:

1. The teacher tells the students that the class is going to play a game that is like "Old Maid." This game is called "Oh No! Pollution!" For this game the students will need to collect the things it takes to make Mammoth Cave National Park. The teacher asks the students to name these things. The students should respond with plants, animals, people, and rocks.

2. The teacher writes the topics on the board and then asks the students to name things that would go under each one of them. The teacher also asks the students if they remember the two symbols that are special about a national park.

Plants	Animals	People	Rocks	Symbols
Oak	Deer	Kids	Limestone	Arrowhead
Maple	Squirrels	Parents	Sandstone	Ranger Hat
Tulip Poplar	Bats	Rangers		
Wildflowers	Raccoons	Visitors		
Grasses	Birds	Teachers		
Ferns	Snakes	Students		

3. The teacher explains that the students are going to play a game and places them into six small groups in different areas of the room. After the cards have been thoroughly shuffled, each group will be given 6 cards. To win the game they will need to have a complete set of cards-1 plant, 1 animal, 1 person, 1 rock, and 1 of each symbol. But there is a catch, one hat is missing and has been replaced with something bad – pollution. If a group gets the pollution card they will want to get rid of it. Just like you want to get rid of the Old Maid, you will want to get rid of pollution. The teacher may wish to place a complete set of cards in view of the students for reference.

4. The students look at their cards and as a group choose the best move.

5. The students decide how many cards they will need to trade. After they have decided, they pick one member of their group to go to the center of the room to trade their cards with another group. The student that is selected to trade cards repeats the number of cards they are trading until they exchange cards with another group. They can only trade with a group that wants to trade the same number of cards.

6. The groups continue to trade cards until one group has a set of all six cards. When a group has a complete set they shout the word "park." The game stops. Any student in the middle goes back to their group with the cards they have in their hand when the word "park" is shouted.

7. The group that shouted park reads their cards to make sure they have a plant, animal, people, rock, arrowhead, and ranger hat card. If they have all six they get six points. The other groups check their cards to make sure they do not have a complete set. If another group has a complete set of six cards they also get six points. The teacher keeps score on the blackboard.

8. The other groups now check their hands to see which one is holding the pollution card. This group receives 0 points for this round.

9. The remaining groups get a point for each part of a set they have, no points are given for the duplicates.

10. The teacher collects the cards and shuffles them to be dealt again. The class can play as many rounds as desired. The teacher may wish to use the items on the cards to review what the class has learned about Mammoth Cave National Park.

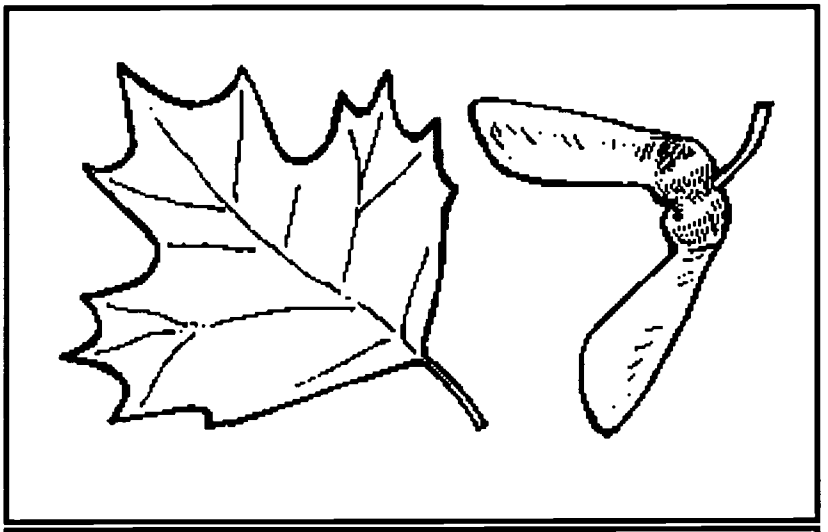
CLOSURE: Today we played "Oh No! Pollution!" and collected all the things it takes to make Mammoth Cave National Park. We also learned that pollution is a very bad thing and that is why it is important to take care of this very special place.

EVALUATIONS:

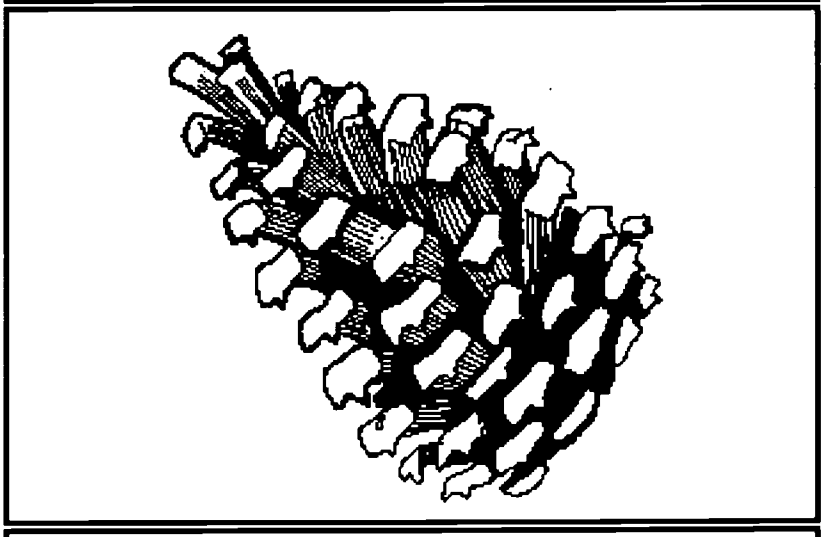
1. The teacher could have the students make their own cards by drawing or cutting out pictures from magazines.

2. The student could make a collage of pollution pictures that could effect Mammoth Cave National Park and their community.

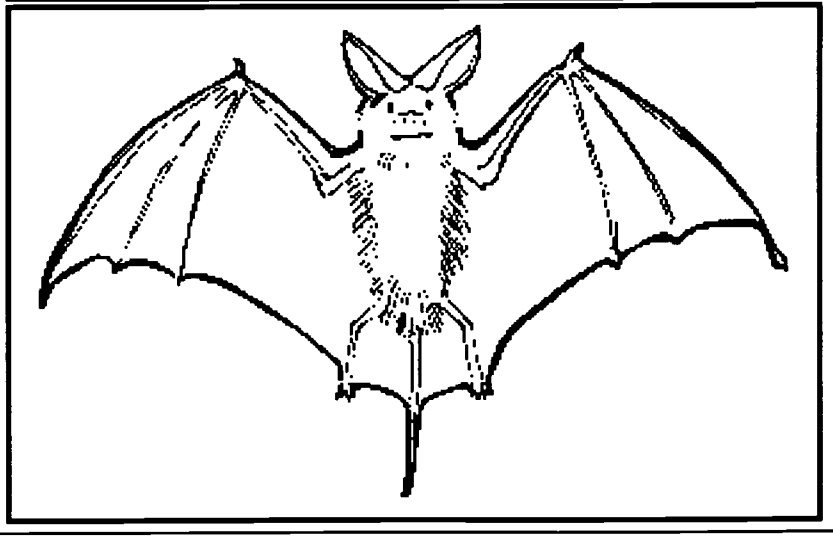
3. The students could write another government agency, the U. S. Forest Service, and ask for information from or about Woodsy Owl.



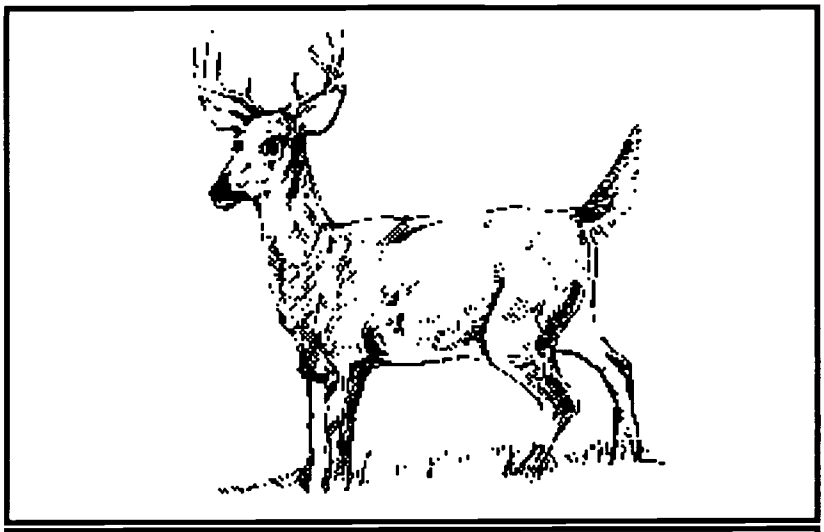
PLANTS



PLANTS



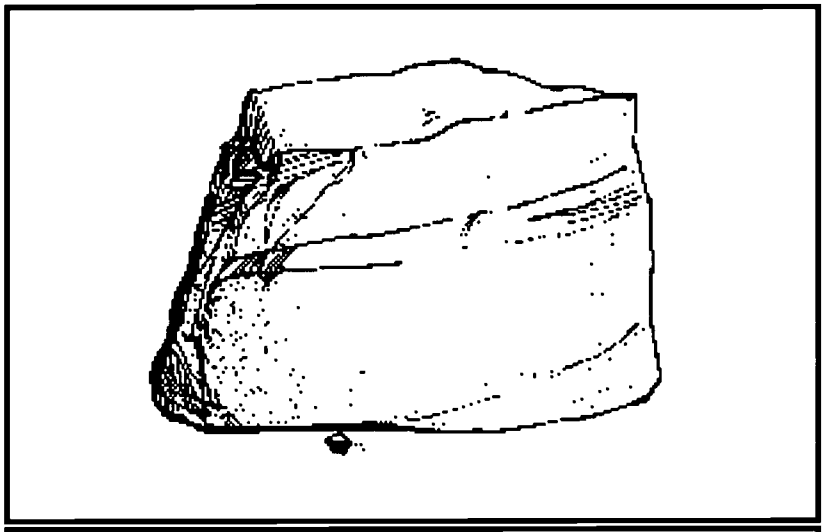
ANIMALS



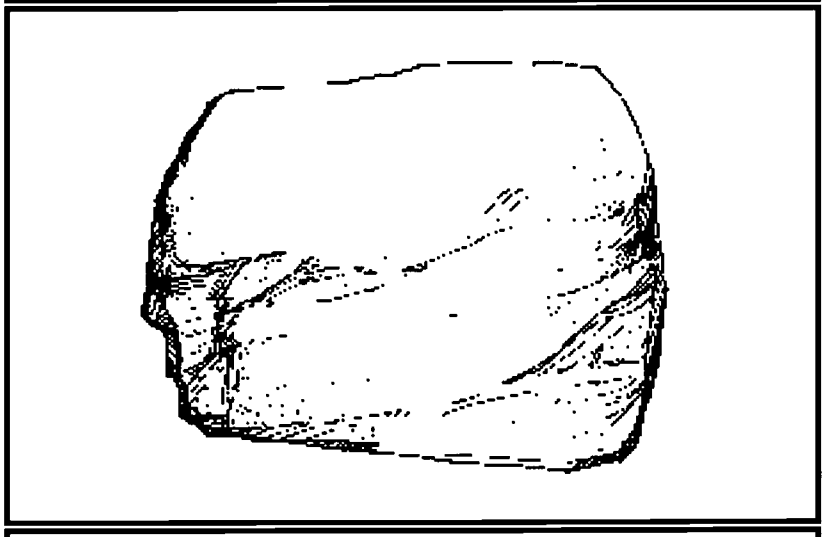
ANIMALS

PEOPLE

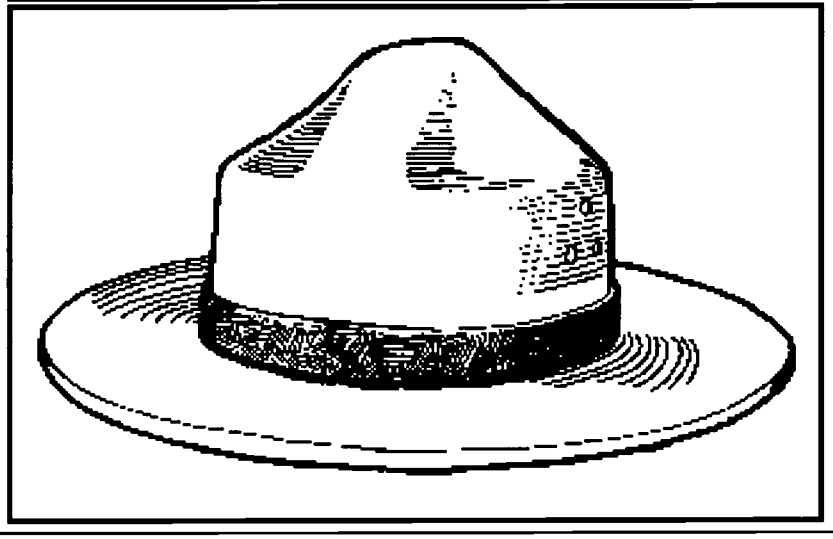
PEOPLE



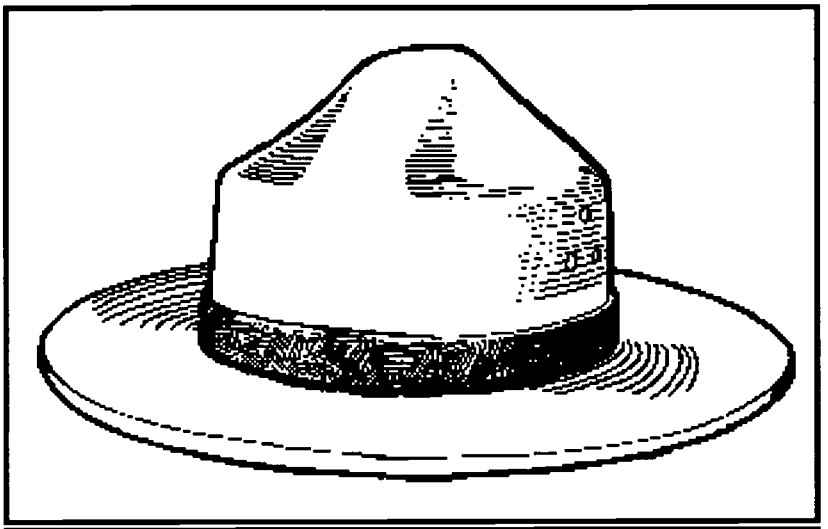
ROCKS



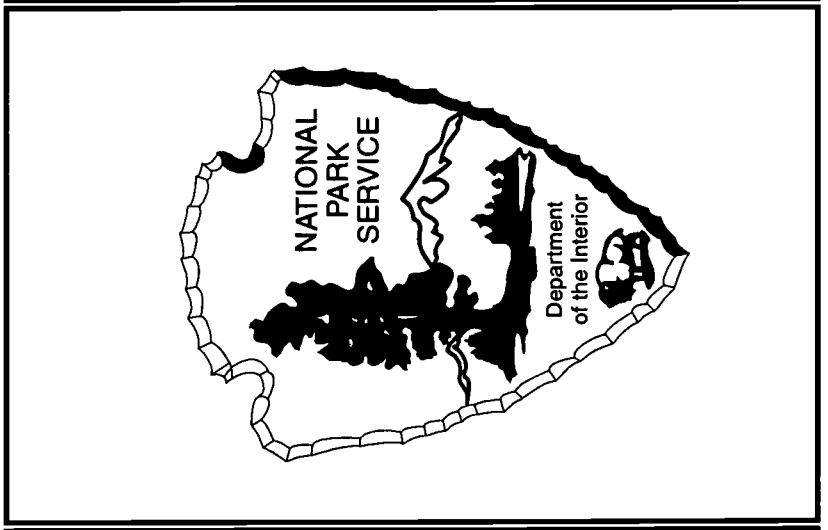
ROCKS



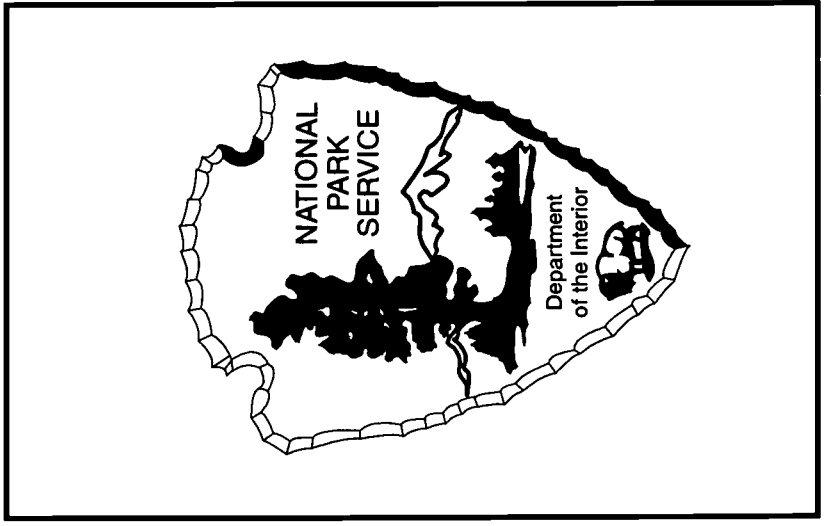
RANGER HAT



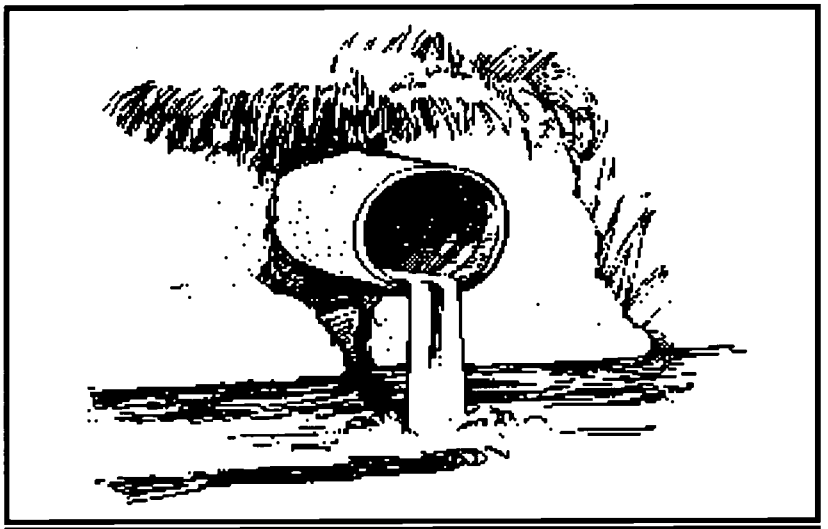
RANGER HAT



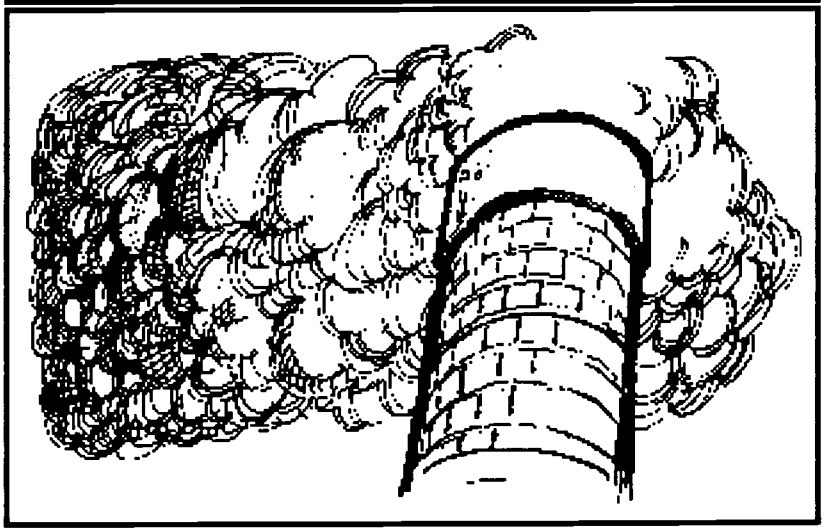
ARROWHEAD



ARROWHEAD



POLLUTION!



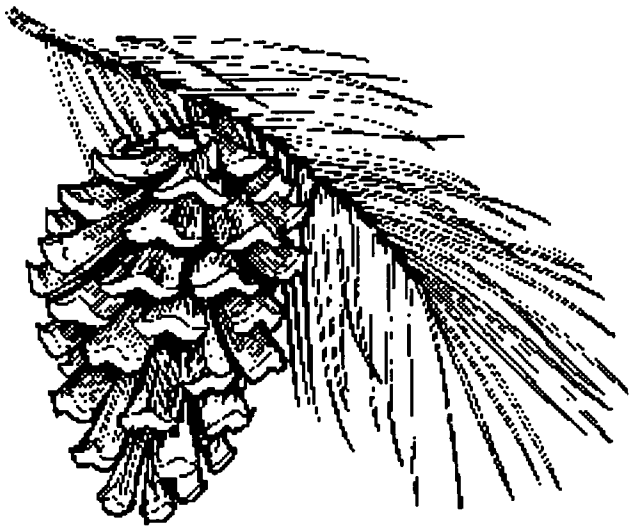
POLLUTION!

WALLACE STEGNER

NATIONAL PARKS ARE
THE BEST IDEA WE EVER
HAD.

ABSOLUTELY AMERICAN,
ABSOLUTELY DEMOCRATIC.

THEY REFLECT US AT OUR
BEST RATHER THAN AT
OUR WORST.



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