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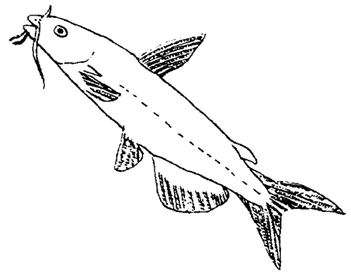
4-H 391 Introduction to NATURESPACE
E-8-00-4C-RP

INTRODUCTION TO NATURESPACE

University of Wisconsin-Extension · 4-H Youth Development Programs



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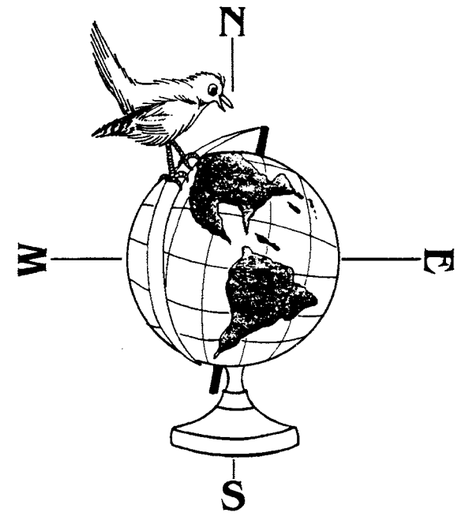
DEAR 4-H MEMBERS AND LEADERS:

Welcome to the world of NATURESPACE. These activities are designed to get your group started in the program. There are activities that focus on each of the ecological concepts of: habitats, ecosystems, populations and people effect. Try to select at least one activity from each concept. After you've completed this unit and selected your NATURESPACE, we suggest a resource map and inventory of your area as an excellent way to begin other activities. Have fun!

The authors,

Scott Craven
Nancy Franz
Paul Brings



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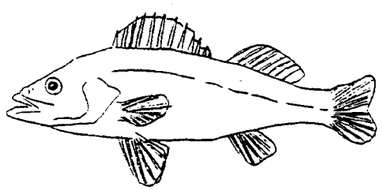


J. List other observations of this space:

_____

_____

II. SHARE YOUR OBSERVATIONS WITH OTHERS.

III. ANSWER THESE QUESTIONS FOR YOUR NATURESPACE:

A. Name ways to protect, conserve and enhance this NATURESPACE:

_____

_____

_____

_____

B. Describe what you could do to help protect, conserve and enhance this NATURESPACE:

_____

_____

_____

_____

IV. WHAT DO YOU LIKE MOST ABOUT THIS NATURESPACE AND WHY?

_____

_____

_____

_____

V. LIST THINGS YOU'D LIKE TO LEARN ABOUT YOUR NATURESPACE:

_____

_____

_____

_____

VI. AFTER STUDYING YOUR NATURESPACE, LIST WHAT YOU'VE LEARNED:

_____

_____

_____

APPENDIX: NATURESPACE INVENTORY

This Inventory exercise can be done as part of your NATURESPACE Resource Map or as part of each visit to your "space."

TYPE OF SPACE: _____

I. TAKE SOME TIME ALONE TO OBSERVE THE SPACE AND ANSWER THE FOLLOWING QUESTIONS:

A. What is the approximate air temperature?

_____

_____

B. What does the soil look like, smell like and feel like?

_____

_____

C. What are the plants and trees like? Which ones are most common?

_____

_____

D. What animal evidence can you find? Which ones are most common?

_____

_____

E. What is the geography like (rock forms, slope, etc.)?

_____

_____

F. What smells and sounds are a part of this space?

_____

_____

G. What evidence of natural phenomena do you see (fire, rain, etc.)?

_____

_____

H. How have people affected this space?

_____

_____

I. Give three words that best describe this space:

_____

_____

UNDERSTANDING NATURESPACE

What is NATURESPACE?

NATURESPACE is a part of Wisconsin 4-H's approach to environmental education. NATURESPACE is also a way to learn about and have fun with nature.

Nature is everywhere—in a sidewalk crack and in a deep, dark northern Wisconsin forest. Nature is interesting and exciting. Have you seen a flower or an insect and wondered what it is? Is it common? Is it rare? Is it dangerous? The outdoors is packed full of interesting plants, animals and events to question. NATURESPACE helps you answer these questions by studying something that interests you or by doing something fun like an adventure activity. The more you find out, the more you will want to know.

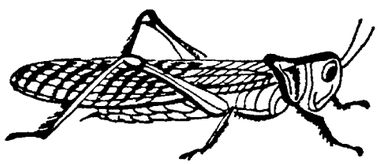
How can you be a part of NATURESPACE? There are three ways.

1. By studying something that interests you, such as, birds, trees or insects in a variety of "spaces."
2. By studying a "space" and some of its parts, such as, birds, flowers or trees.
3. By trying an adventure activity, such as, canoeing or cross-country skiing and letting your curiosity take off. What animal track was that we just skied over? Why is the water so murky where we are canoeing?

Why NATURESPACE?

NATURESPACE can help you "put the pieces together"—to understand what makes life tick. Ecology has become a very important and common word. It literally means the "study of houses or homes." An "ecosystem" is a life system—a place or home that supports life. A pond is an ecosystem, a field is an ecosystem, a city is an ecosystem, a wood lot is an ecosystem. Each of these ecosystems is also a space where you can learn about nature.

We are a part of those ecosystems, too, just like any other creature. We are dependent on the other parts of our ecosystem—air, water, energy, soil, other creatures—just like all other living things. We cannot live alone, but we have a big advantage over other members of ecosystems. We can think and learn and change things within our ecosystem—for better or worse! If we are wise, we will keep our ecosystem clean and running smoothly. If we are foolish, we could destroy our ecosystem. Talk of threats to our world ecosystem, such as, acid rain, the greenhouse effect and ozone loss is all around us in newspapers and on television. All of us play a role in the care of our own ecosystem. We must know what makes nature and ecosystems work. That is what NATURESPACE is all about. It's also about fun and sharing and responsibility. Try it and find out.



HABITAT HAPPENINGS

Animals need food, water, shelter and other similar animals in order to survive. You will be looking at a specific animal searching out where it finds the four things it needs to survive.

NEEDED:

Paper
Pencils
Markers (optional)

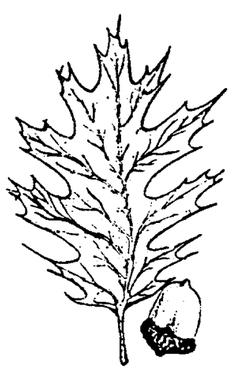
MEMBER DOES:

1. Choose an animal that lives near you. (Pick an animal that is easy to observe, such as, a rabbit, bird or squirrel.)
2. Label four pieces of paper with "water," "food," "shelter" and "other animals."
3. Observe your animal in its habitat for a few days.
4. On each piece of paper, draw a simple map of the habitat where your animal lives. Then, on the piece of paper titled "water," mark all the locations where your animal might find water. Do the same for each sheet, marking where the animal could find each of the things it needs to survive.
5. Make a cover for your animal booklet. Title the booklet "Habitat of (**animal's name**)."

GOING FURTHER:

1. Select other animals and create additional habitat booklets.
2. Create a habitat booklet of your own family.
3. Using the same animal, do a fall, winter, spring and summer booklet showing how the location and availability of each habitat component changes with the seasons.
4. Use the attached map activity and instructions to make a detailed habitat map to guide you if you are going to study a NATURESPACE activity later.

NOTES:

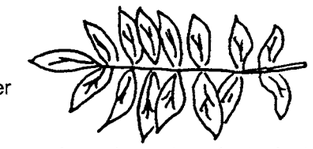


LAND USE

This activity is meant to help you discover the ways the land is used in your neighborhood.

NEEDED:

Colored pencils or crayons
Large piece of drawing paper



MEMBER DOES:

1. Take a look at the land around your home in order to decide how people have affected the land's use. To begin, you will need to draw a simple map of the area that you wish to study. Draw a large square or rectangle on paper to represent the outside edges of the study area. This could be sidewalks around one city block or the roads or fence line around your farm.
2. Take a walk around your area and add the following to your map:

   Shade in yellow on those parts of your map that represent areas used for human homes. Try to show things in scale. If a building takes up half of the total area, shade in half of the area on your map.

   Shade in brown—any stores, businesses, government buildings or work-related buildings, such as, barns or factories.

   Shade in red—all spaces used for cars. Be sure to include streets, alleys, driveways, garages, service stations and parking places.

   Shade in green—trees, lawns, hedges, fields and gardens.

   Pick another color to represent anything not included above.
3. On the back of your map, list the uses of land according to how much space they take up—from largest to smallest.

   If you could change the amount of two colors, more of one and less of another, which would you change?

   If a piece of land (a farm, for example) on the edge of a city is purchased and changed to a housing development, there is less green and more yellow on your map. How does this affect the plants and animals that lived in the fields and woods that are now homes and yards?

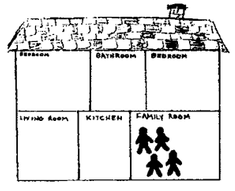
GOING FURTHER:

Pick an area within your map and list five changes that you think would help improve the area. Work to complete the one on which you think you could do the best job.

NOTES:

FAMILY DRAWING

The purpose of this activity is to graphically demonstrate how many people could live in your home.

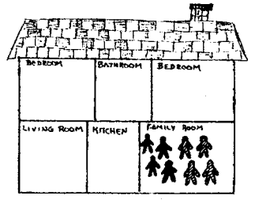


NEEDED:

Large sheet of paper
Colored pencils or crayons

MEMBER DOES:

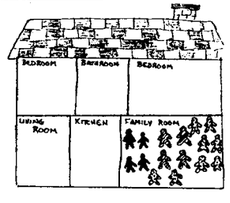
1. Draw a floor plan of your home, either from the top (looking straight down) or from the side. Remember to put the bedroom, bathroom, living room, kitchen, dining room, family room, etc., in your picture.



2. Using a different color, draw pictures of people in the room that your family uses the most.

3. Now, using a third color, double the number of people in your home.

4. Using a fourth color, again double the number of people in your home.

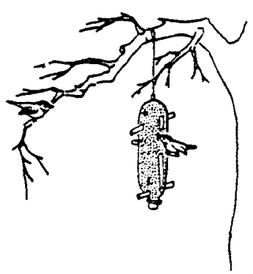


5. Discuss: how many people are sleeping in each of your beds? What would happen when you needed to get in the bathroom before school? How much food would be needed in your cupboards each time you doubled the number of people in your home?

GOING FURTHER:

Look around your community in areas where there are large populations of people. This may be in a place where there are apartments, townhouses or condos. What types of things have been done to relieve the congestion and make it not appear crowded? Where do these people get their food? Where do they park their cars? Do you think their population could double without affecting their living environment?

NOTES:



Making A NATURESPACE Resource Map

A map of your NATURESPACE should show all the different kinds of wildlife and habitat types present in the area you choose. You need to be observant and careful to check an area of land and to prepare an accurate and informative map that is close to scale.

You can map the woods, a local park, part of a river or creek bank, a forested area, pond, lake, fencerow or even a backyard. The area does not have to be large.

You will probably need a week or so to make a good map. Visit the area several times and at different times of the day to be sure your wildlife survey is complete.

You may wish to enlarge this project by mapping the same area at different seasons of the year. You are almost sure to find a seasonal change in kinds or numbers of wildlife.

You will need the following:
Pencil
Plain paper
Ruler
Large piece of cardboard or plywood for a drawing board

When you make the map, draw the map to scale, and give the scale in the margin. For example, 1 inch on the map equals 100 feet on the ground. Draw the map so that the top of the page indicates north. Label important information.

Show on the map where you found animals. In the margin, list the animals and when you saw them, as well as the habitats you saw them in (such as a fencerow, rock pile, or pond). See sample map.

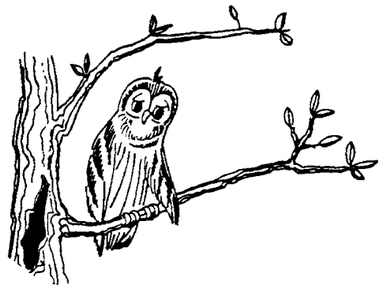
Use symbols that give as much information as possible. Sometimes you will need to make new symbols in addition to the ones shown. Explain all symbols in the map margin.

Use reference numbers in the map for places or things that you explain in the map margin (for example, animal tracks and their location).

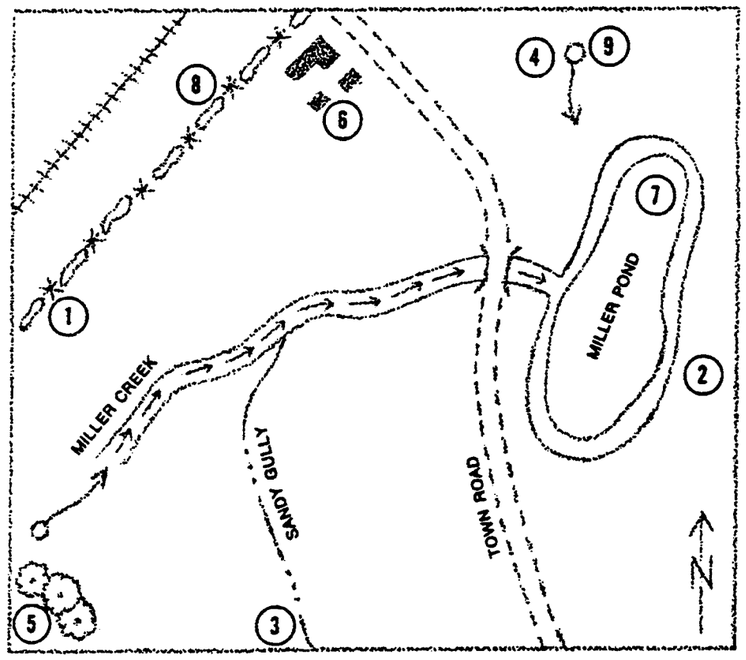
Displaying Your Map

You may mount your map on poster board or some other backing for display at a club meeting, school, fair or some other function. Be sure that the map is accompanied by all symbols and other necessary information. You may even wish to add to your display with labeled drawings, paintings, pictures or photographs of the wildlife and habitat in the area.

Use your imagination in making the display as attractive and informative as possible. For example, you might use different colors to illustrate specific habitats or food crops.



NATURESPACE Resource Map



RESOURCE MAP SYMBOLS

- Unpaved road
- Paved road
- Railroad
- Resource area edge (when not a field edge or fence)
- Field boundary (without fence)
- Wire fence
- Shrubs and trees in fencerow
- Crops
- Woodland
- Buildings
- Spring
- Stream
- Bridge
- Lake, pond, or reservoir
- Marsh
- Gully
- North arrow
- Scale (example: 1 inch = 100 feet)

1. Saw doe deer near fencerow shrubs in early morning.
2. Skunk tracks found near pond in early morning.
3. Saw cottontail rabbit near gully in late morning.
4. Fox seen near spring at dusk.
5. Saw two doe deer near pine trees in early morning.
6. Saw hen turkey near old buildings in late morning.
7. Two mallard ducks observed on pond in afternoon.
8. Ruffed grouse flushed near fencerow in late morning.
9. Fox with pups seen near spring at dusk.

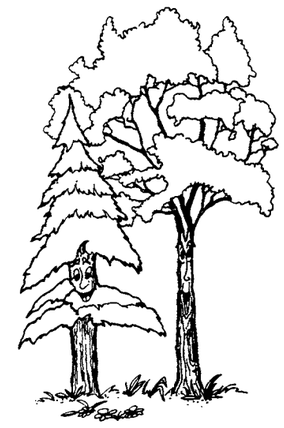
(Adapted from SW433, 4-H Wildlife Project)

Each person can come up with their own estimate of the beany population. Then go back and count all the beanies and see how close everyone came. It's perfectly normal to have many different estimates. Most of them should be pretty close to the real number of beanies.

Make it a contest by trying to guess the total number of beanies before any capturing and marking is done. See what number is closest to the real number—the "guess" or the calculated number!

Imagine how hard it must be for biologists who work with real wild animals! It is hard, but since most wild animals don't stand around in the open to be counted, methods like this one must be used.

NOTES:



POPULATION COUNT

The purpose of this activity is to get an understanding of one way to inventory or count a population of wild animals. You will be counting the rare and endangered "Beany" population. This is the same way wildlife or fish managers might capture, mark, and release members of a wild population.

NEEDED:

Large-mouthed, one-gallon container filled with dried beans (kidney, blackeye peas, beans, peas)
A marking pencil or paint

MEMBER DOES:

1. Your group is going to try to figure out the total population of "Beanies" in the jar by "capturing" several random samples of the beany population and marking them. Have each person in your group capture a small handful of beans by reaching in the container. (Remember that the mature Beany doesn't bite!) Mark the beans taken from the jar with a colored marker and count the number of marked beanies. Write down the total number marked by the group and put all the captured beanies back into the jar.

2. Shake the container to mix the marked and unmarked beanies—the way marked wild animals would mix into their population when released.

3. Have each group member reach into the container again to randomly select a handful of beans. They may have to close their eyes in order not to get all marked beans. This needs to be a random sample!

4. To find the size of the beany population in the jar, use the following formula:

$$\frac{\textbf{Total marked beanies (Step 3)}}{\textbf{Total marked/unmarked beanies (Step 3)}} = \frac{\textbf{Total beanies marked (Step 1)}}{\textbf{Total number of beanies in jar}}$$

For example, in the following equation, there were a total of 10 beans marked in Step 1. When the group members reached into the jar in Step 3, they picked out a total of 12 beanies—five were marked and seven were unmarked.

$$\frac{\textbf{5 marked beanies (Step 3)}}{\textbf{12 marked/unmarked beanies (Step 3)}} = \frac{\textbf{10 total beanies marked (Step 1)}}{\textbf{"X" number of beanies in jar}}$$

To find "X" - your estimated population of beanies in the jar - multiply 12 X 10, which equals 120. Then divide 120 by 5. Your answer is 24. The estimated population of beanies in the jar is 24.

Now try this example. In Step 1, you marked 100 beanies in a big jar of beanies. In Step 3, your group picked out 120 beanies - 40 marked, 80 unmarked. What is your estimated total population of beanies in the jar? If you said 300 (40/120 = 100/300), you're right!

EXPLORING HABITATS

The entire Earth is a complex ecosystem. Every living and nonliving thing in some way effects everything else. You will be studying a small section of the ecosystem—the habitat.

NEEDED:

Pencil
Paper
Markers (optional)

MEMBER DOES:

1. Find an area outside your home that has some grass, trees or other plants (it should have a variety of different kinds of plants). The area should be no larger than 10' by 10'. If possible, find an area with some water (a small pond or creek). This is your habitat study area.

2. Draw your habitat. Include the plants, trees and any water.

3. List all the elements in your study area in the proper category. If you do not know the name of a plant, write a simple description like "small fuzzy plant."

EXAMPLE

Plants	Animals	Nonliving Things	Human-Made Things
Oak Tree	Squirrel	Air	Paper
Fungus	Worm	Water	Soda pop-top

4. After you've made such a list, think about each thing and how it could affect everything else. Make a diagram showing the interaction in your area or write a short story with illustrations describing the interaction.

5. Observe your area on and off for about a week. Note any changes that have occurred. Are there any new members? Have any members left the area?

GOING FURTHER:

1. Create your own mini-habitat in a terrarium or aquarium. Make sure you include all the parts you listed in your outdoor habitat (plants, animals, nonliving things and human-made things).

2. Study two very different areas and compare the lists; how are they similar and how are they different?

3. The "bottle biology" project promoted through the Center for Biology Education, UW-Madison, is a fun way to make mini-ecosystems and study how they function.

NOTES:

MINI-ECOSYSTEMS

In teams of two, you will study a square foot of soil. A foot of rich Wisconsin soil is packed with thousands of tiny animals and plants.

NEEDED:

Spoons
String
Hand lenses
Ruler

MEMBER DOES:

1. Each team should choose an area in which to mark out a square foot on the ground with their string. Avoid areas that may contain poison ivy or endangered or threatened wildflowers.

2. Have each team inventory their square foot and record all the plants and animals that they find. After the inventory is complete, each team should use the spoons to explore the top two or three inches of soil. Using the hand lens, look at the tiny plant roots and insects found. Rub soil in your hand and smell it. Sprinkle some of the soil on a piece of white paper to help make the tiny animals more visible.

3. Dig deeper into the soil until the color changes. Has the smell or texture changed? What might make the color change?

4. After the teams have spent at least 30 minutes studying their areas, they should try to restructure the area to the same way it appeared before.

5. Discuss why it was impossible to put the soil back exactly as it was found. What happens when an ecosystem is altered or changed by fire, flood or people? Will wildlife and plants return?

GOING FURTHER:

1. Get together and discuss what each team found in their mini-ecosystem.

2. Did you know that it is estimated that in a given cubic foot of rich Wisconsin soil there will be found: 100 miles of root hairs, 1,000 animals and 10,000 plants, bacteria, fungi and molds?

NOTES:

WEB OF LIFE

Here is a chance to look at the components of an ecosystem and tie them together into a food web.

NEEDED:

Large tag board
Glue
String
A variety of pictures of plants, wildlife, water, birds, fish, etc.

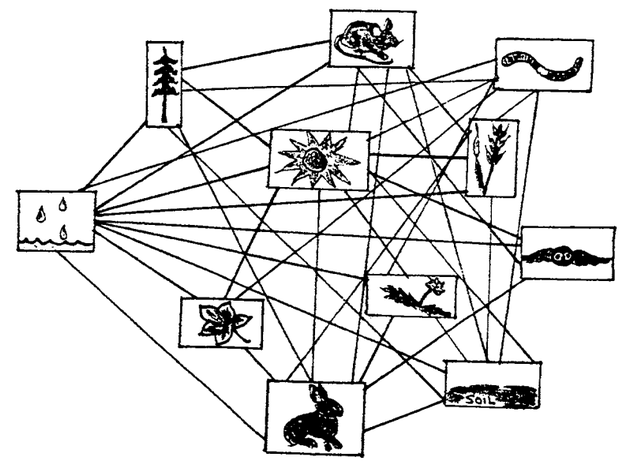
MEMBER DOES:

1. Cut out the pictures of wildlife, plants, water, soil, etc., and glue them on your tag board. Arrange them in such a way that you can run a string from each plant or animal. Start with the sun and run your string to the plants, then to the animals that eat plants, then to the animals that eat animals. This is called a simple food chain. Glue the string on a tag board.

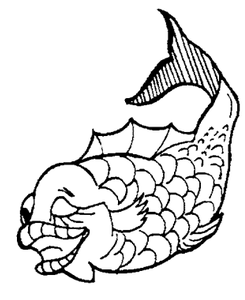
2. You may want to use straight pins to keep the string tight while the glue dries.

3. When you have completed the project, you should have a food web showing a variety of food chains. You will notice that the food chains are intertwined; some animals may eat both plants and other animals—humans are a good example.

4. Discuss: what would happen if all the plants disappeared? What would happen if just one animal in your food web disappeared? How important is the sun?



GOING FURTHER:

Try this same project by giving each member in your group or family a picture and connecting a string to each person to form a food chain. Ask the following questions: what would happen if all the plants died? Ask the people representing plants to let go of their string. What happens to your food web? You can do the same with the water, animals, soil or sun. What happens when we alter or change our ecosystem?

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