DOCUMENT RESUME

ED 137 081 SE 022 109

TITLE	Elementary Environmental Learning Packet K-3, Third Revised Edition. [Primary CEL Blocks, Student Activity Cards].
INSTITUTION	Brevard County School Board, Cocoa, Fla.
SPONS AGENCY	Bureau of Elementary and Secondary Education (DHEW/OE), Washington, D.C.
PUB DATE	76
NOTE	264p.; For related Intermediate Learning Packet, see SE 022 110; For the Second Revised Edition of Primary Teacher's Guide, see ED 119 960; Not available in hard copy due to marginal legibility of original document
EDRS PRICE	MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS	Art; *Elementary Education; *Environment; *Environmental Education; *Instructional Materials; Language Arts; *Learning Activities; Mathematics; Music; Outdoor Education; Primary Grades; Science Activities; Social Studies
IDENTIFIERS	Elementary Secondary Education Act Title III; ESEA Title III

ABSTRACT

This environmental education program consists of two levels: primary and intermediate. The learning materials are activity based and incorporate process and subject area skills with knowledge and concern for the environment. The program is also interdisciplinary including activities and skills from art, language arts, mathematics, music, science, and social studies. The materials in this primary set consist of student activity cards and resource materials. A glossary is provided; it is keyed to the activity cards. (RH)

To do . .

Many things are around you. These things make up your environment. You live in the environment. Say the word--<u>n-V-rn-ment</u>.

Take a walk. Look around you. Listen. Smell. Touch things around you. Taste.

Talk about the things you observed.

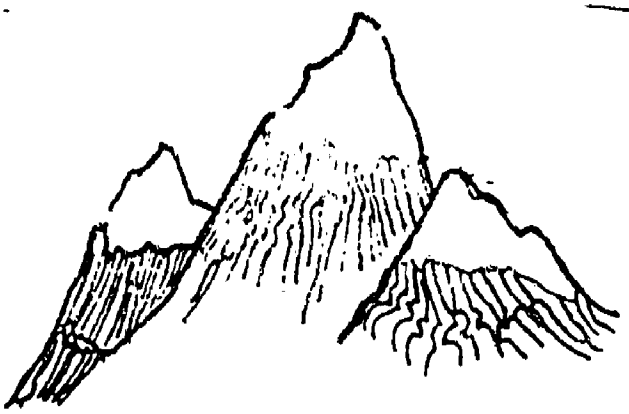
Do more . do more . .

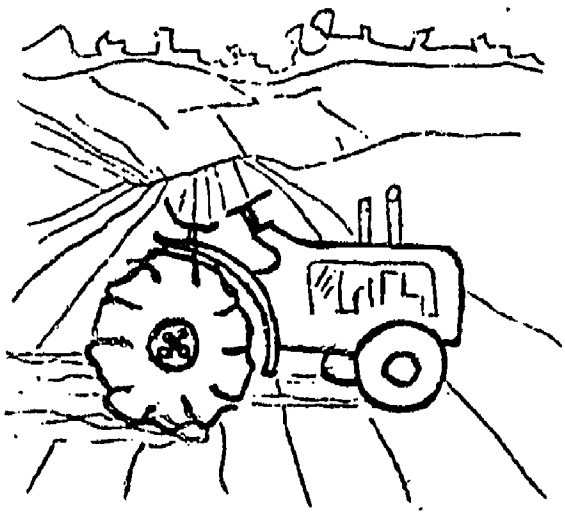
- What things do you like? Make a collage about them.
- What things would you change? Why? Make a list.
- Write a poem or story about your environment. Read it to the class.
- Draw a fish. Draw the things you would find around it. This is its environment. Is it the same as yours?
- Does everyone have the same environment?
- What makes an environment "good"?

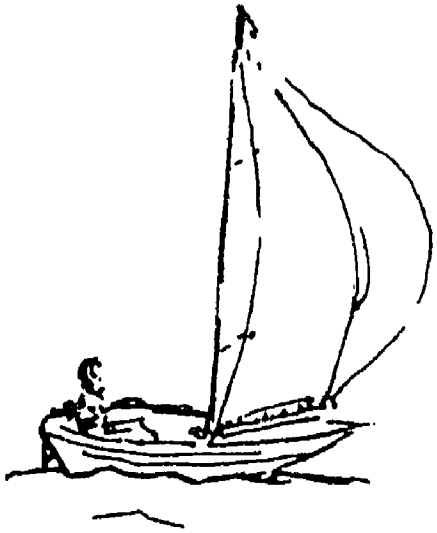
What now?

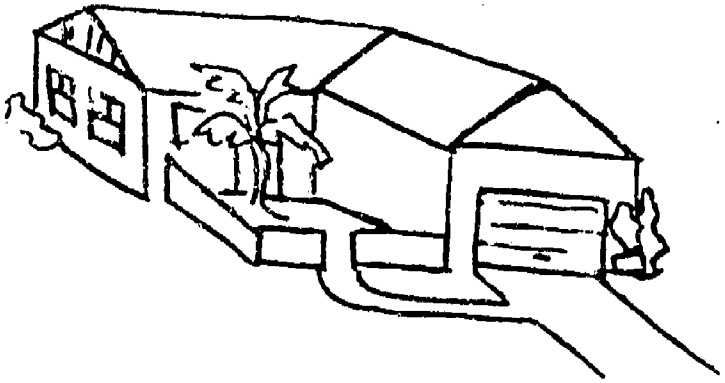
Your teacher will give you a sheet. Look at the pictures. Circle the things you might see in your environment.

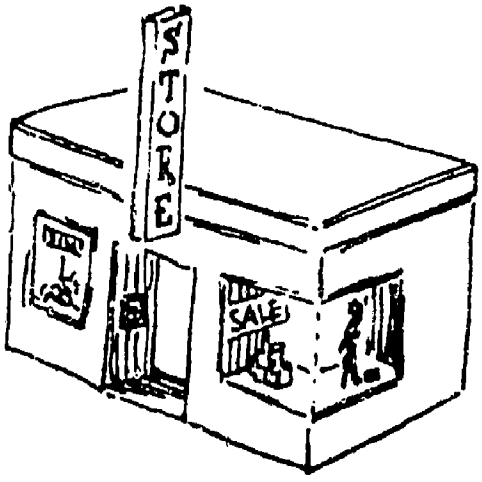
Circle the things that can be found in your environment.











To do . .

There are many things in your environment. Some are living. Some are not. Living things can grow and change. They can make more living things. They can die.

Look around your school. Find 5 living things. Show them to a friend.

Do more . do more . .

Find three nonliving things. Bring them to class. Your teacher will give you three seeds. Plant all six things. Water all six. Care for all six. Keep a record. What happens? How are living things different?

Look for nonliving things. Make rubbings of them. Use crayon, chalk, or pencil.

Do nonliving things change? Try to find out. Plan an experiment. Report to the class.

What happens when a living thing dies?

What now?

Find pictures of 6 things. Which are living? Which are nonliving?

Make one collage for living things. Make another for nonliving things.

To do . .

How are you different?

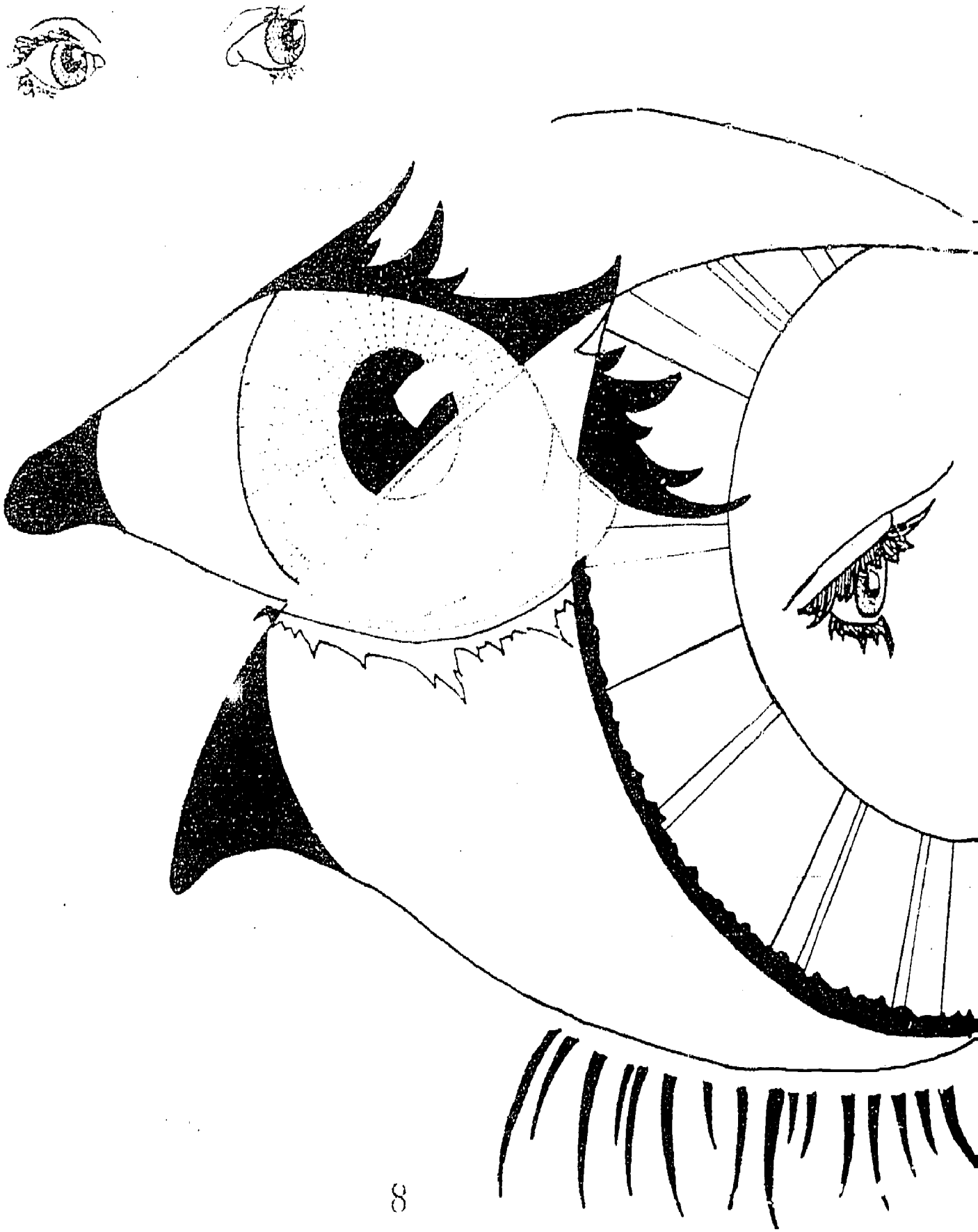
Start by using your head. Make a mobile of it. Your teacher will help you. Hang the finished mobile. Compare yours with others. How are you different? Make a class list.

Do more . do more . .

- Make a model of yourself. Start with a large piece of paper. Lie down on it. Have someone draw around you. Add the things that make you special. Use your favorite colors.
- Look around. Does anyone else look just like you? Why not?
- Fill out the card, Things That Make Me Special. What things make you different?
- Is everyone different in some way?
- Look around. There are many different animals. How many can you find?
- Why is it good to be different?

What now?

How many ways are people different? Make a list.



THINGS THAT MAKE ME SPECIAL

	Circle one:
sex	male female
age	5 6 7 8 9 10
number of people in my family	2 3 4 5 6 7
skin color	black brown red white yellow
eye color	blue brown
hair color	black blond brown red
hair length	short medium long
height	short medium long
hobbies	
favorite sport	
favorite color	
favorite food	

To do . .

Bring a baby picture of yourself. Your teacher will use it. Look at the picture. How have you changed? Make a list.

Does everyone change? Look at the other baby pictures. Can you tell who they are? Try it.

Do more . do more . .

- Thumbprints do not change. Make thumbprints. Study them. Use your prints to make pictures.
- List other ways you have not changed.
- The environment changes. How do these changes affect you? Make a collage. Show changes in the environment.
- Go outside and find something that is changing. Show a friend.
- Is change good?

What now?

Your teacher has a list. Which things change? Which do not? Fill out the chart.

CHANGE

Study this list. Decide which things change. Decide which do not. Put each thing in the right column.

Height	Weight	Eye color
Hair color	Hair length	Thumbprints
Number of fingers	Clothes you wear	

Change	Don't Change

To do . .

Choose three shapes. Trace around them. Cut out the paper shapes. Use them to make something.

Try making different things. Which do you like best?

Do more . do more . .

. Use your shapes--
  . Invent an animal.
  . Make more shapes.
  . Invent flowers, houses, people.
. Use tissue paper shapes. Make a collage.
. Make a mobile. Use objects with different shapes.
. How are shapes used in buildings?
. What shapes are used in nature?
. Make a collection. Collect objects with different shapes. Display them. Group them. Which are natural? Which are man-made?

What now?

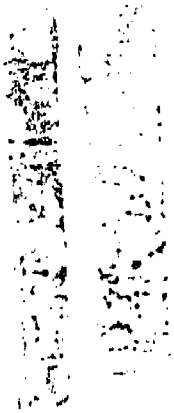
Look for shapes in your environment. Find each shape once. Make a record.

Do more . do more . .

. Blindfold a friend. Take him on a touch walk. Stay in the classroom.
. Go outdoors. Take rubbings of different textures. How many can you find?
. Collect natural objects. Make a collage with them. Give it a title.
. Feel man-made objects. How do they feel? Describe them.
. Make a touch book. Put a different texture on each page. Label each texture.
. Why are textures important?

What now?

Your teacher has a list of words. Which ones describe textures?



To do . .

Go on an odor hunt. Pick a place that has lots of odors. Record all the things you smelled.

Draw a picture of one thing you smelled. Put it on the board. Pick a word that describes the smell. Add it to the board.

Learn 5 smell words.

Do more . do more . .

- Find a picture of one thing that smells. Bring it to class. Do you like the smell? Tell the class.
- Have an odor hunt. Stay inside. Blindfold everyone. Sit in a circle. Bring an object to the circle. Can they guess what it is?
- Do you use your sense of smell? How?
- Do animals use their sense of smell? How?
- What animals use smell in a special way?

What now?

Take a bag from your teacher. Describe the object in the bag. Use only smell words.

To do . .

Sounds are all around you. They are part of your environment. Go on a sound hike. Listen for 60 seconds. Think of one sound you heard. Draw a picture. Show what made the scund.

Do more . do more . .

- What sounds help people? How?
- Are some sounds nice to hear? Name some.
- What sounds bother you? Make a collage about these.
- Listen again. Do you hear natural sounds? Do you hear man-made sounds?
- Make a tape-recording of sounds. Stay in one place. Play it for your friends. Can they guess where you recorded it?
- What is your favorite sound? Write a poem about it.

What now?

Tell about one sound you heard. What made the sound? Where did you hear it? Was it loud or soft? Did you like it?


HELP

To do . .

What is noise? Do you like it? Is it good for you?

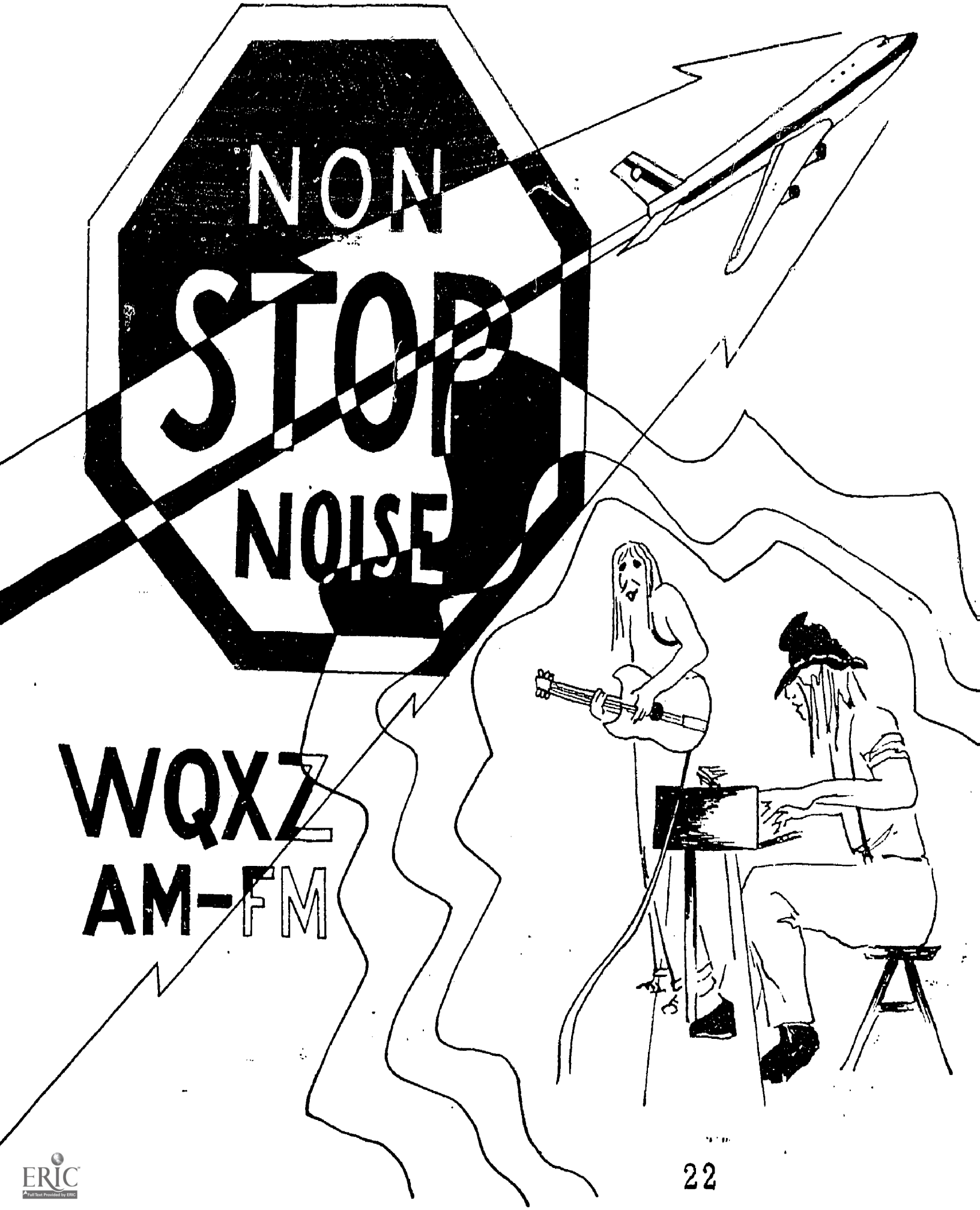
Survey your home or school. Record all the noise-producers. How do they affect people? What can be done about noise? How can you help?

Do more . do more . .

- Draw a cartoon. Show how noise might bother someone.
- Some noises can cause hearing damage. Some people hear a lot of noise in their jobs. Make a list of these jobs.
- How are people protected from noise? Try to find out.
- Be a noise-detective. Use a tape recorder. Record the noises in your classroom. Identify the "noise-producers."
- Can you lower the noise in your room?
- Write a poem. Tell how you feel about noise.

What now?

Make a class list. List ways to reduce noise. Try some of the ideas. Does it help?


NON
STOP
NOISE
WQXZ
AM-FM

To do . .

10

What makes you happy? Find a picture of one thing. Why does it make you happy? Tell the class.

Find something that makes you sad. Why does it make you sad? Tell someone.

Do more . do more . .

. How do you feel when you see:
  rain? fire?
  litter? a dead animal?
. Act out or write about:
  What makes a hungry animal happy?
  What makes a thirsty animal happy?
. What things do animals need?
. What do plants need? How are you like plants? How are you like other animals?
. Try to make someone happy. How did you do it? Tell the class.

What now?

Finish this sentence:
For me, happiness is _____
_____.

To do . .

Read the poem on the front. Listen to the song, "Inchworm". Do you like the tune? Do you like the words? Why? What do the words mean?

Are you too busy to see beauty? Do you know someone else who is?

Do more . do more . .

- How do marigolds help the environment? Do you like them?
- Plant marigolds. Do insects like them? Where could you use marigolds?
- Make a marigold sponge painting. Your teacher will help you.
- Is a weed a flower? Why don't people like weeds?
- Make weed prints. Are they beautiful?
- Do one thing to make your environment more beautiful.

What now?

Notice something beautiful that you see everyday. Tell a friend about it.

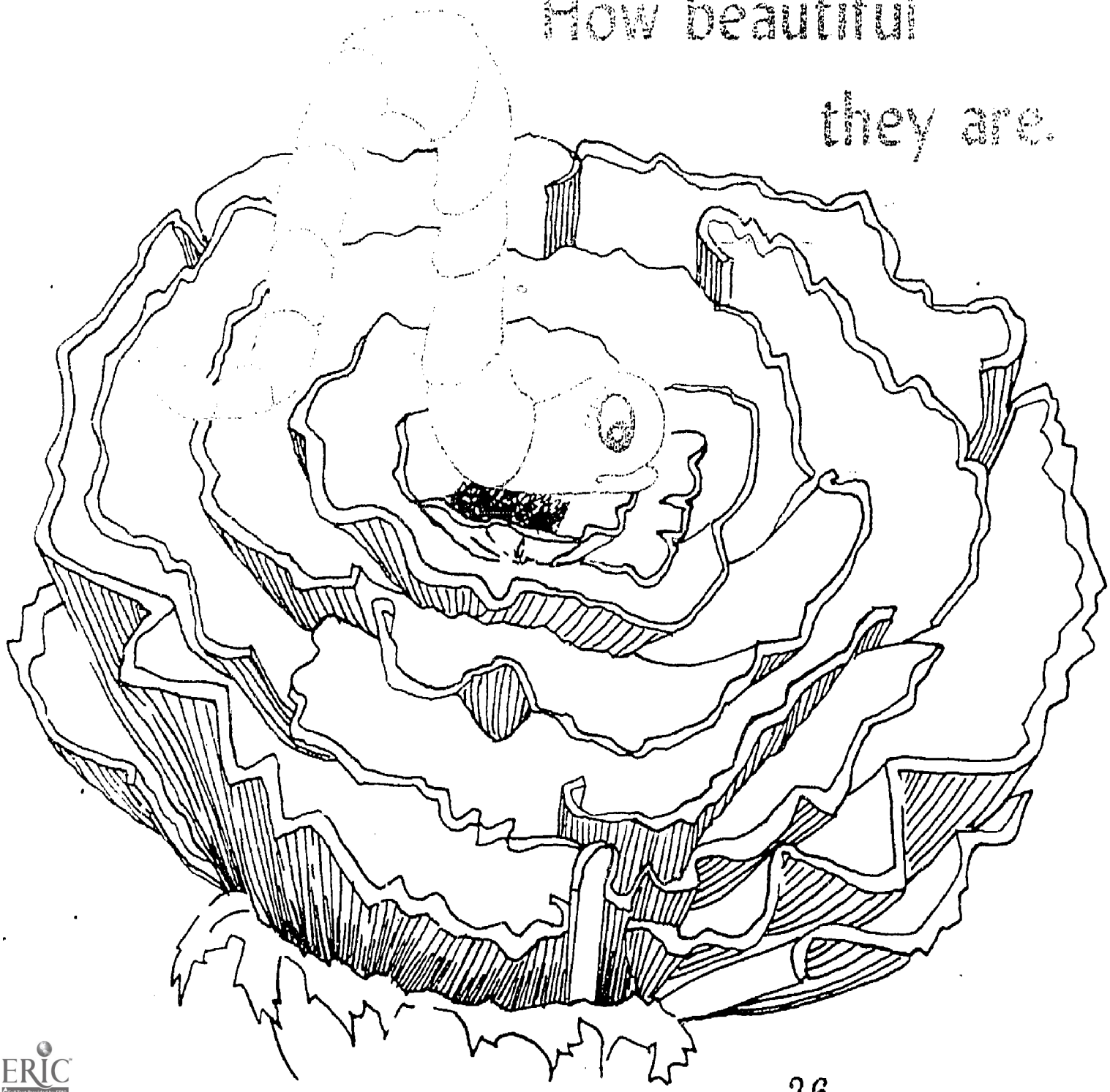
Inchworm, inchworm.

Measuring the marigolds.

Seems to me, you'd stop and see,

How beautiful

they are.



To do . .

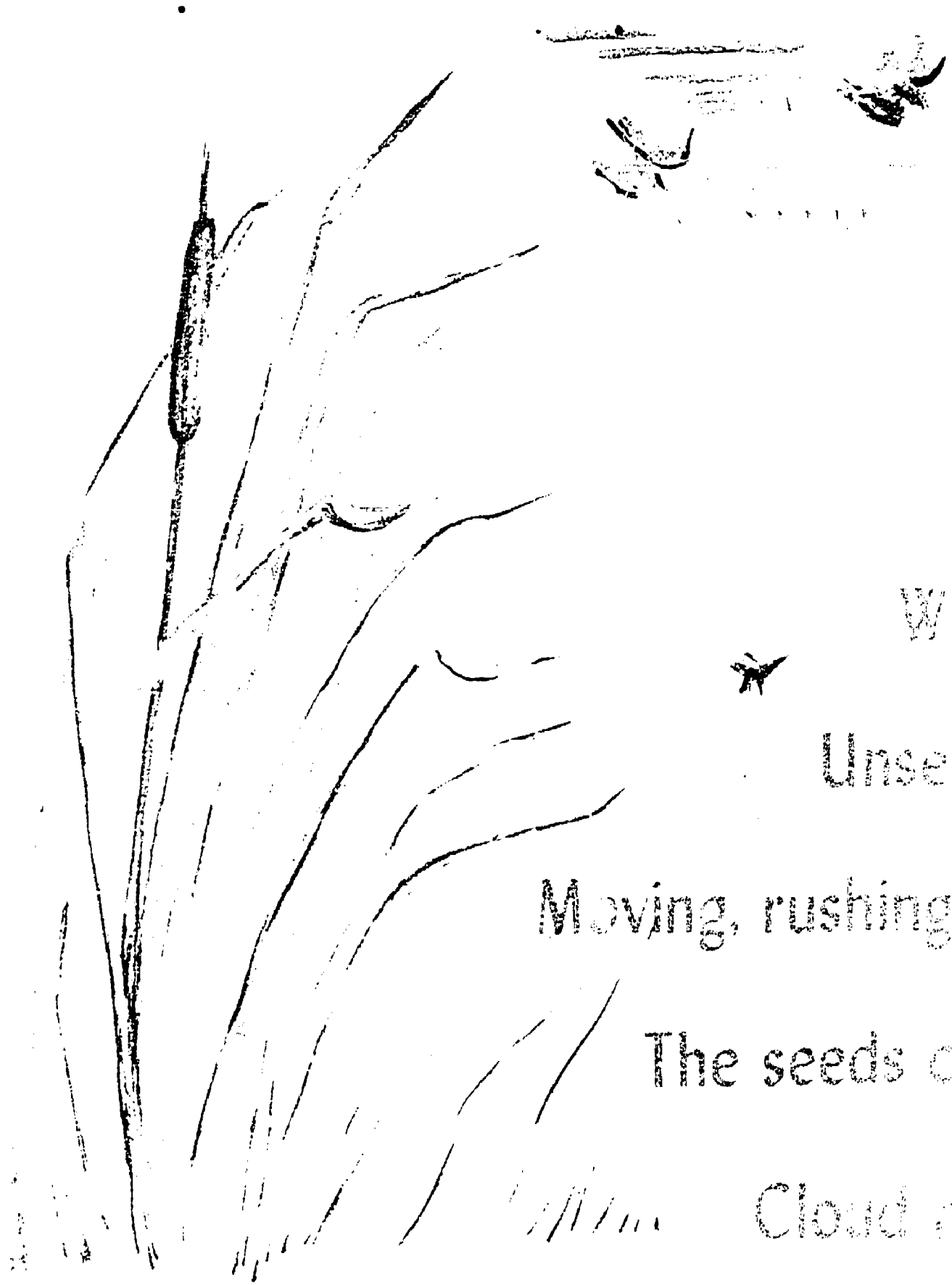
People write poems about their environment. The poems express their feelings. Write a special kind of poem. It is called a cinquain. Here is all you do:

Do more . do more . .

- Line 1 - 1 word - subject or title.
  Line 2 - 2 words - explains the title.
  Line 3 - 3 words - shows action.
  Line 4 - 4 words - completes line 3 or adds a further thought.
  Line 5 - 1 word - explains the title.
- Do a painting. Add it to your poem.
- Make a booklet. Put in your poems and pictures.

What now?

Read your cinquain to the class.



Wind

Unseen air

Moving, rushing, mixing

The seeds of earth

Cloud maker

To do . .

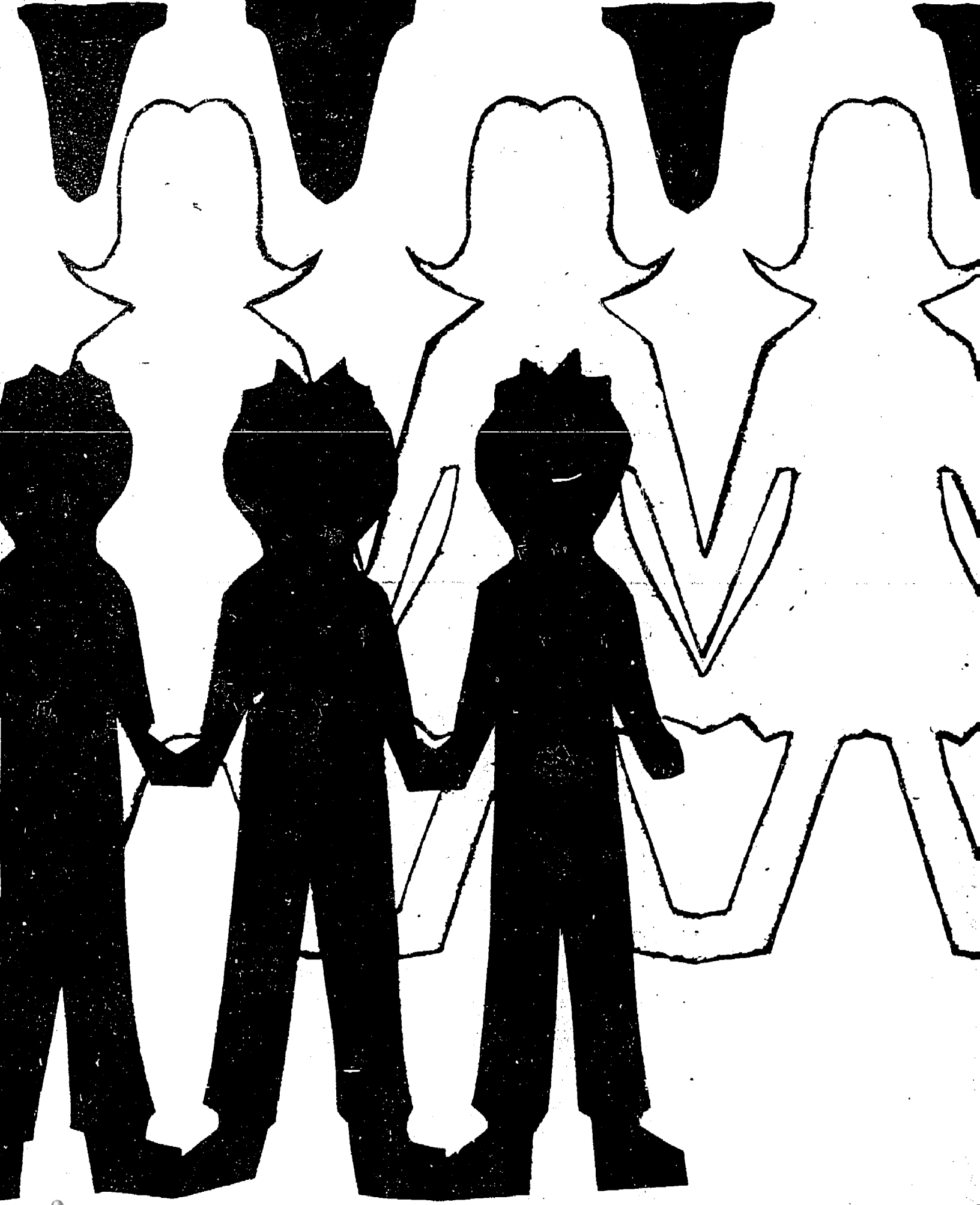
Find the five people you talk to most. You interact with these people. Give each one a piece of string. Have each student do the same. Look at the pattern. How do the students interact?

Do more . do more . .

- Use a stamp pad and paper. Find the people you depend upon. Collect their thumbprints. List why you need each one.
- Use another piece of paper. Who depends upon you? Collect their thumbprints. List why they need you.
- Are some people on both pieces of paper? You and these people are interdependent. You need each other.
- Look around you. Pick one thing. What does it depend on? What depends on it? Make a list or drawings.

What now?

What (or whom) do you interact with? Make a drawing.



To do . .

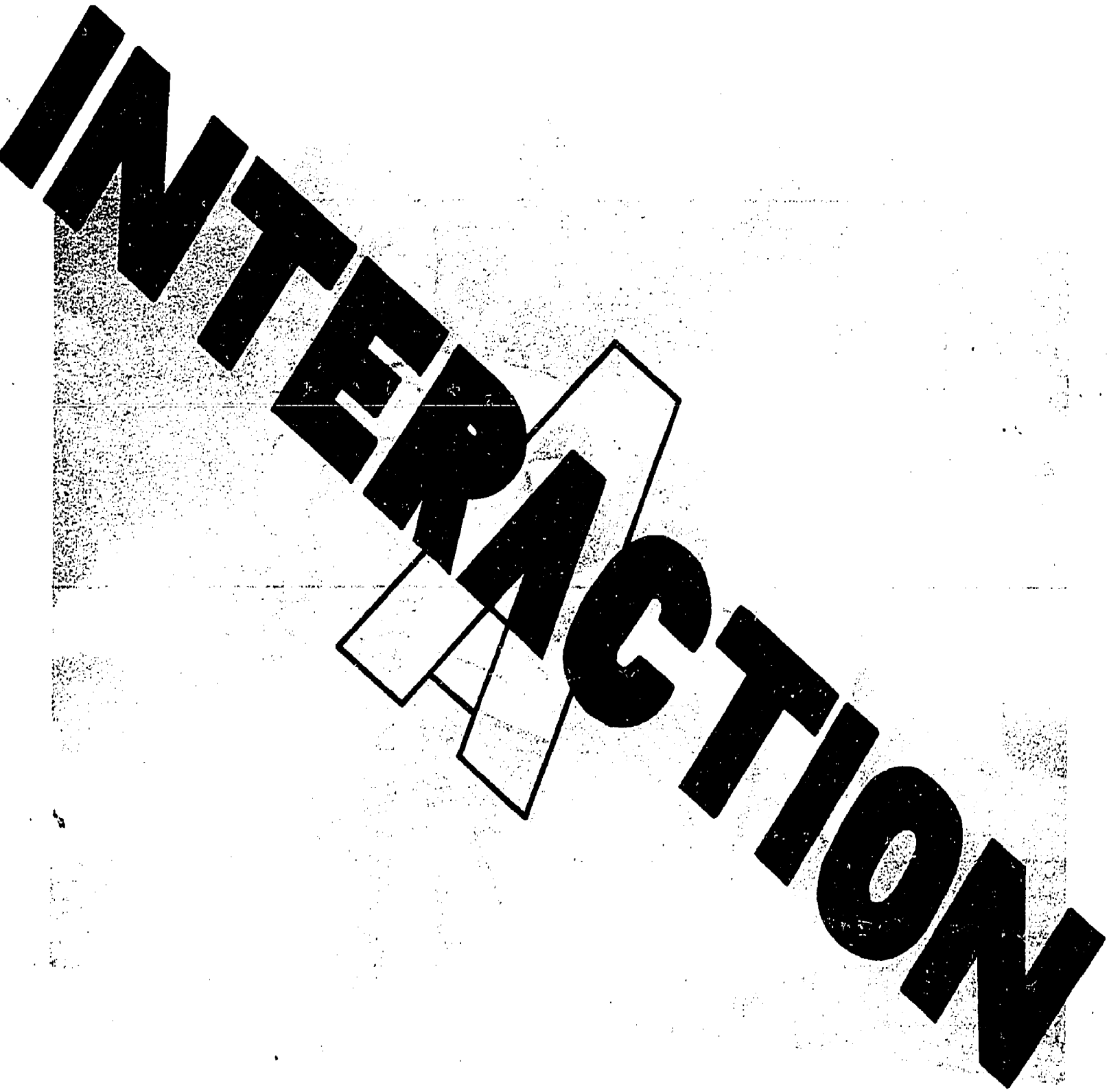
Go outside. Sit quietly. What things do you see interacting (wind - trees - bee - flower)? Make a list. Why is interaction important?

Do more . do more . .

. Collect an ant's nest. Put it in a jar. Observe the ants. How do they interact?
. Read "A Different Language". How do the animals in the story interact?
. You interact with many things. Make a list. What do you interact with in one hour?
. Plants and animals interact. Prove this to a friend.
. How are interaction and interdependence alike? How are they different?

What now?

Make a collage. Show 5 ways you interact with your environment.


INTERACTION

A DIFFERENT LANGUAGE

Do you like picnics? Who eats the most? Do the ants eat more than you? How do ants find food? Maybe one ant says, "Hey, Joe, the food's over here!" Maybe the ants just see the food.

Ants can't see very well. They can't talk either. They have long feelers. They are called antennae. Ants use them like we use our noses. When ants find food, they signal. They touch their bodies to the ground. This leaves a trail. The trail is made by a special chemical. It comes from the ant's body. The trail leads to the food. It leads back to the nest. Other ants smell the chemical. They rush out of the nest. They follow the trail to the food.

When two ants meet, they sometimes stop. They tap each other with their antennae. They are trading smell signals. This helps them to know ants from their own colony.

Some animals use sound. Baby chicks signal their mothers. They can signal if they are lost. They also signal if they are cold or hungry. They seem to be saying, "Cheep, cheep." This may mean, "I am cold."

Birds also use sound. Why do birds sing? Sometimes the song is a signal. Some songs are warnings. A male bird claims a piece of ground in the spring. This is his territory. He warns other males to stay away. He sings to females, too. He tries to attract them.

Birds use colors to signal. Males are usually brightly-colored. Females are not. This helps the birds. They can tell males from females. This helps them find mates.

Monkeys have territories, too. Someone may come into their territory. They roar and howl. The forest rings with sound. Each clan signals the others. A roar prepares the other groups for danger.

Animal language is important. It helps animals find food. It signals danger. It helps them stay away from danger. It helps them find mates. It helps them raise their young.

-Nature and Science,
Vol. 5, No. 9,
January 1968, pp.5-7.

Vocabulary

1. signal: movement or sound that has special meaning
2. chemical: a special substance, like water, sugar
3. colony: a group like a family, tribe
4. territory: a piece of ground
5. attract: to pull toward, to make something come
6. mates: "marriage" partners in nature
7. clan: small group, family

Questions-for Thought

1. You drop your ice cream cone in the grass. Later, ants are crawling all over it. Why? Explain EXACTLY what happens.
2. Pretend you are an ant. How could you tell if another ant was a friend?
3. Why do baby chicks go "cheep"?
4. A bird's song might be a warning. Explain.
5. When do monkeys howl? Why?
6. What does animal languages do? Make a list.

INTERACTION IN AN ANTHILL

How can you study an anthill? How can you see inside? How do you know what happens?

Bring the anthill to you. Make an anthouse.

Collecting Ants

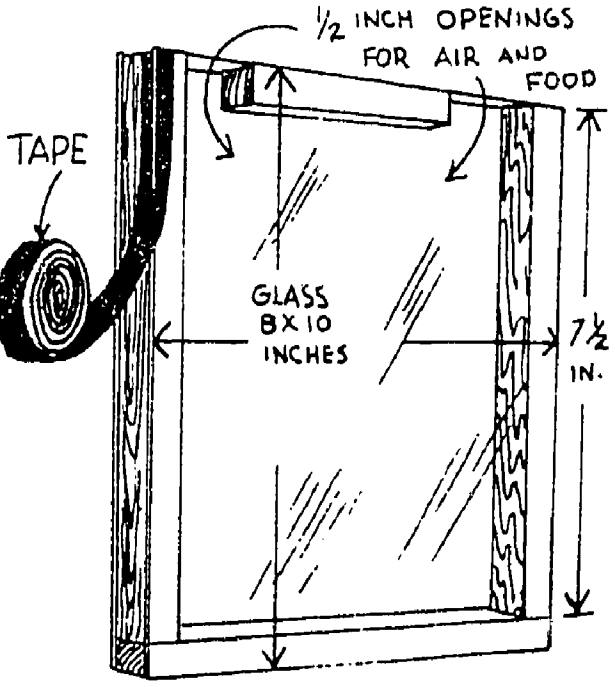
Common brown ants can be found everywhere. Look in yards and empty lots. Look for small piles of dirt. These are entrances to anthills. The hill may be several inches deep. Work carefully. Dig up ants and dirt. Put them in a large paper bag. Close it tightly. You don't have to capture all the ants. You do have to get the queen. She is much larger than the others.

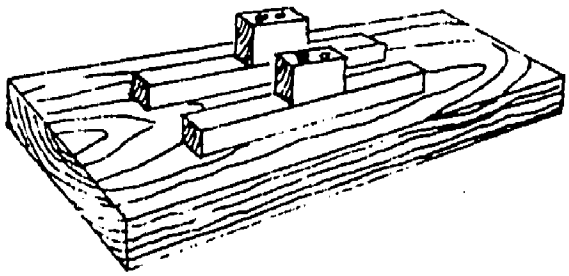
Building the Anthouse

You will need:

2 panes of glass, 8" x 10"
a four foot strip of wood, ½" wide and ½" thick

a piece of wood at least 11" x 4"
(Could be the side of an orange crate.)
2 pieces of cardboard the same size as the glass
Sponge, about 1" x 1" x ½"
2 small balls of absorbent cotton
1 roll of adhesive tape
Glue that will stick to wood and glass
A hammer and some long, thin nails





Directions:

Cut the following strips of wood:
1 strip 10" long
2 strips 7½" long
1 strip 9" long

Lay one pane of glass on the table. Glue the strips to it. Use the picture as your guide. This is the frame. You cannot finish it until you have the ants and the dirt.

Make a stand. Use the 11" x 4" piece of wood for the base. Cut 2 strips 5" long. Cut 2 strips 2½" long.

Hold the other pane of glass in place over the frame. Place the wood strips on their bottom edges. Place them in the center of the base. Mark the width. Nail the strips in place as shown in the picture. The anthouse should stand upright. It should fit between the strips.

Go outdoors. Put in the ants and dirt. Lay the frame down flat. Put the glass side down. Put the ants and dirt inside the frame. Fill it a little more than halfway.

Place the sponge on top of the dirt. Place it under one of the air holes in the top. Quickly glue the other pane of glass to the frame. Plug the air holes with cotton. The ants cannot escape now. Let the glue dry. Tape the edges of the "glass sandwich." Do not tape over the air holes.

Caring for Your Ants

1. Use an eyedropper for watering. Soak the sponge at least once a week. The dirt should be moist but not wet. Too much water will drown the ants.

2. Feed the ants every few days. A drop of honey or molasses will do. You can use mashed apples or bananas. Ants do not need much food. Do not over feed them.

3. Keep the anthouse away from bright sunlight or heat.

4. Ants like to work in the dark. Cover the sides of the house with cardboard. You can try taping red cellophane to the glass. This filters out the light. You can watch the ants. You will not disturb them. Keep a magnifying glass handy.

To do . .

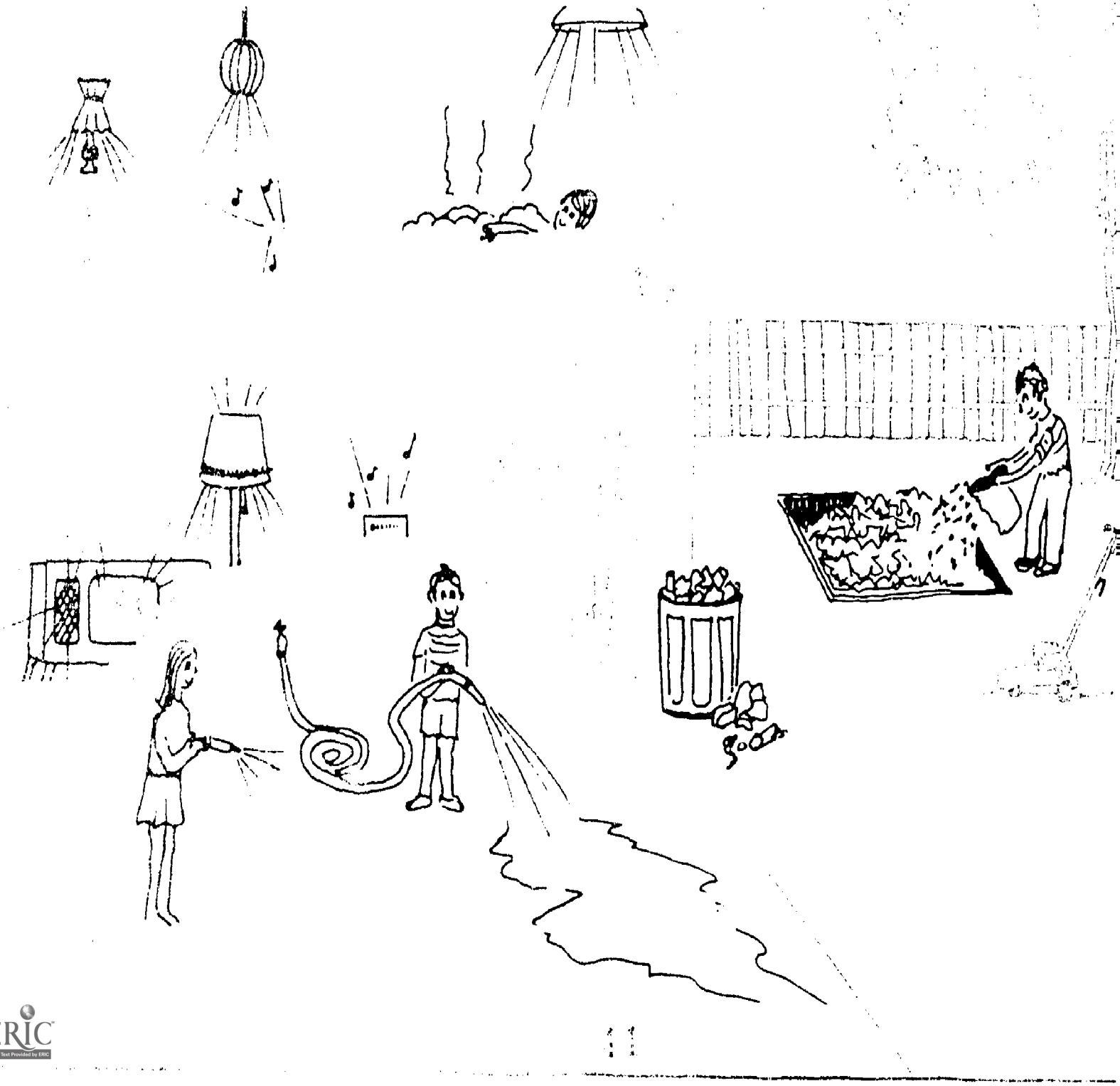
Your house is part of the environment. Make a model house. Your teacher will give you the parts. Put them together. Color the house. Add an environment to the model.

Do more . do more . .

. The environment affects your house. Draw a picture of your house. Add the things that affect it.
. What things do you use in your house? Do they affect the environment? Make a chart.
. What things do you use outside? How do they affect the environment? Make a collage.
. Do all people live in houses? Where else do they live? Do their homes affect the environment?

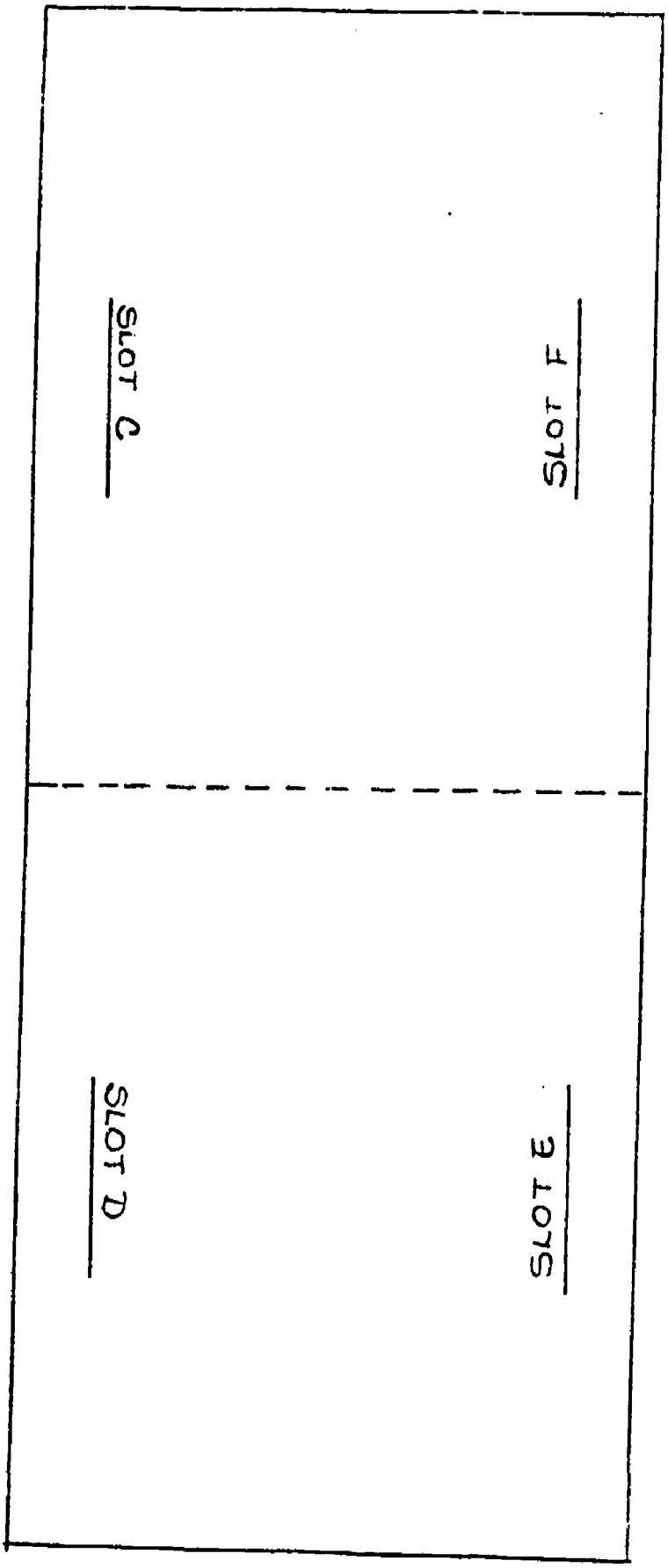
What now?

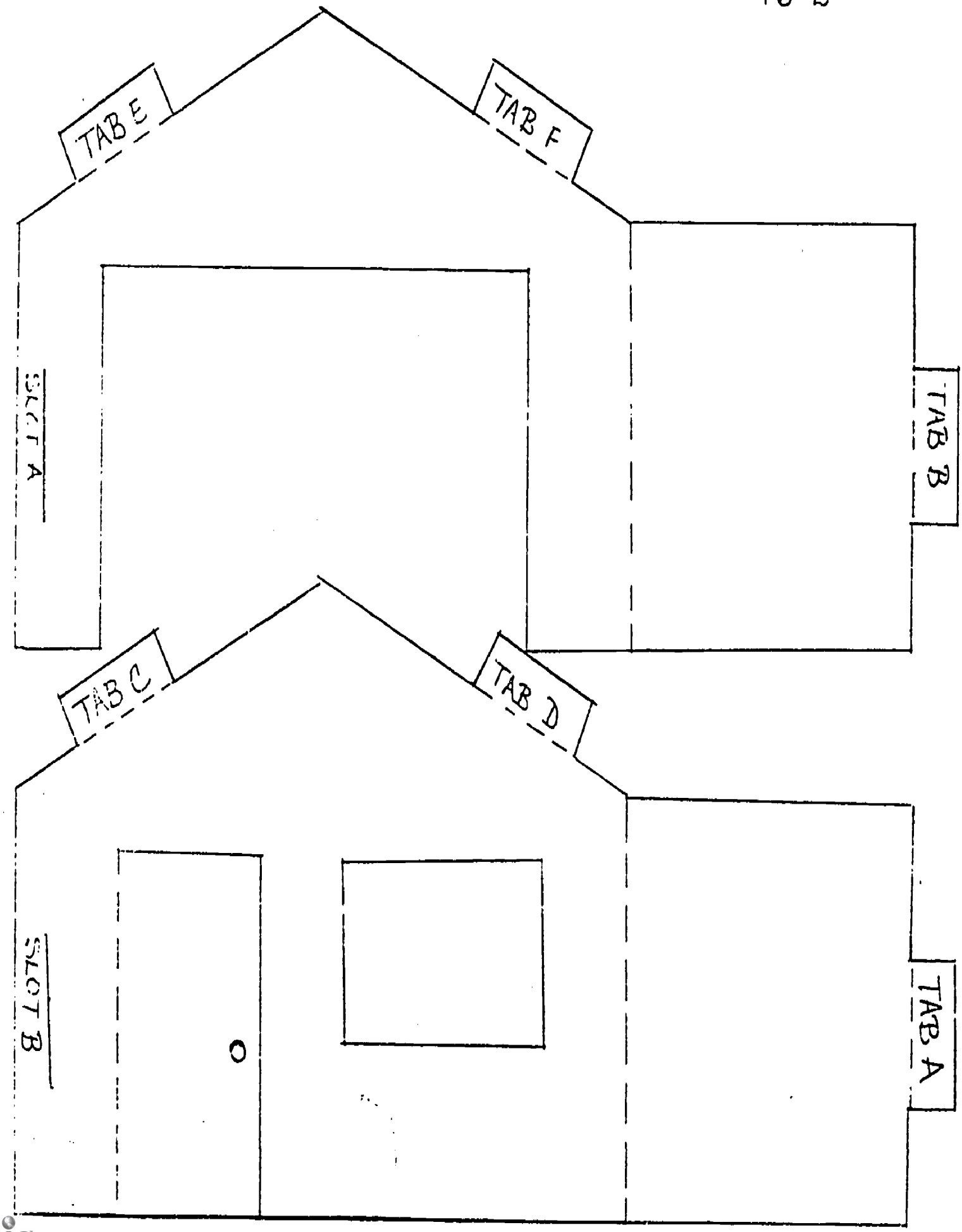
Your house interacts with the environment. Show how it does.



MODEL HOUSE

Directions: Cut along solid lines. Fold along dotted lines. Match tabs and slots.




TAB E
TAB F
SLOT A
TAB B
TAB C
TAB D
SLOT B
TAB A

To do . .

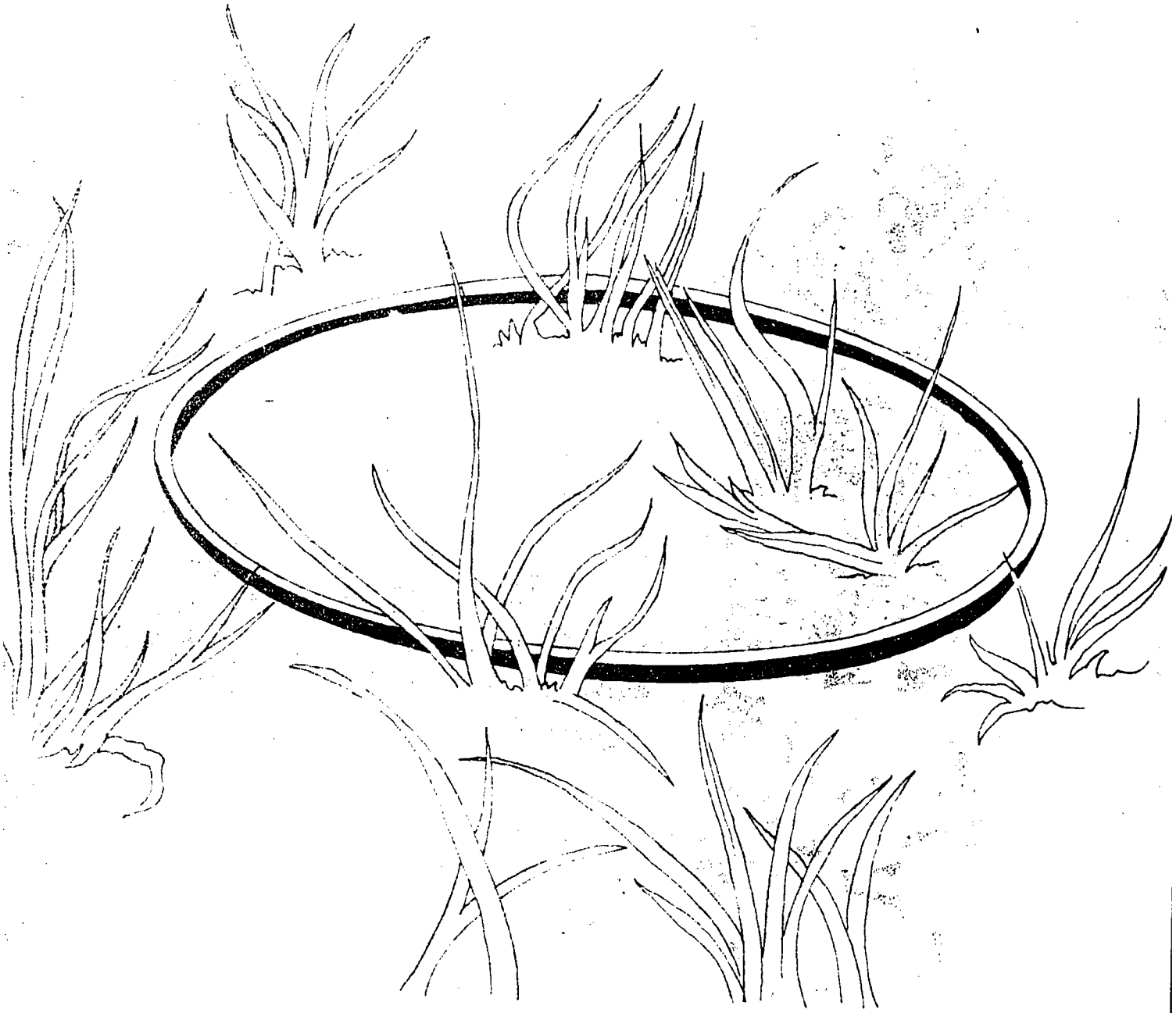
Go outside. Close your eyes. Toss a hoop. Look at the things inside the hoop. List everything you see. List the living and non-living things.

Do more . do more . .

- Go to a different area. Toss your hoop again. Add to your chart. Compare your results.
- What makes environments different?
- Do you see anything you would change? Talk about it.
- Are the things in the hoop interacting? How do you know?
- Pretend you are a snail. Draw a picture of this hoop-world.

What now?

Toss your hoop on the sidewalk. Predict what you will find. What did you find? Were you right?



Hula Hoop Toss Data Card	
First Throw	Second Throw
Living things I saw:	Living things I saw:
Non-living things I saw:	Non-living things I saw:

To do . .

A green plant is a living thing. Look at your picture. It is a plant. Color it. What do green plants need? Add these things.

Plants do not always get what they need. What happens then?

Do more . do more . .

. Green plants can:

- .take in food
- .make food
- .take in water
- .die
- .make other living things like themselves
- .take in air
- .give off air and water
- .grow and change
- .move

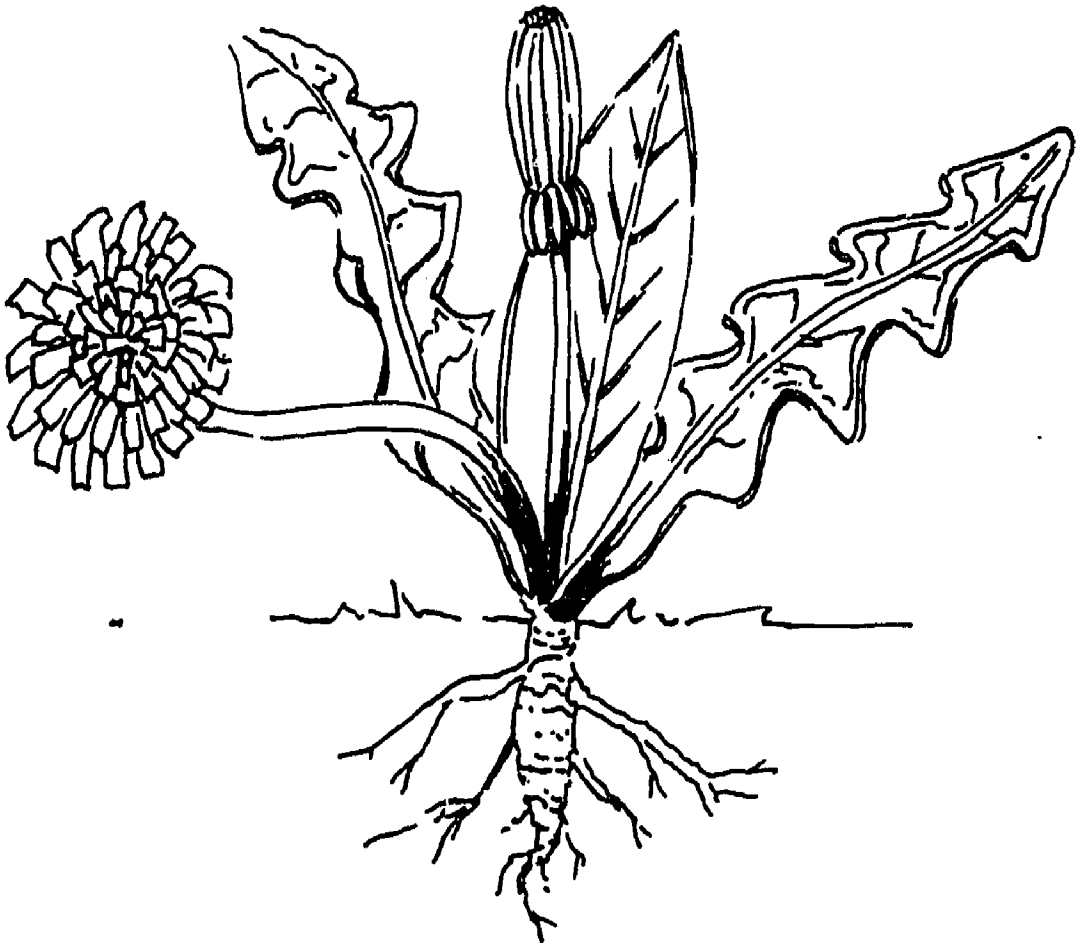
. Go outdoors. Look for green plants. What are they doing? What things can you see?

. Why are green plants important?

What now?

Why do you need plants? Write a story. Read it to the class.

A GREEN PLANT



Most green plants have:

 roots

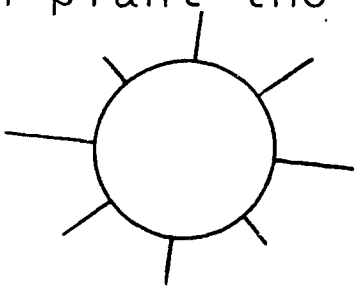
 stems

 leaves

Some also have  flowers.

Color the roots white.
Color the stems green.
Color the leaves green.
Color the flowers red.

Give your green plant the things it needs:

Sunlight 

Water 

Plant Food
(Most plants get the food from the soil. Color the soil brown.)

Air
(You don't have to draw it; it's already there.)

To do . .

Seeds are special. They can fly and swim. They can go piggy-back. They can turn into parachutes.

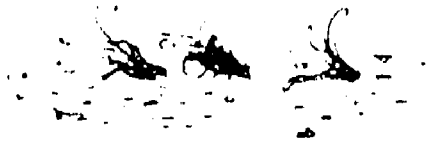
Look closely at seeds. What parts help them travel?

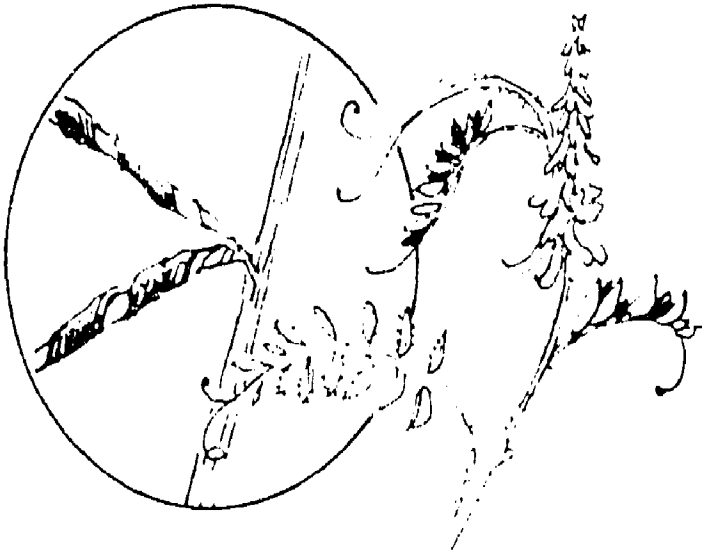
Do more . do more . .

- What if all seeds dropped below the plant? Could many sprout? Why not?
- How do birds help scatter seeds? What other animals help?
- Read "A Mighty Seed". What was the seed? How is it special?
- Try growing a plant. Start it without a seed.
- Visit a nursery in your area. How do they grow new plants? Do they use seeds?

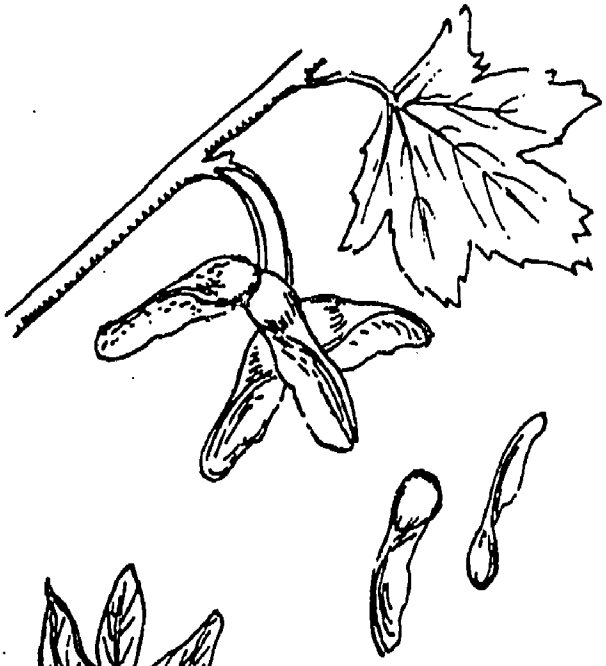
What now?

Collect seeds. Group them by the way they travel. (The card, Seed Travelers, may help you.)





Seed Travelers[1]



Seeds That Fly

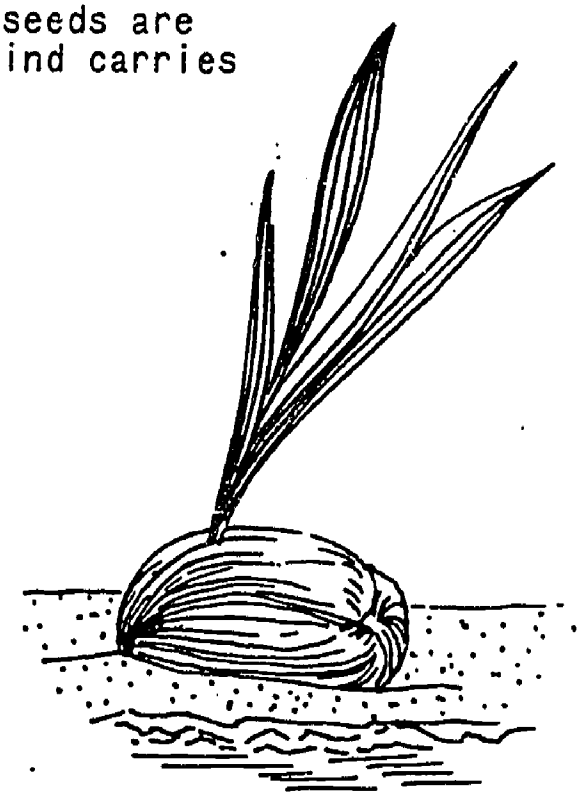
The maple seed has "wings." They help it fly away.

Milkweed seeds have "parachutes" attached.

The dandelion seeds are very light. The wind carries them away.

Seeds That Float

Coconut seeds float. They may travel hundreds of miles.



[1] Adapted from "How Seeds Get Around," Nature and Science, Oct. 14, 1968, p. 8 and "How Seeds Travel," Ranger Ricks Nature Magazine, October 1967, p. 32.

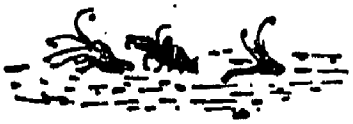
Seeds That Hitchhike

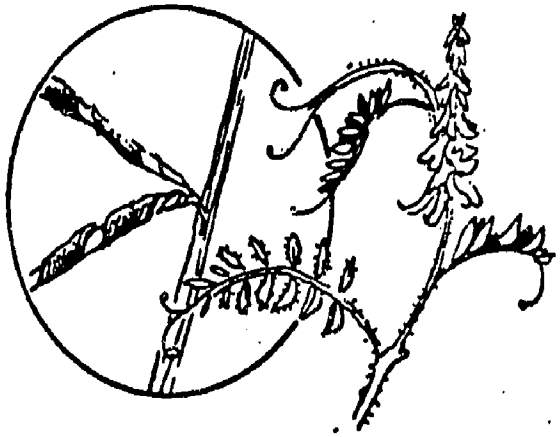
Some seeds attach themselves to animals. Animals carry them to new places. Other seeds are inside the fruit. Animals eat the seeds.

Seeds That Are Shot

Witch hazel seed pods pop open. The seed may be shot over 10 feet.

Crimson clover seeds have bristles. They open and close. This makes the seeds creep slowly along the ground.





Wild geranium plants shoot capsules away from the seed.

The seed pods of vetch split apart. They toss the seeds away.

A MIGHTY SEED

There is a special seed. It can float hundreds of miles. It can float for months. It does not sink.

One day, the seed reaches land. It bumps into the sandy shore. A special thing happens. The seed sprouts. Soon another tree has started.

Did you guess what the seed is? A coconut! The coconut is really a seed. It floats because it is hollow inside. The outside is a hard shell. It is called the husk. It protects the seed.

Coconuts are also used for food. They grow high up in trees. In some countries, monkeys pick the coconuts. Coconut milk is bottled. The meat of the coconut is cut up. The husk is made into many things.

Open a coconut. Taste the milk. Taste the meat. What other parts can you find?

--Hoover, D.A., "The Seafaring Coconut", Ranger Rick's Nature Magazine.

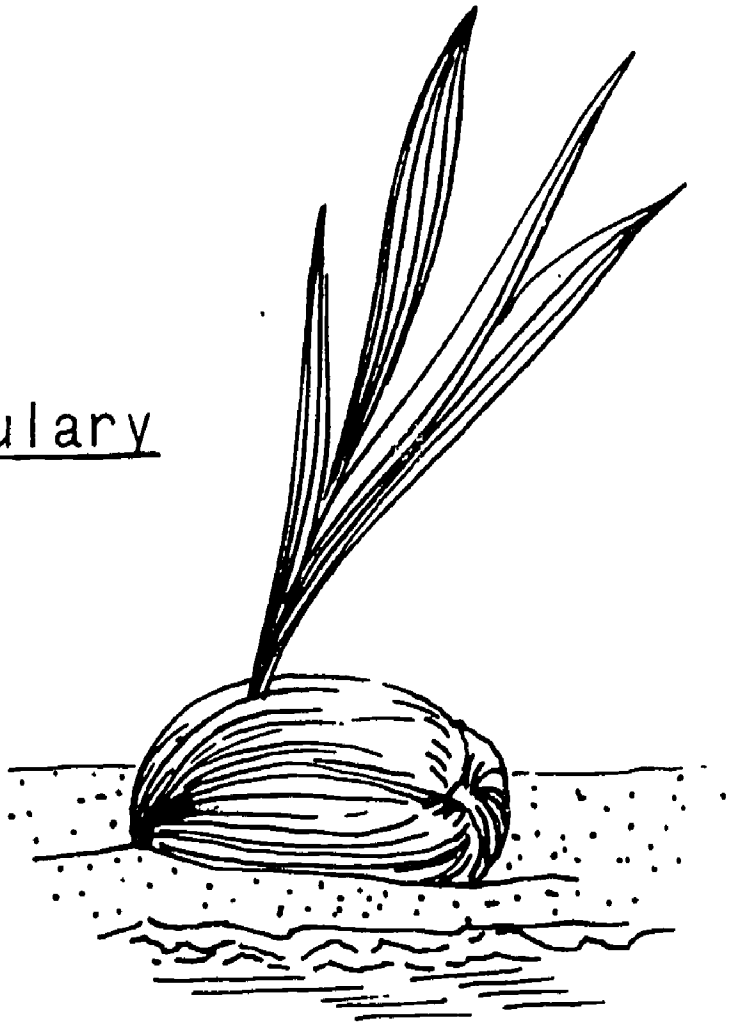
Questions for Thought

1. Why doesn't the coconut sink?

2. What would happen if all the sandy shores were paved?

Vocabulary

1. protect: keep safe



To do . .

Read the poem, "My Tree." Someone cared about this tree.

Find a tree you see every day. Get to know it. Observe the tree every day. Keep a record.

Do more . do more . .

. Stand back. Look at your tree. Draw its shape.
. Look at the tree closely. Make a rubbing of the bark. Use a color you like.
. Make a leaf print. Use a leaf from your tree. Study the print. Can you see the veins? the pores?
. How old is your tree? See if you can find out.
. Many animals depend on trees. Your teacher will give you a puzzle. Put it together. See who needs the tree.

What now?

What did you find out about your tree? Write a story or poem about your tree.

My Tree

This is my tree .

My place to be done.

My branches for climbing.

My green leaves for hiding in.

My sunshine for reading.

My clouds for dreaming.

My shy sky for singing.

My my tree, my beautiful tree.

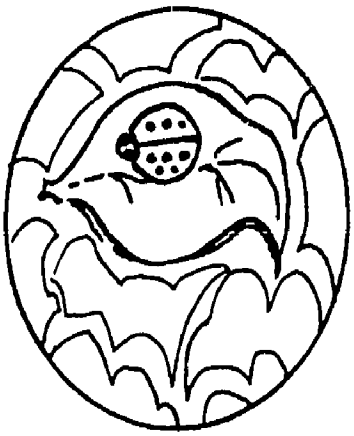
Scholastic Earth Corp

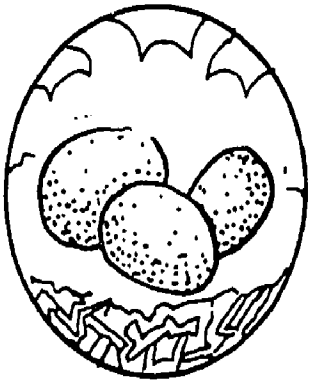
These things need the tree.

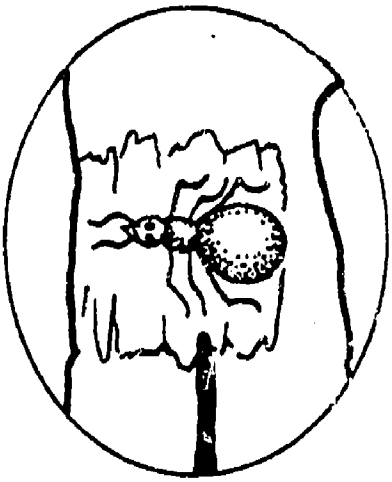
Put the tree together.

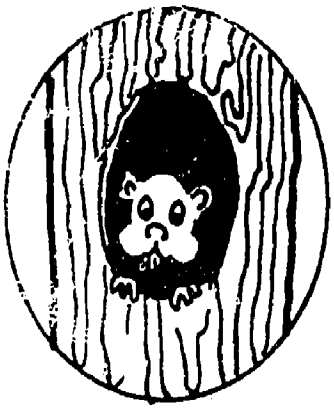
Cut out the circles .

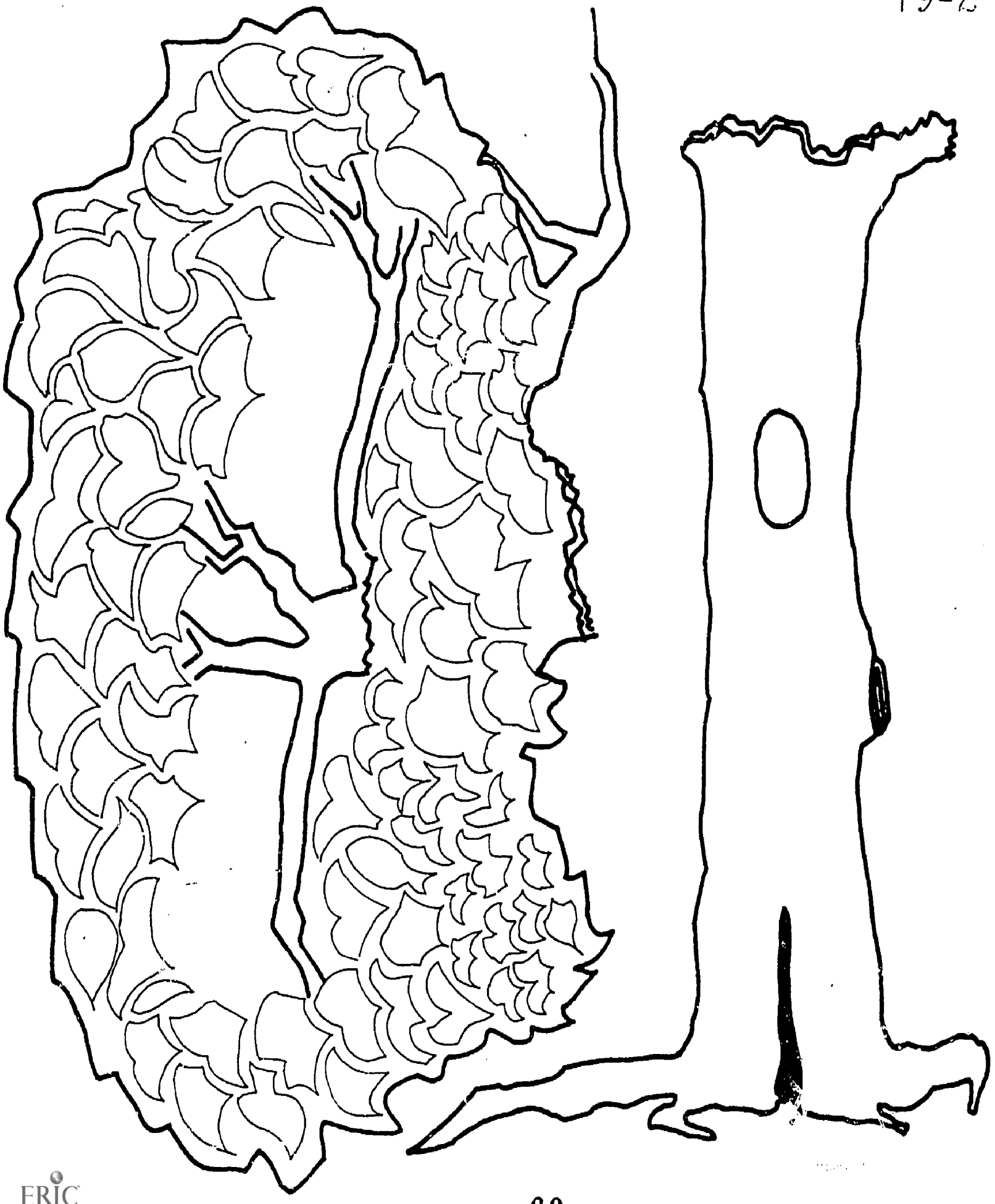
Put them in the tree .











To do . .

Trees are important. They help the environment. We need trees.

Pick a hot day. Take the temperature under a large tree. Take it in the sun. Is there a difference? Why?

Do more . do more . .

- Examine a leaf closely. Use a hand lens. Look at the underside. What do you see?
- Get a piece of wood. Sand it. Rub oil on it. Look at the grain. Is it the same for all woods?
- Use your wood to make something.
- Look around you. Find things made of wood.
- What foods do we get from trees? Make a collage.

What now?

Make a poster. Show some reasons we need trees.

To do . .

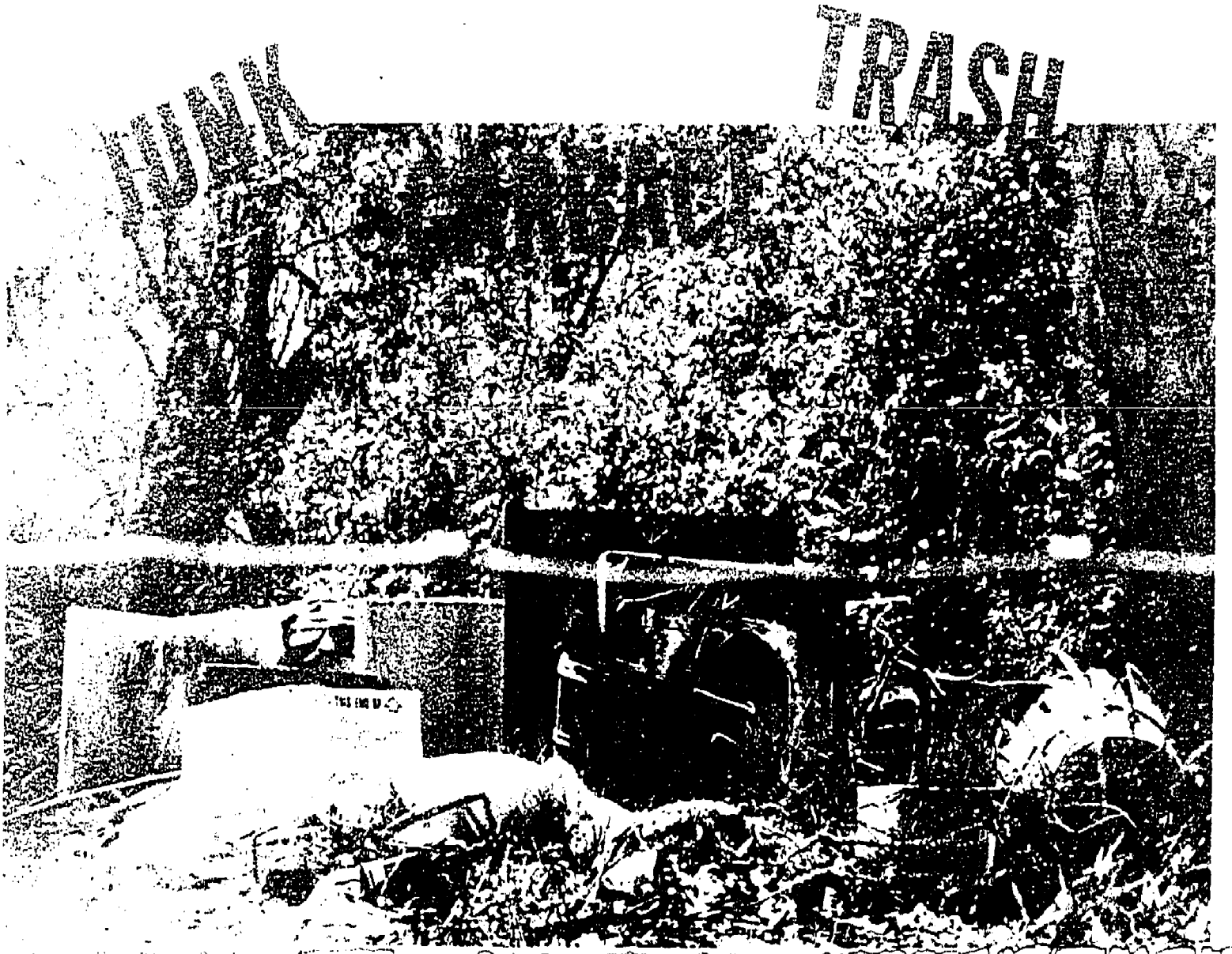
Litter is trash left on the ground. Your teacher will give you a puzzle. Look at the picture. The boy has found some litter. He wants to clean up the environment. Help him. Find the way to the litter basket.

Do more . do more . .

- What is wrong with litter? What does it do?
- Make a litter bag. Color it. Take a walk around the school. Pick up litter. Put it in your litter bag.
- What types of litter did you find? Who put the litter there? Could any of the litter have been used again?
- Find a way to reuse some of the litter.
- Where was lots of litter found? Try to have a litter barrel placed there.

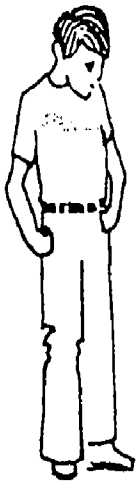
What now?

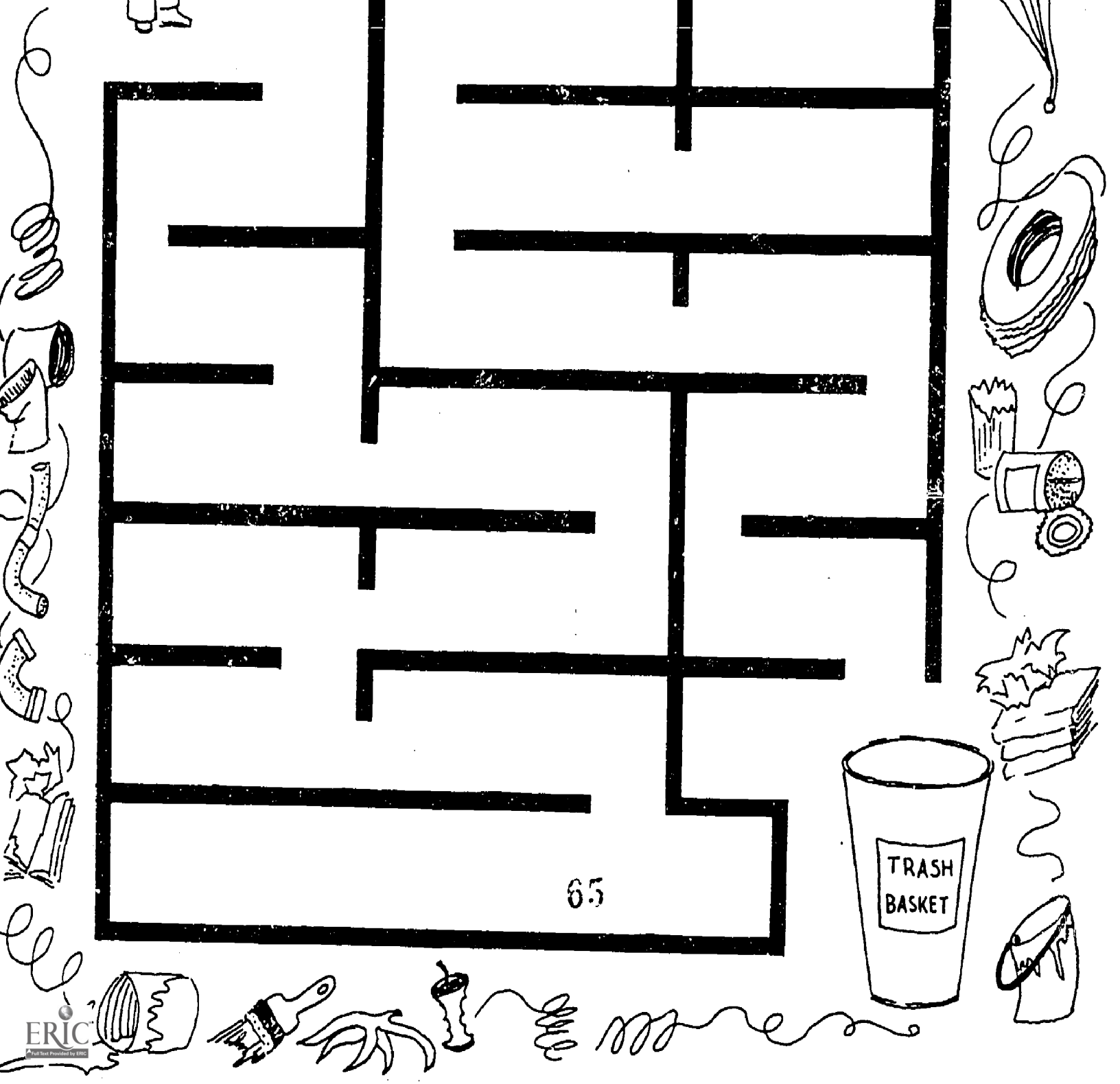
How can you reduce the litter on your school grounds? Make a list. Try some of your ideas. Report to the class.



LITTER

This boy is trying to clean up his environment. 21 –
Help him find the way to the trash barrel.





DATA SHEET

OBSERVATIONS OF LITTER IN OUR ENVIRONMENT

Describe The Litter	Where Did You See It?	How Was The Litter Harming The Environment?	What Did You Do About It?

To do . .

Leaves are forever falling. Grass is always growing. Do they reach the sky? Why not?

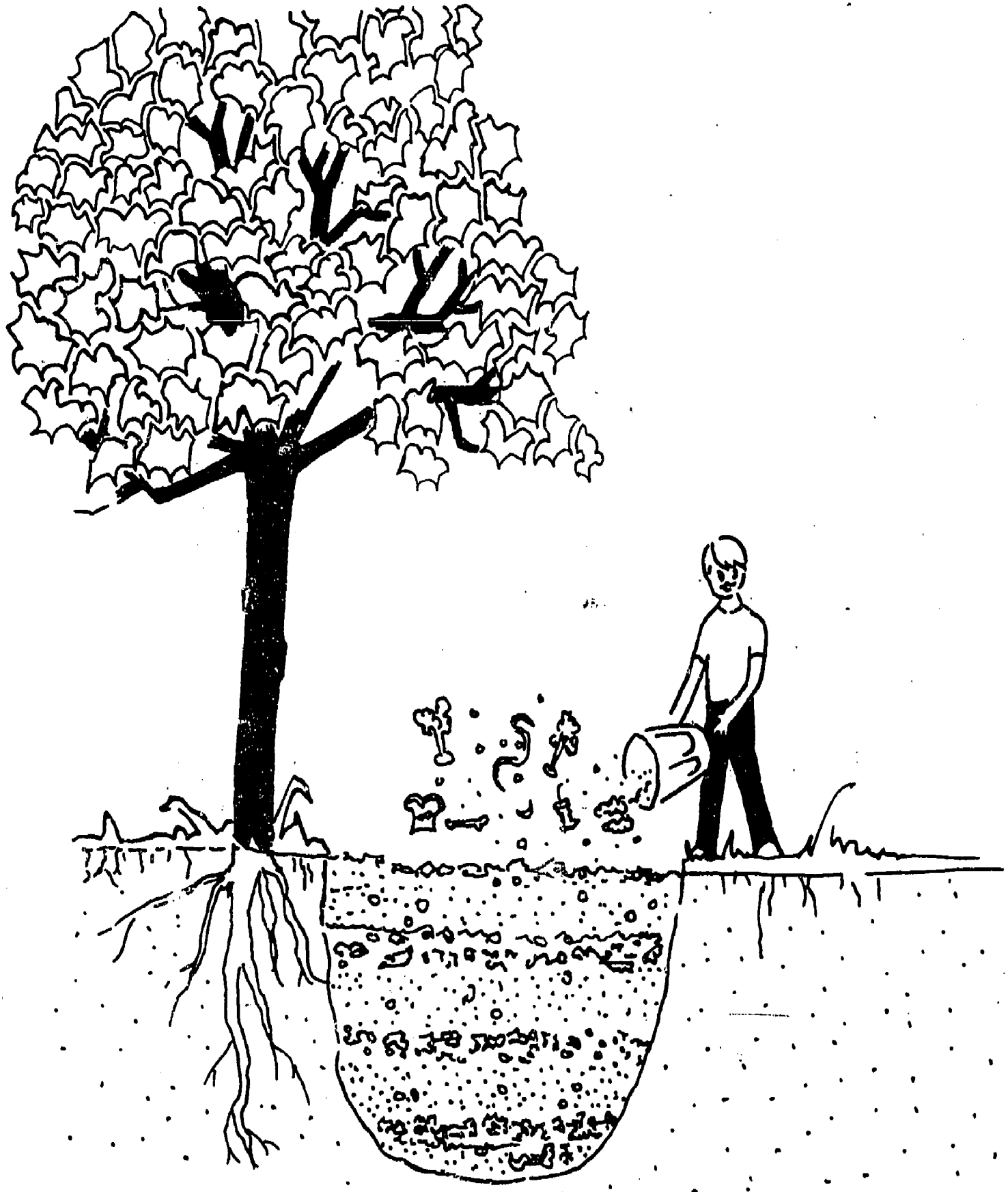
Make a compost. Your teacher will help. Record what goes in. Predict what will happen.

Do more . do more . .

- Put a thermometer in the pile. Read it every day. What happens?
- Wait 4 days. Dig up a little. Can you see any change?
- Wait two weeks. Dig up the compost. What has happened? Record what is left.
- Does man-made litter disappear?
- What causes decay? Why is decay good?
- Try a compost at home. What things can you add?

What now?

Look at your garbage. What things will decay? What will not?



To do . .

Recycle means "to use over." We throw away many things. Some could be reused.

Have a recycling fair. Show ways materials can be reused. Who found the most ways? Who found the best way?

Do more . do more . .

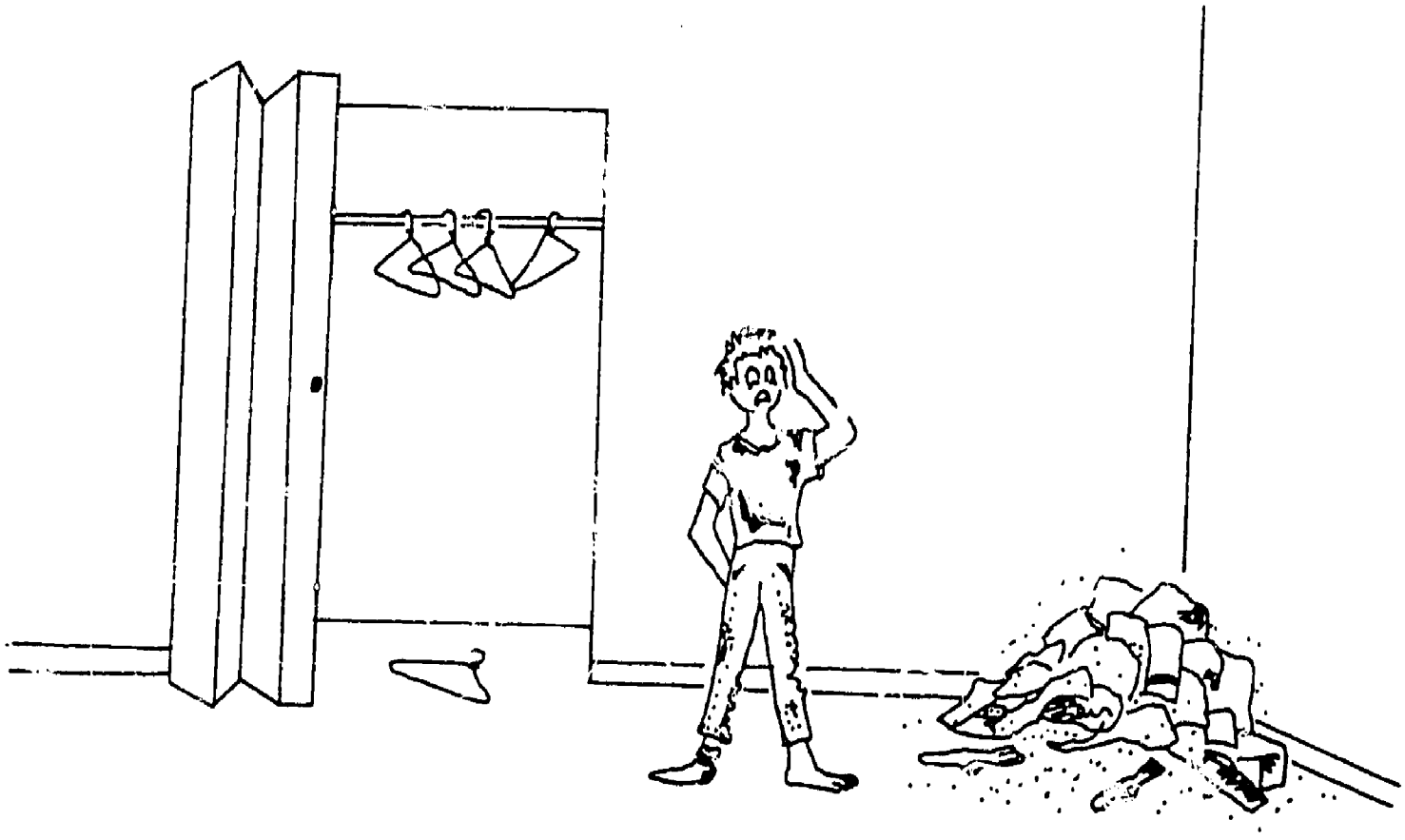
- What does a recycling plant do? Find out.
- We put bottles and cans in the garbage. They are taken away. Where do they go? What happens to them?
- Start a project. Reuse glass jars. Collect aluminum cans. Sell them. Use the money. Help the environment.
- How many throw-aways does your family use? Keep a record. Try to cut down the number.
- How does nature recycle things?

What now?

Make a present. Use something you might throw away. Add a message. List five ways to recycle things. Give it to someone you like.

RECYCLING

What if you
-never wore your clothes twice?
-threw your dirty clothes in a pile?
-never washed dirty clothes?



You would look like the boy in the picture. You would have no clean clothes. There would be a pile of dirty clothes.

We do use our clothes over. There are many things that we don't reuse. We don't reuse:

.newspapers
.paper cups
.plastic forks
.glass jars
.aluminum cans

We just throw them away! Someday we may be like the boy. We may be left with just a pile of garbage. Every day, the problem gets bigger.

Most of the things we use are made from natural resources. A tree is a natural resource. So is water. Some of these resources can be replaced. New trees can be grown. We must be careful not to use these faster than nature can replace them. Other resources, like aluminum, cannot be replaced. They are called non-renewable. We must be careful to reuse these.

To recycle means to use over. Nature recycles materials. Water is used over and over. So is food energy. Here are some reasons recycling is good:

1. It conserves our natural resources.
2. It makes less garbage to get rid of.
3. It saves money.

You and your family can help. You can conserve natural resources. Here are some ideas:

1) Don't buy non-returnable containers and bags. Use bottles with a deposit. You can return them for your deposit. It is cheaper this way, too. Tell your mother to buy produce that has not been wrapped. Don't pay for something you will throw away.
2) Don't buy plastic containers. They cannot be recycled. They don't decay. They just add to the garbage pile. If you must buy plastic, try to reuse it.
3) Try to use fewer paper products. Recycle paper products when possible.
4) Recycle all materials you can. Aluminum, glass, and paper can be recycled. Locate recycling centers in your neighborhood. Recycling saves natural resources. It also reduces solid waste. It can make money for you, too.
5) Find uses for materials you can't recycle. Use cut-off containers for storing toys and crayons. Use styrofoam for decorations. Plastic dinnerware can be reused.

6) Make a compost pile. Use the organic materials in your garbage. The compost makes a natural fertilizer. You can use it on your lawn. Read the activity card on composting.

Vocabulary

1. reuse: use again
2. natural resources: raw materials found in nature
3. non-renewable: cannot be replaced
4. renewable: can be replaced
5. conserves: saves
6. deposit: money you pay when you take something and get back when you return it
7. non-deposit bottles: bottles which have no deposit (cannot be returned)
8. recycling centers: a place where you can return things that can be recycled, and get money for them
9. reduces: makes less
10. compost pile: a pile where organic materials decay and turn into fertilizer
11. organic: coming from living things, or things which were once alive
12. fertilizer: a substance which makes plants grow better

Questions for Thought

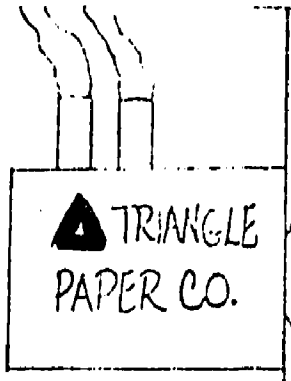
1. Draw some things that you reuse.
2. Draw some things you do not reuse.
3. Can you think of any ways in which you might reuse the things you usually don't use again?
4. Why should we recycle the iron in cars?
5. Where did this paper come from? Will we always have enough paper? Why?
6. Are returnable bottles better than non-returnable bottles? Why?
7. Why do you think so many people buy non-returnable bottles?
8. What happens to napkins, tissues and other paper products?
9. Can we prevent this? (keep it from happening) Why? What can we do?
10. Is plastic good? Why?
11. Why do you think plastic is used so much?
12. If you had to talk somebody into bringing things to a recycling center, what would you say?
13. Why are compost piles good?
14. Can everyone make compost piles? Explain.

RECYCLING PAPER SAVES TREES!

1.

Trees are cut for paper. A 15-year old tree will produce 3,600 grocery bags.

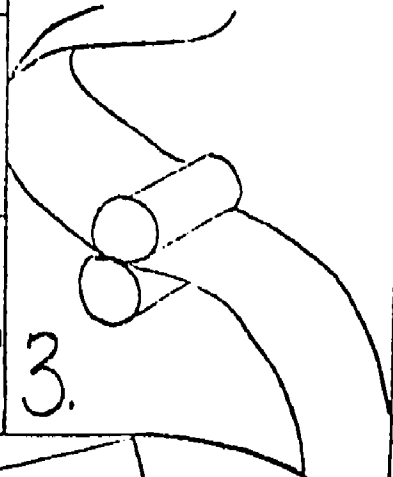
2.



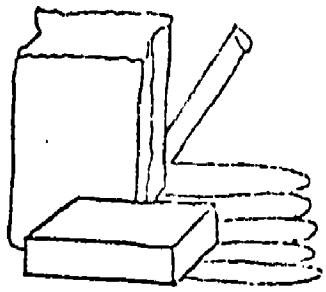
At the paper plant, the logs are broken into pulp.

Screens and rollers press the pulp into paper.

3.

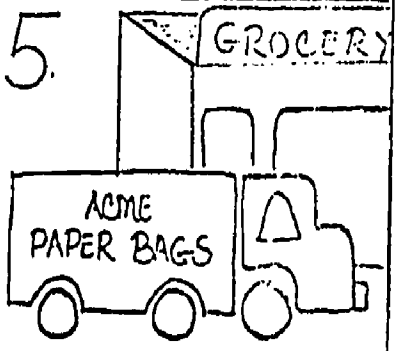


4.



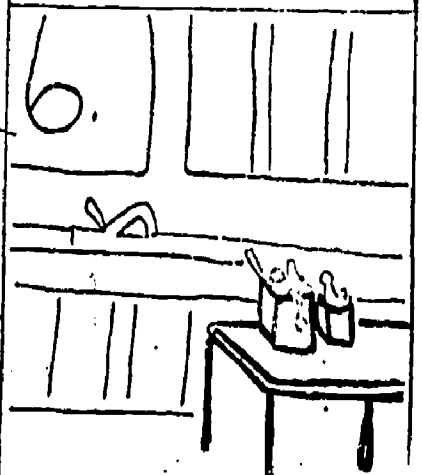
Printers and box makers use the paper to make new products.

5.



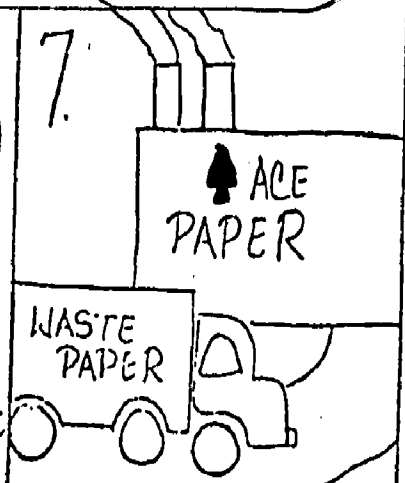
The bags are shipped to the store where you buy groceries.

6.



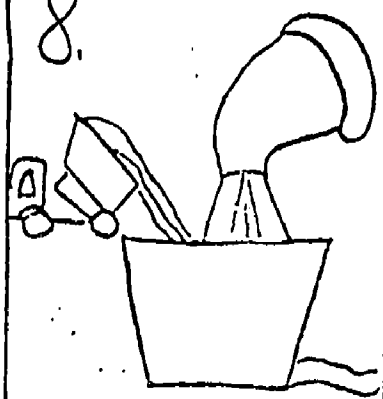
You take your groceries home in bags and save the bags for recycling.

7.



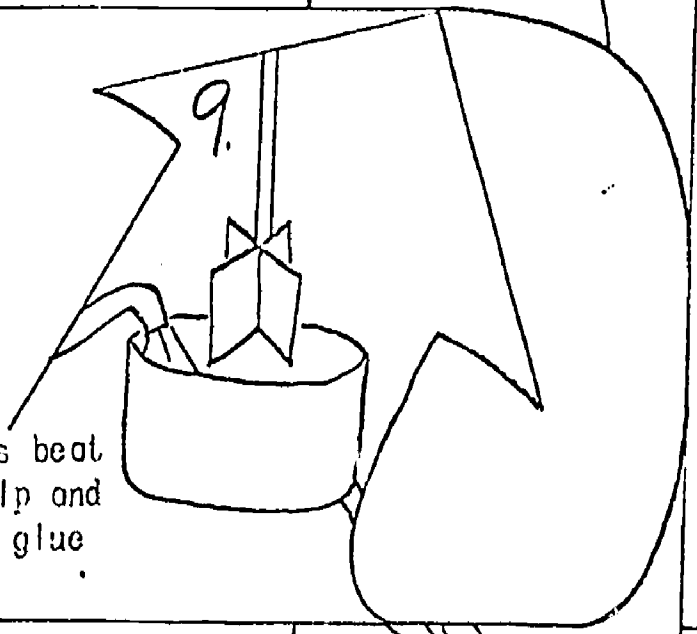
The bags are collected, sorted, and taken to the paper mill.

8.



The paper is prepared for deinking.

9.



Deinking paddles beat the paper to pulp and remove old ink, glue and staples.

To do . .

We need water. We use it many ways. Look around your house. Make a list of the ways you use water.

How much water do you use in a month? Ask your parents.

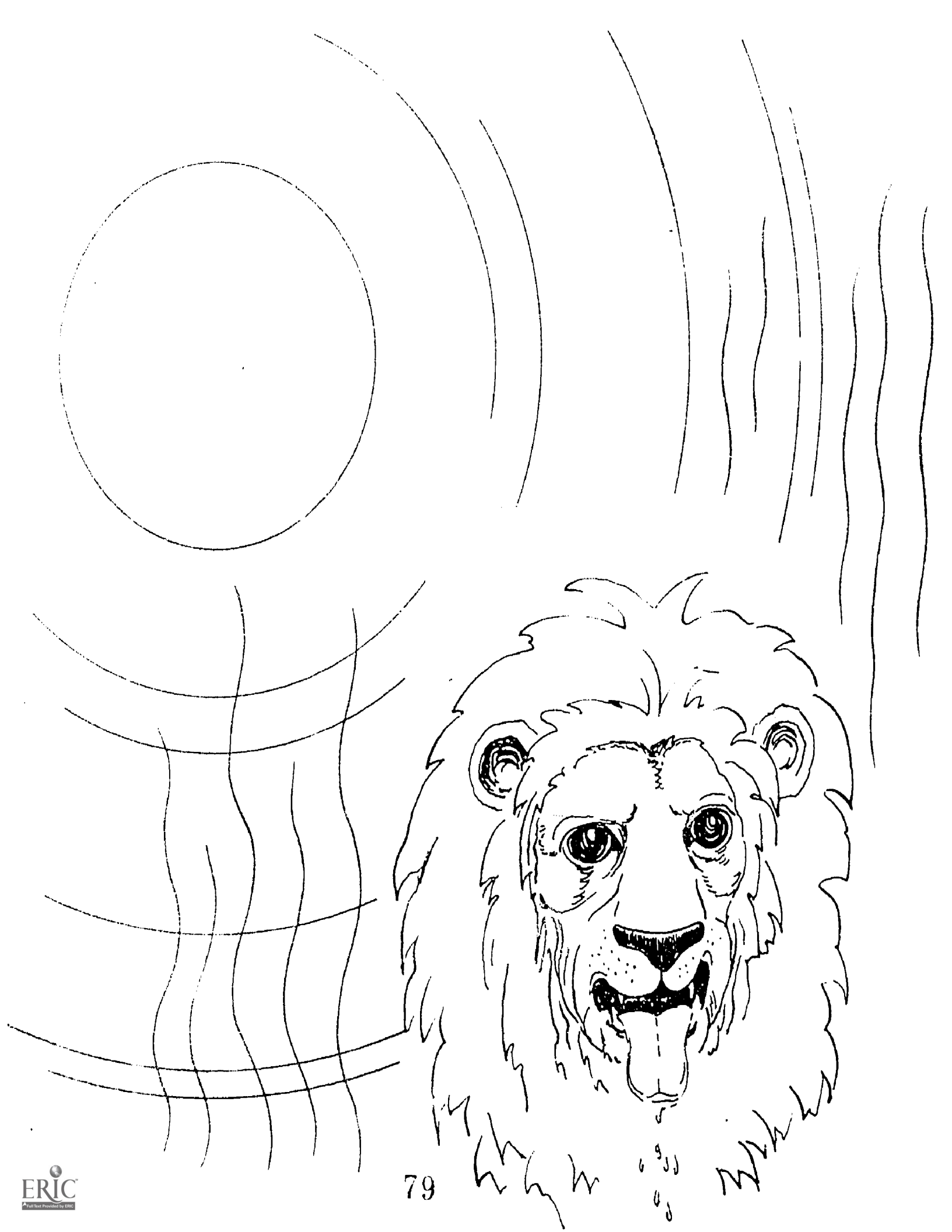
Where does your water come from? Is there plenty of water? Find out.

Do more . do more . .

- Make a collage. Show all the ways man uses water.
- What happens to dirty water? Can it be reused?
- How does nature clean water? Make a water cycle. Follow the water drops.
- Evaporation is part of the water cycle. It helps cool things. Put a wet cloth on your skin. Remove it. Blow on the spot. What happens? How does this help you?
- Dogs have few sweat glands. How do they keep cool? Watch them on a hot day.

What now?

How does water get to your house? How is it used there? Can it be used again? Make a drawing. Answer these questions.



WATER CYCLE WHEEL

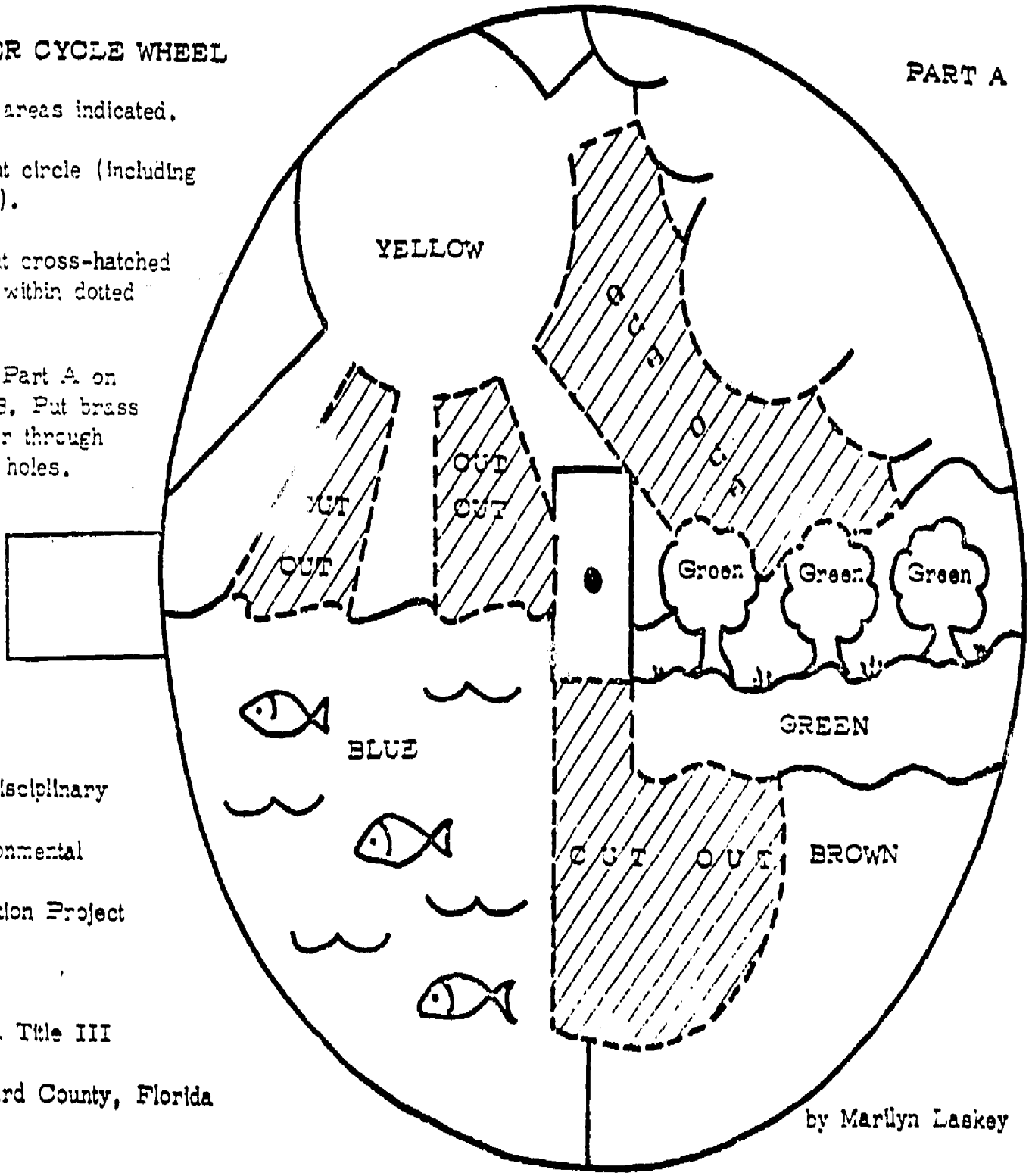
PART A

Color areas indicated.

Cut out circle (including handle).

Cut out cross-hatched areas within dotted lines.

Place Part A on Part B. Put brass fastener through center holes.



Interdisciplinary

Environmental

Education Project

K-12

ESEA Title III

Broward County, Florida

by Marilyn Laskey

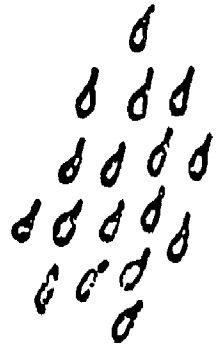
WATER CYCLE WHEEL

PART B

Cut out whole circle.

Place Part A on Part B.

Put brass fastener through center hole.



Inter-disciplinary Environmental Education Project K-12

ESEA Title III
Broward County, Florida

by

Marilyn Laskey

To do . .

Look around your school grounds. Look for animal homes. (Don't overlook small animals.) Record what you find.

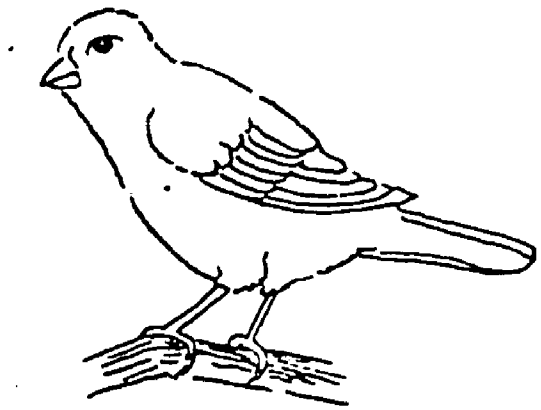
Do more . do more . .

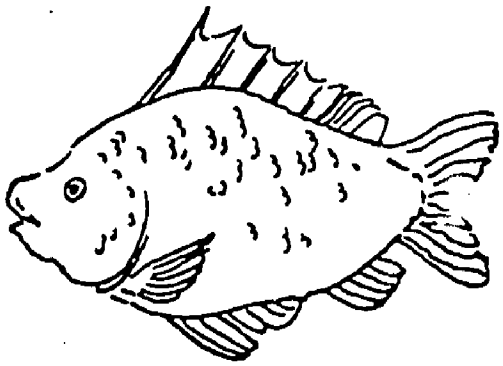
- Why do animals need homes? How do they use their homes?
- Make a model of an animal home. Add the natural environment. Put it around the home.
- Read the story about the beaver. How is its home special?
- Read about other animal homes.
- Build a home for an animal. Observe the home. Keep a record.
- Write a story about your favorite animal. Describe the animal's home.

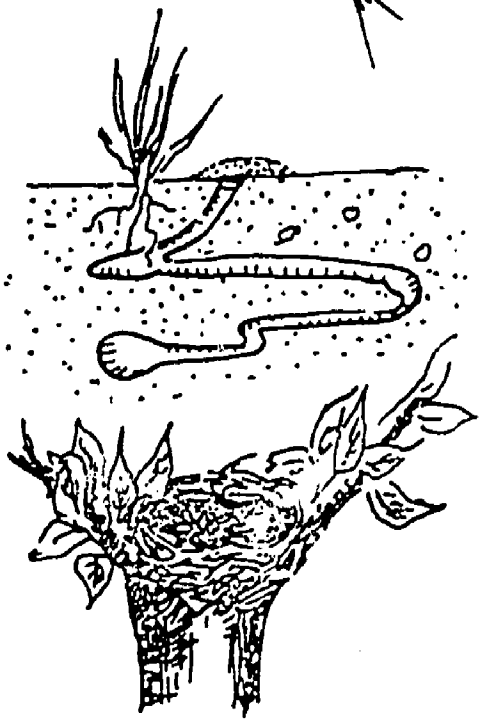
What now?

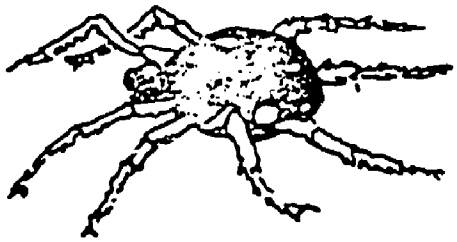
Your teacher will give you a sheet. Match each animal with its home.

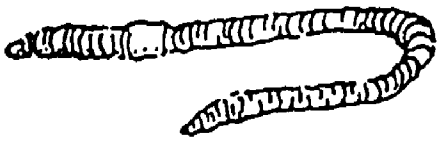
ANIMAL HOMES

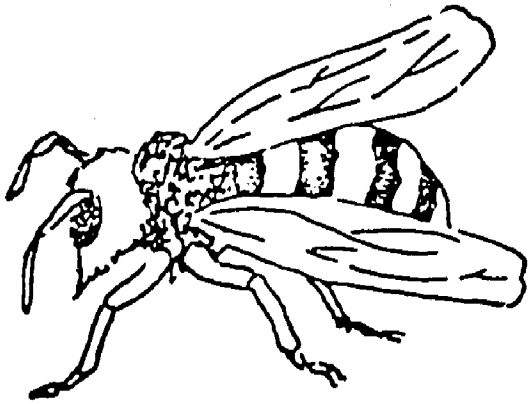


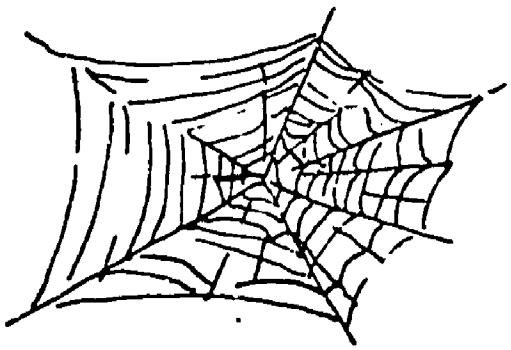












Draw a line from each animal to its home.

THE BEAVER

The beaver is an engineer. He helps prevent floods. He builds dams and houses. He makes his own water canals. His home may have several rooms. It gives him shelter and food.

The beaver starts with a dam. He builds it across a stream. He cuts down small trees. His teeth are razor sharp. He piles the logs across the stream. His front paws and broad, flat tail help here. The beaver piles mud and sticks into the holes of the dam. Now he has a pond where he can build a home.

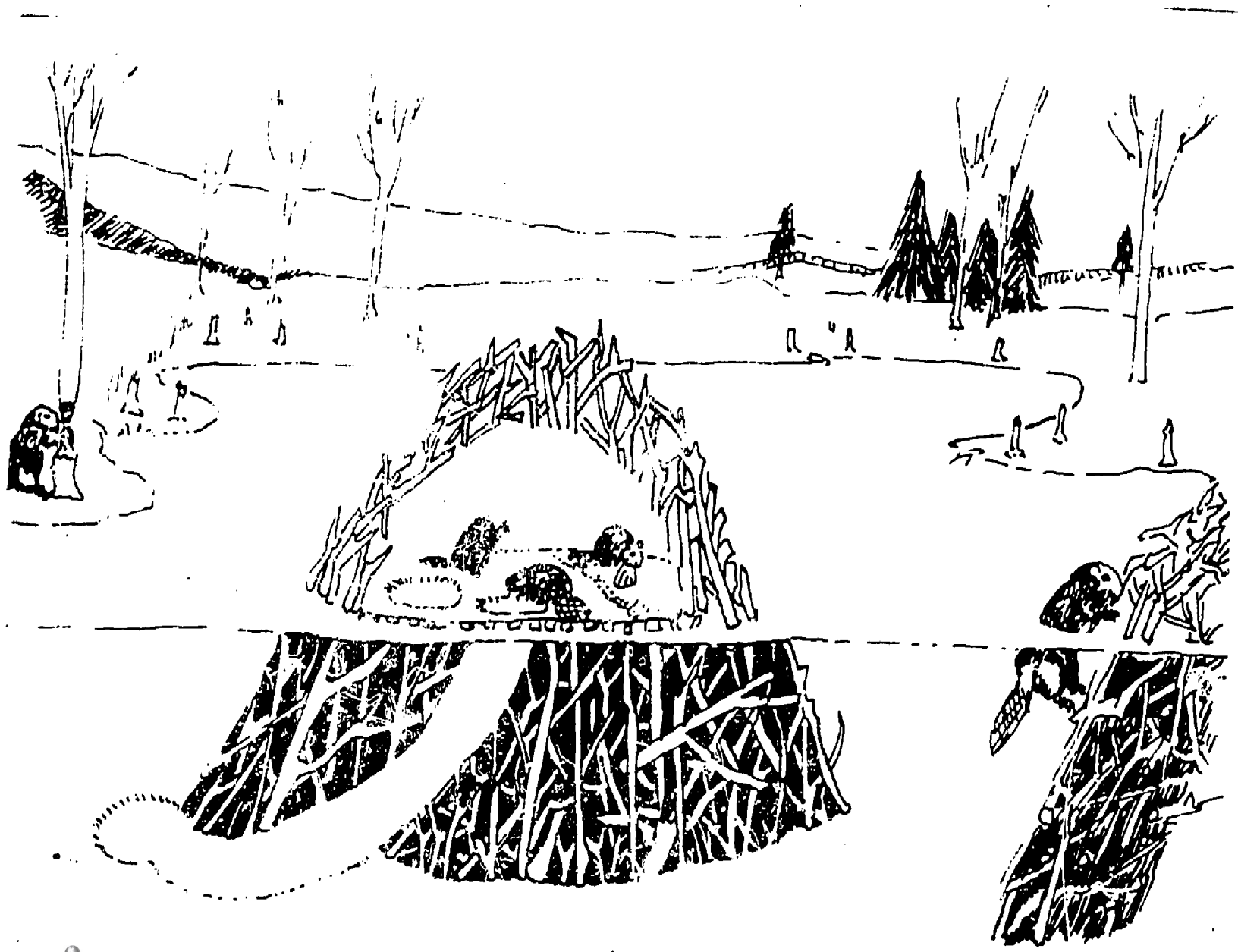
The beavers' home is built in the center of the pond. The beavers enter through an underwater passage. The rooms are above the water. Tiny holes let in fresh air.

The floor is covered with wood shavings. The beaver strips them from small twigs. The shavings are used to keep the family warm. The beaver changes them often.

The beavers' house is made of sticks and mud. The top has many layers. This makes it strong. When the pond freezes, the beaver is safe from predators. A large animal can walk on the house without harming it.

The beaver is a vegetarian. He usually eats leaves and bark. The beaver stores food for the winter. He makes a pile near his house. His food is right in the pond with him. He can even nibble on his house if he has to.

--Goudey, Alice E., Here Come the Beavers, New York: Charles Scribner's Sons.



Vocabulary

1. engineer: someone who builds roads, buildings, bridges, dams, canals and other things
2. prevent: keep from hapening; stop
3. canals: man-made streams
4. shelter: a place to stay, like a house
5. twigs: tiny branches on a tree
6. predators: animals which hunt other animals for food
7. vegetarian: someone who eats no meat, only vegetables
8. nibble: to take small bites of food

Questions for Thought

1. How is the beaver adapted for his life?
2. How does the beaver use wood shavings?
3. Why is the top of the ledge so strong?
4. What kind of food does the beaver eat?
5. How does the beaver keep from starving during the winter?

To do . .

An earthworm lives in the ground. That is its house. Make a worm house. You will need a jar. Fill the bottom with dark soil, called humus. Fill the top with sand. Cover with dead leaves. Add earthworms.

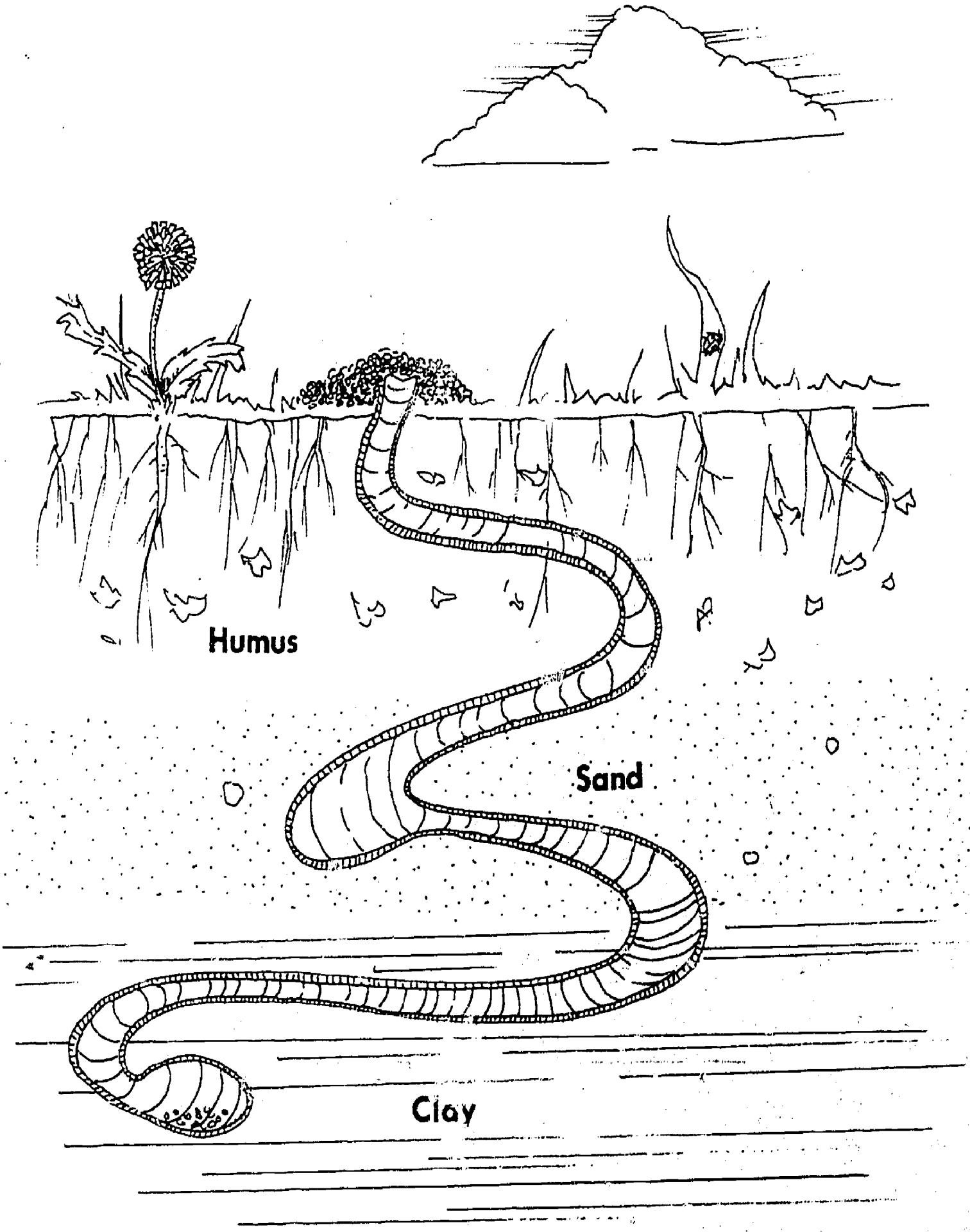
Make your worm comfortable. Cover the jar with dark paper.

Do more . do more . .

- Watch the soil. What happens? Keep a record.
- Watch a worm as it moves. (Use a magnifying glass.) How does it move?
- What do earthworms need? Could you live in an earthworm's environment? How are worms adapted to their environment?
- How does a worm eat? What does it eat? What eats earthworms?
- Pretend you are an earthworm. Write about your life. Record your story.
- Why are earthworms important?

What now?

Draw a picture. Show how earthworms help the environment.


Humus
Sand
Clay

To do . .

Many animals live in the environment. Some are insects. Find the card on insects. Look for insects inside. Look outside. Record what you find.

Watch several insects. Record their activities.

Do more . do more . .

Make a model of an insect.

Do an insect "help man. List some helpful insects. Read about one.

The cockroach is an insect. It has been here a long time. Read "A Good Survivor." Why have roaches been here so long? Why don't people like them?

What do insects eat? What eats insects?

How do insects protect themselves?

What is your favorite insect? Draw its life cycle.

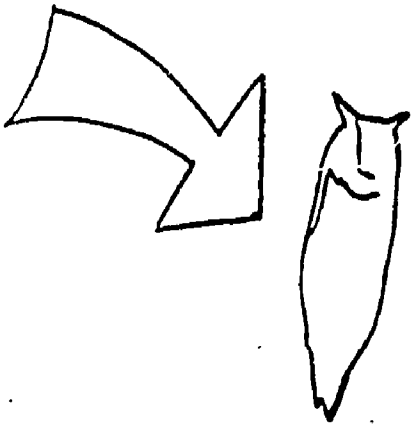
What now?

Your teacher has a sheet. Look at the pictures. Circle the insects.

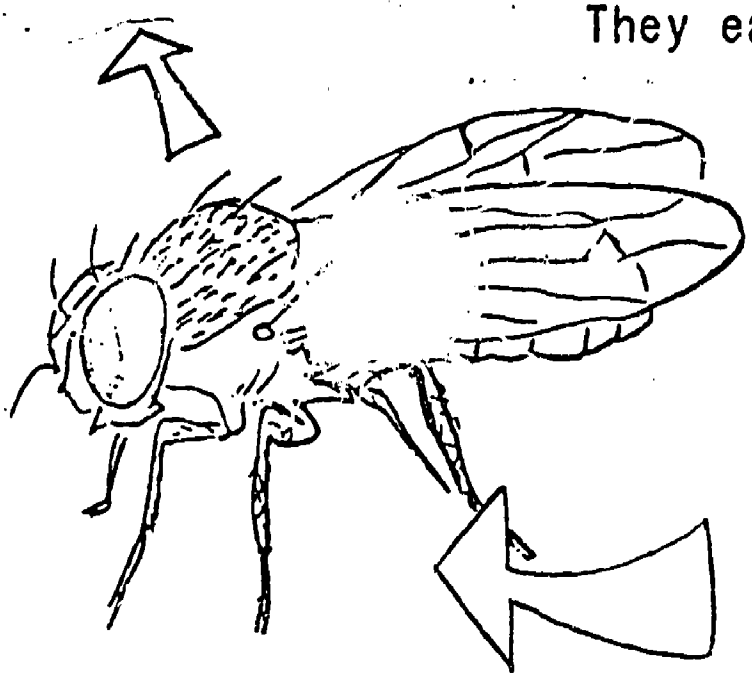
SOME INSECTS DO A LOT OF CHANGING

Fruit Flies start out as eggs.

They hatch into larvae. Larvae look like worms. They eat <u>lots</u>!

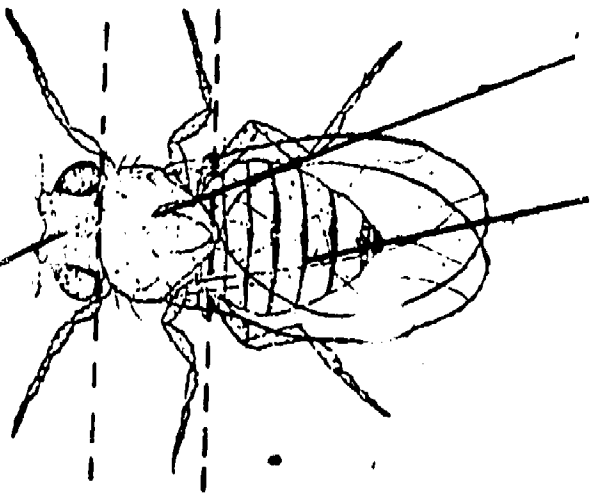


In the pupa stage there is no moving. - - - But there is a lot happening.

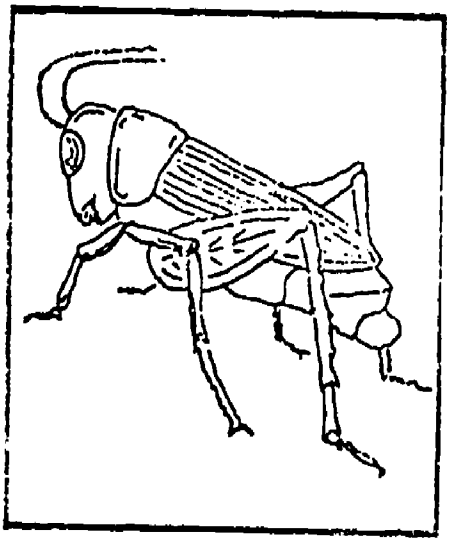


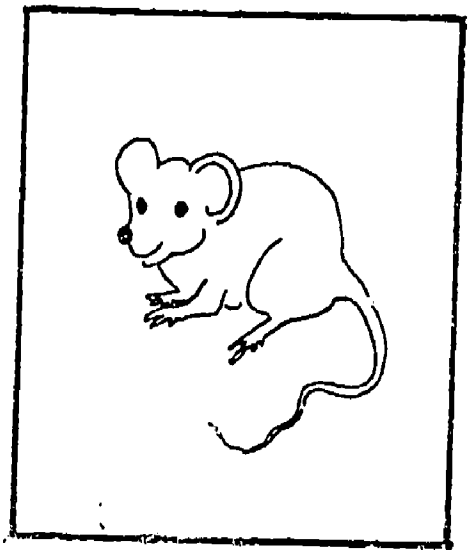
Finally the adult comes out. The adult will mate and lay eggs.

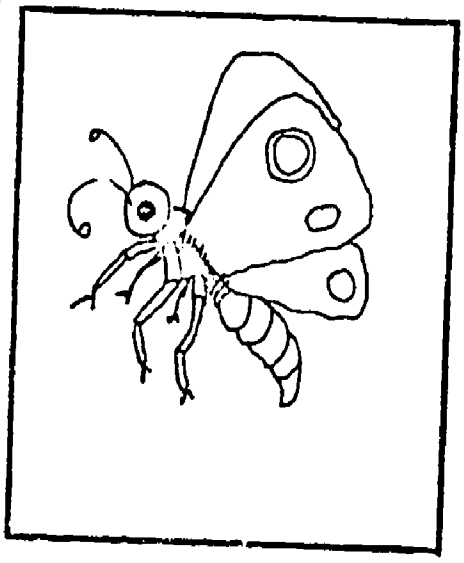
Insects have 3 body parts.

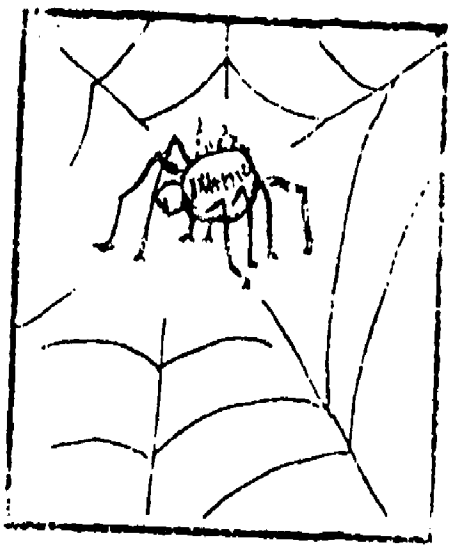


Look at the six animals below. Circle the ones that are insects.









A GOOD SURVIVOR

The cockroach has been around a long time. Scientists think cockroaches have been here about 300 million years!

Today, there are over 3000 kinds of cockroaches. Most live in warm places.

Cockroaches started out in Africa. They spread all over the world. They probably traveled by ship.

Cockroaches like to live with people. People don't like cockroaches. Without thinking about it, people help cockroaches survive. They give them the food and warmth they need.

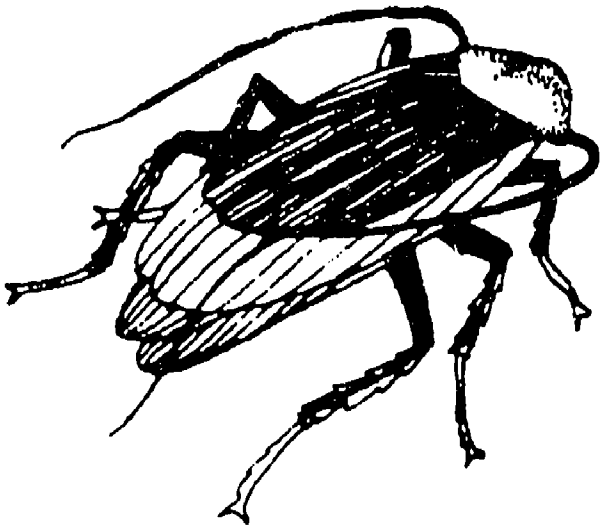
Cockroaches eat many things. They like wet food and garbage. They can eat wallpaper, glue or shoe polish. They can live a month without food. They usually don't have to. People leave them plenty to eat.

You may not see cockroaches around your house. During the day they hide. They stay in cracks and holes. At night, they come out. They search for food. They use their antennae to feel and smell.

It's hard to surprise cockroaches. They can feel you coming. Little hairs on their body are disturbed by any movement.

Cockroaches spoil food with their body wastes. They carry germs. They spread diseases such as polio and typhoid.

People try to get rid of roaches. They spray pesticides. Some cockroaches are not killed by the spray. Their young are not killed either. Scientists are looking for better ways to get rid of cockroaches.



--"Public Pest Number One," Ranger Rick's Nature Magazine, March 1972.

Vocabulary

1. survive: stay alive
2. antennae: feelers (It's one antenna; two antennae.)
3. disturbed: bothered
4. spoil: make bad; ruin
5. germs: tiny plants and animals that cause sicknesses
6. diseases: sicknesses
7. pesticides: chemicals to kill insects or other pests

Questions for Thought

1. How did cockroaches spread all over the world?

2. How do people help roaches without meaning to? (HINT: What two things do they need?)

3. When do cockroaches search for their food?

4. Why are roaches dangerous?

5. Are roaches easy to kill? Why?

To do . .

Spiders are important. Some build webs. Go on a spider web hunt. Go in the morning. What kinds of webs do you see? How strong is a web?

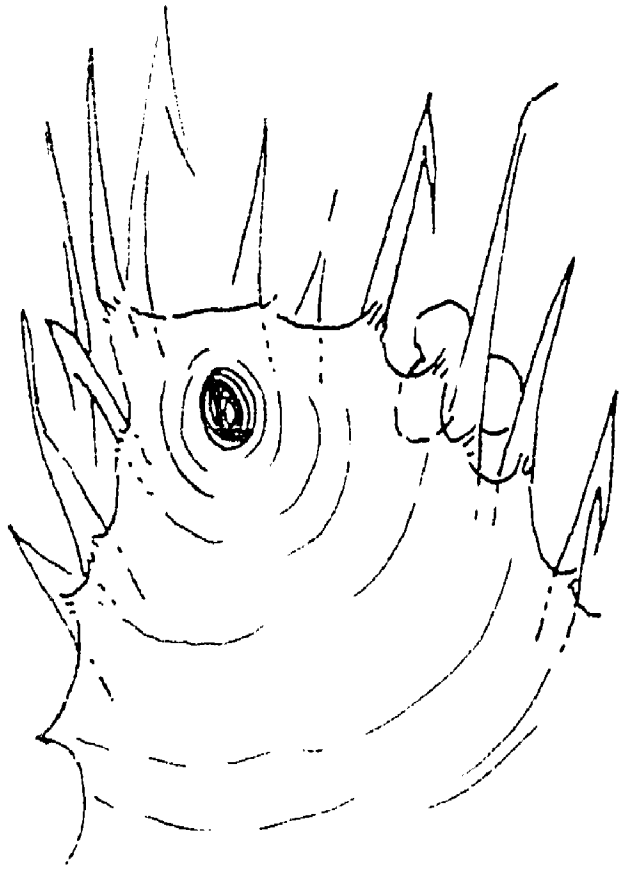
Why do spiders build webs: Find out.

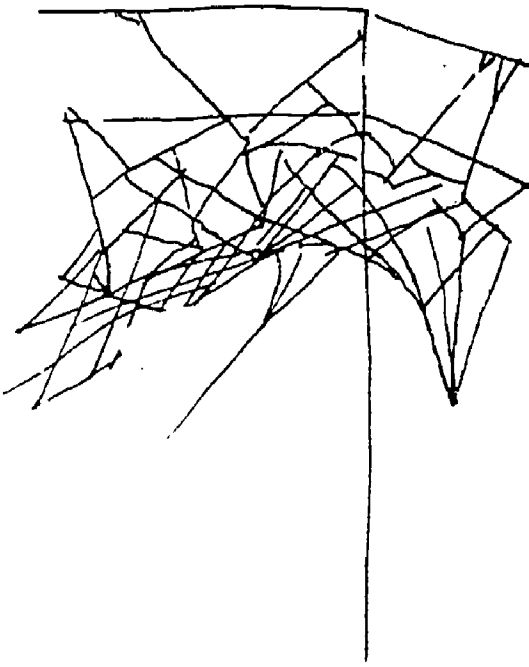
Do more . do more . .

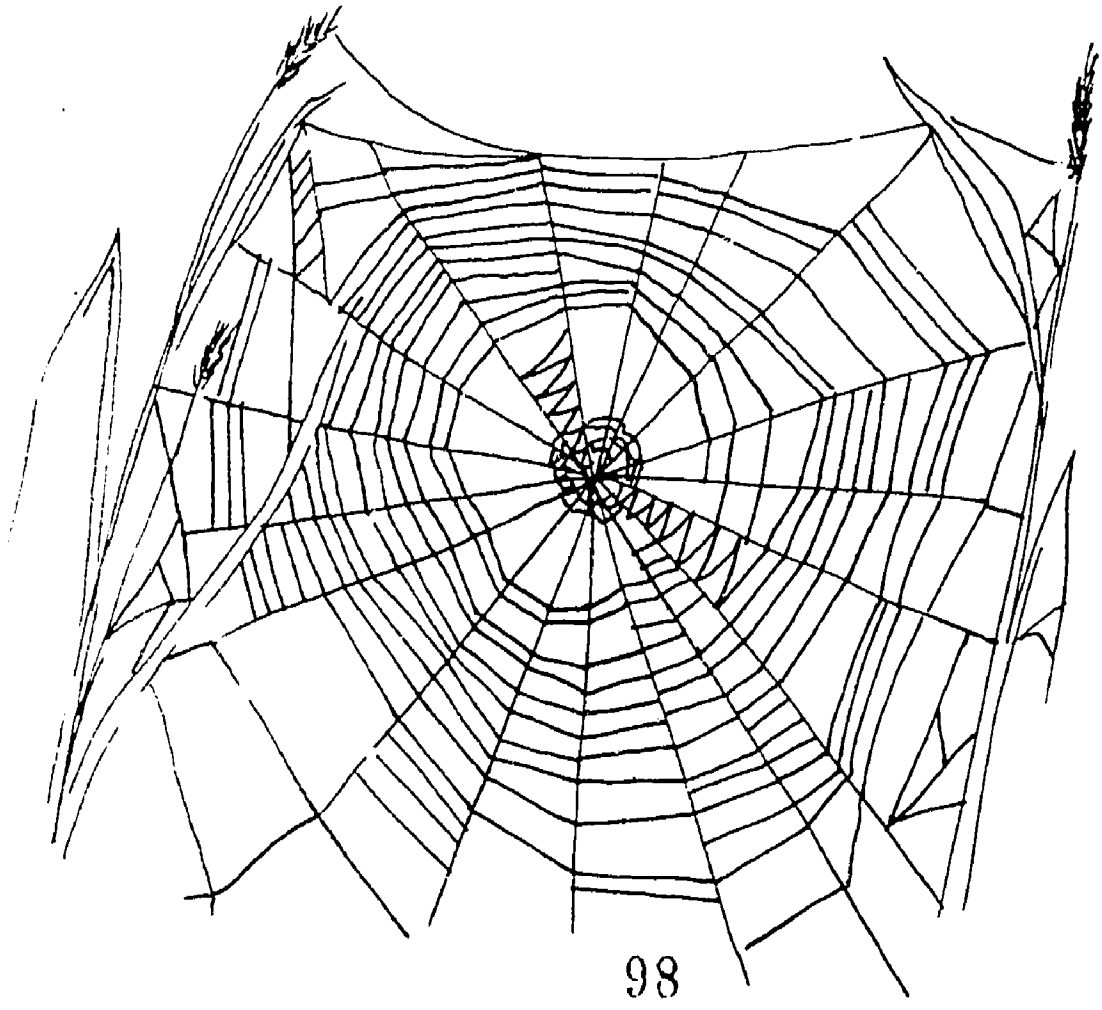
. What do spiders eat? What eats spiders? Collect pictures of each.
. Spiders trap food many ways. Read about the trap-door spider.
. Make a model of a spider. Compare it to the insect. How is it different?
. How do spiders spin webs? Act out the web-making.
. Most baby spiders never see their mother. Find out why.
. How do spiders help man?
. Watch a spider. Write or record a story about it.

What now?

Why shouldn't you kill spiders? Tell two people.







To do . .

Birds live everywhere. Why would a bird live in the city?

Read "City Birds." How have these birds changed? How has their environment changed? Why do they like cities?

Do more . do more . .

- Make a present for the birds. Make a bird feeder. Hang it near your room. Watch for visitors.
- What birds live in your area? Keep a record. How are they <u>adapted</u> to that environment?
- What birds do you see each month? Keep a list. Do they change?
- What is the most unusual bird you have seen? Describe it.
- Observe beaks and feet of birds. Are they all alike? Draw pictures.

What now?

Pick out your favorite bird. Draw a picture of it. Write a short report. Tell what it eats. Describe its environment.

CITY BIRDS

Many birds live in the city. It is their home. They can find the things they need there. Birds need food and a place to nest.

STARLINGS

As cities grew, forest birds left. Insects multiplied. They were a problem.

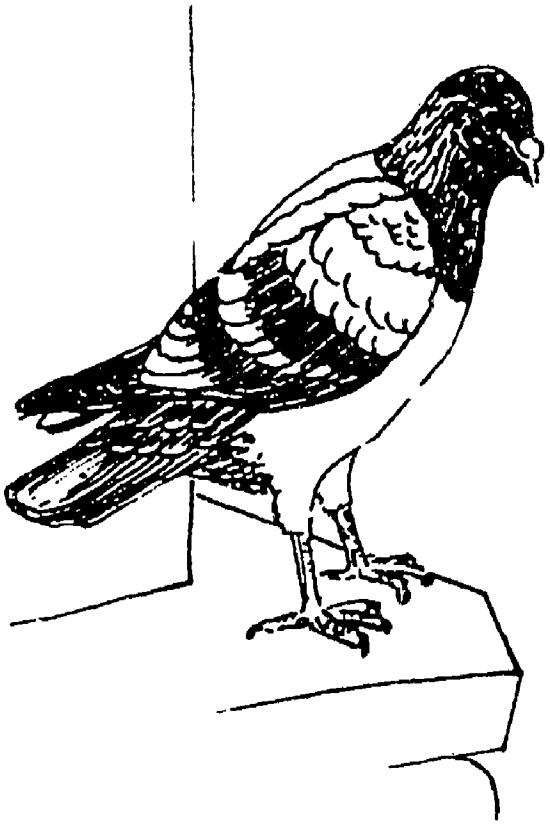
In 1890, people brought Starlings to New York City. The birds came from Europe. People brought the birds to eat the pests. Their plan worked. One starling family ate 14,000 insects in three weeks.

Starlings eat other kinds of food. You can see them near garbage dumps. They gather there in large groups.

Starlings roost on city buildings. They gather there in flocks. They nest under the eaves of buildings. They also nest in drain gutters.

Do you think starlings are adapted for city life?

PIGEON



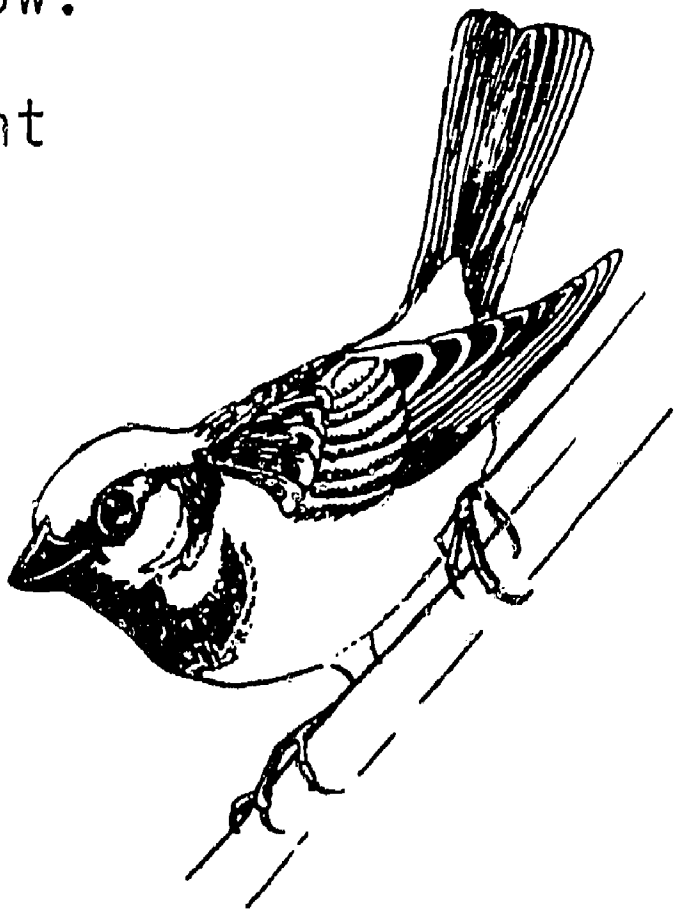
If you live in the city, you know what a pigeon is. In fact, some cities are trying to get rid of pigeons. There are too many pigeons. They carry diseases.

Pigeons were brought here by colonists. As people left the farms, so did pigeons. They made the buildings their home. They made the parks and streets their kitchen.

The pigeon's ancestors were called rock doves. They built their nests in rocky cliffs. They lived in Europe. Today, pigeons nest on window ledges. Newer office buildings have fewer places for nests. Do you think pigeons will survive?

SPARROWS

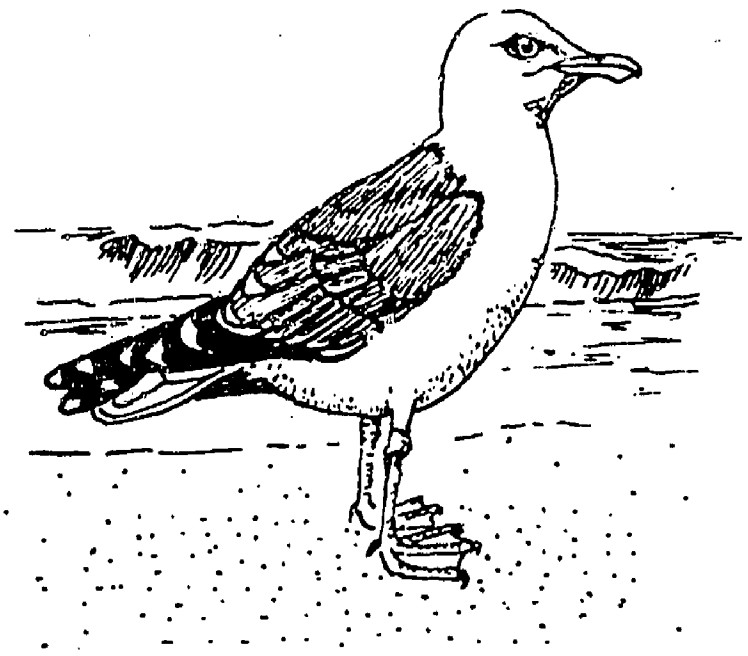
You would probably call this bird a sparrow. It is really a Weaver finch. They were brought to North America in 1850. They came from Europe.



Sparrows eat grain and bread crumbs. They also eat insects. Do you think they can find enough food in the city?

The sparrow's ancestors built their nest in tree holes. Where do you think sparrows nest in the city? They nest under the eaves of buildings.

HERRING GULL

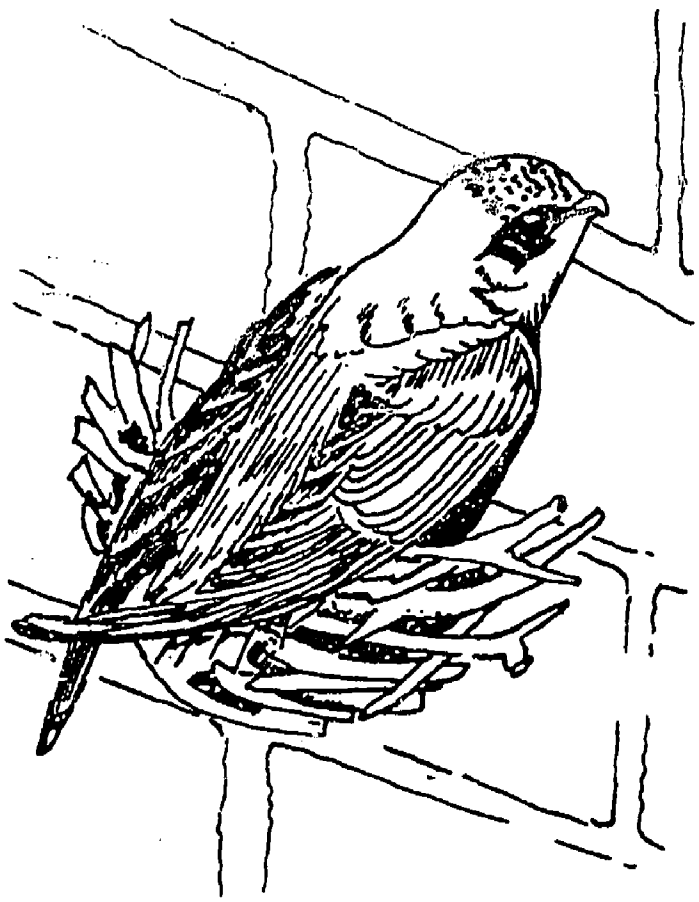


Have you ever seen this bird? It is a herring gull. You can find these birds near rivers. They also live near large bodies of water.

Herring gulls are scavengers (SCAV-n-gerz). Scavengers eat dead things. Herring gulls clear food litter from beaches. They flock near garbage dumps.

Sometimes, herring gulls are called pollution indicators. Can you guess why? A gathering of gulls means pollution is high. It may mean something has killed the fish. It may mean garbage has been dumped into the water.

CHIMNEY SWIFTS



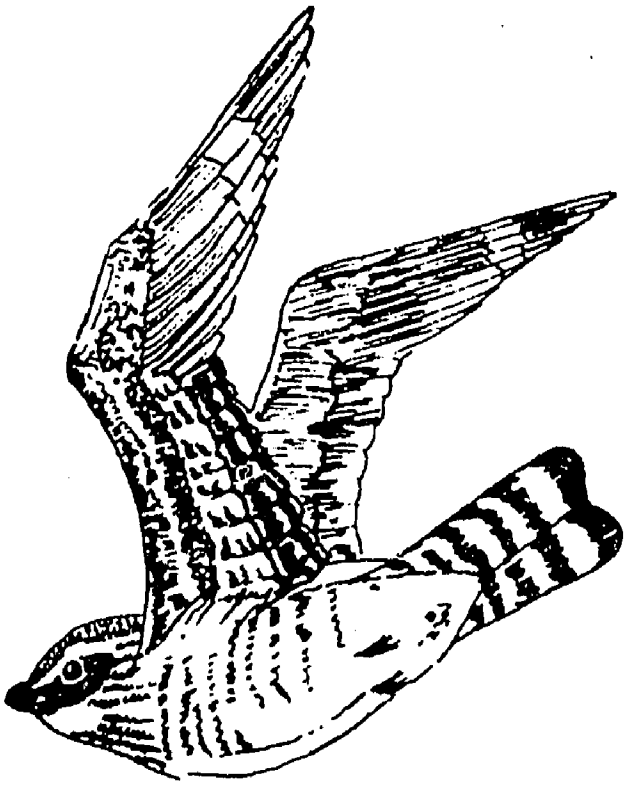
Chimney swifts fly in a zig-zag pattern. They feed while flying. They eat insects. The insects are attracted by city lights. The lights help the swifts see the insects.

The bird's ancestors built shelf-like nests. They built them on cave walls or inside hollow trees. Today, these birds make their homes in chimneys. They "glue" twigs to the chimney with saliva.

Sometimes, humans build out-of-season fires. The heat loosens the nest. The birds may end up in the fireplace.

Look around your community. Do you see many chimneys? Do you think there are Chimney swifts around?

NIGHTHAWKS



Nighthawks nest in open fields or on gravel. In cities, they nest on rooftops.

At twilight, you may see the nighthawk. Listen for his call - peent.

The nighthawk is not really a hawk. He catches insects. He flies in the evening sky.

Vocabulary

1. flock: large group, as a flock of sheep
2. eaves: part of the roof that sticks out over the walls
3. adapted: suited for
4. ancestor: ones who came before, as grandparents
5. survive: continue to live
6. scavengers: animals that ead dead things
7. attracted: drawn to

To do . .

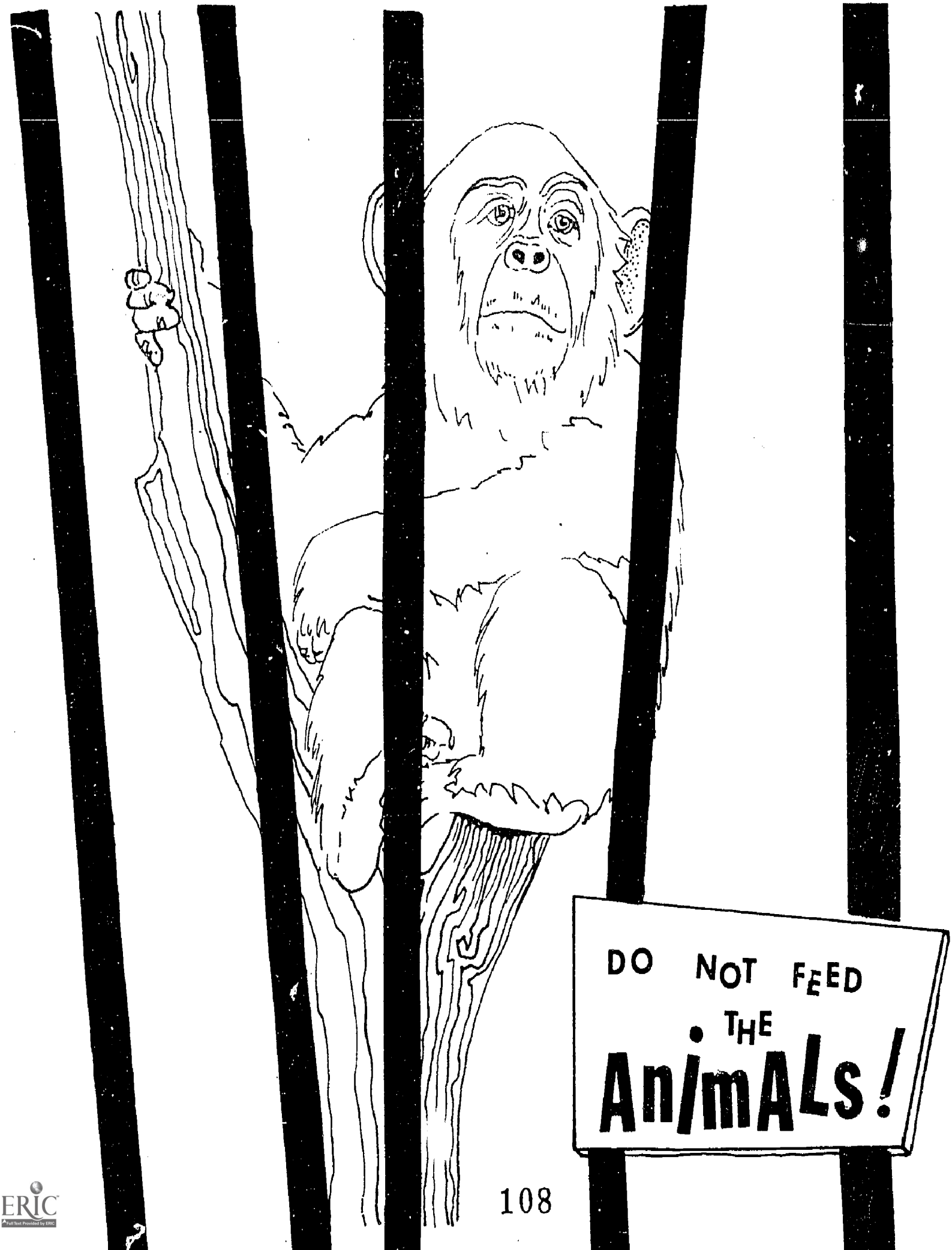
How would you feel with nothing to do? Take a piece of string. Cut it 50 inches long. Make it into a circle. Sit inside it. Do not talk or move for 5 minutes. How did you feel? How do you think a caged animal feels?

Do more . do more . .

- Read the card about zoos. Are zoos necessary? What makes a good zoo?
- How's your Z.Q.? Visit a zoo in your area. Rate it.
- Talk to the people at the zoo. Do they help the animals feel at home? How?
- Read "Zoo Doctor." How is he different from your doctor?
- Could any of your pets feel like caged animals? Find out how to care for your pets.

What now?

Write a story about a caged animal.


DO NOT FEED
THE
AnimALs!

THE ZOO -- A SPECIAL PLACE[1]

A zoo is a very special place. There are different kinds of zoos. Some zoos keep only one kind of animal. Some keep many kinds of animals. A good zoo should do five things:

1) Help people have fun. You can enjoy yourself there.
2) Help people learn. A good zoo should give you information about animals.
3) Study the animals there. Scientists need to know about animal diseases. They need to know about their foods and behavior.
4) Help animals stay alive. Some animals can no longer live in the wild. They have lost their homes to man. Other animals have been hunted too much. Zoos help these animals.
5) Give the animals a natural place to stay. Their area should be as much like their natural environment as possible.

[1] Adapted from Ranger Rick's Nature Magazine, March 1971.

HOW GOOD IS YOUR ZOO?[1]

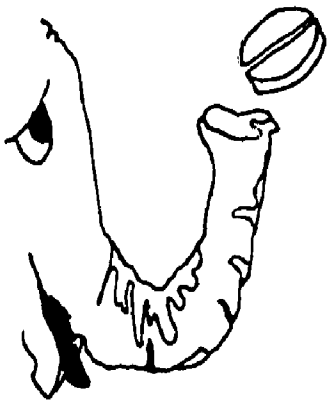
Here are some questions to help you decide if this zoo is a good one. Give the zoo a "bad", a "fair", or a "good" on each question. If the zoo gets fewer than six "goods", talk to the people who run the zoo. See what they think can be done.

QUESTION	RATING		
	Good	Fair	Bad
1. CAGES AND PENS: Do the animals have enough room to run around?			
2. GROUNDS: Are there signs to help you? Is the zoo clean? Are there restrooms?			
3. PEOPLE: Can you find someone to answer your questions? Are they friendly?			
4. INFORMATION? Are there signs near the cages? Do they tell you about the animals?			
5. CLEANLINESS: Are the cages and pens clean? Do the animals have fresh water to drink?			
6. YOUR AREA: Does the zoo have animals from your area?			
7. HEALTH: Do the animals look healthy? (Remember, some animals shed in the Spring.)			
8. BABIES: Are the animals able to have babies? How many were born at the zoo last year?			
9. GUIDEBOOK: Does the zoo give you a guidebook? Does it help you understand what you see there?			
10. YOUR OPINION: Did you enjoy the visit? Do you want to come back again?			

[1] Adapted from Ranger Rick's Nature Magazine, March 1971.

Vocabulary

1. diseases: sickness
2. behavior: the way people or animals act (behave)
3. natural: having to do with nature
4. environment: everything all around you (or anything else)
5. shed: lose hair
6. opinion: belief (the way you feel about something)

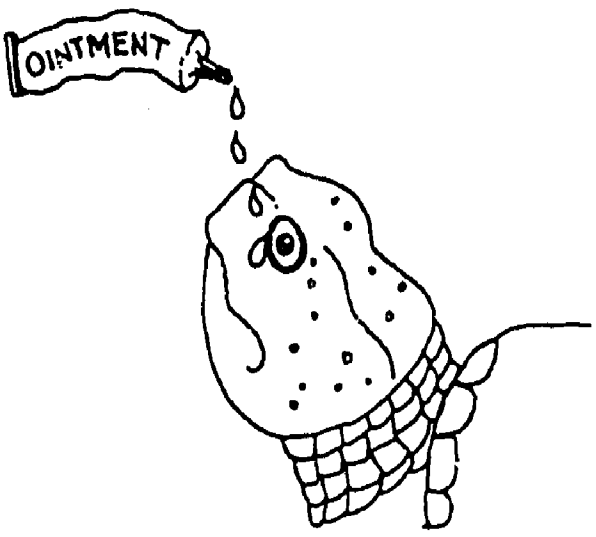


ZOO DOCTOR

Would you like to:
- put a pill down an elephant's trunk?
- look down a gorilla's throat?
- put medicine in a turtle's eye?

Someone does this every day. He is called a zoo doctor. A zoo doctor is a veterinarian. Veterinarians take care of animals.

The zoo doctor has a big job. Animals get sick each day. He must also protect the animals from disease. Diseases can be passed from one animal to another. They can be passed from humans to animals.



The zoo doctor checks each new animal. He makes sure it is healthy. Animals can bring germs or parasites with them.

The doctor helps the animals other ways. He tries to see that they are kept in natural surroundings. He sees that they get the proper food. This keeps them healthy and happy.

Some zoos have hospitals. The doctor tries to correct serious problems there. He may operate on animals. Sometimes animals in the zoo die. The doctor tries to find out why. He tries to prevent more deaths.

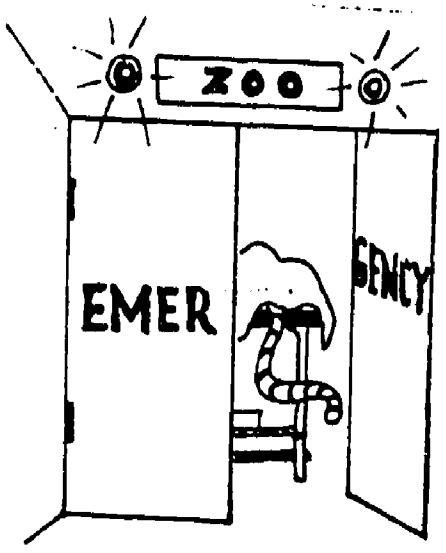
--Nature and Science, Vol. 6, No. 5 (Nov. 1968), p.25.

Vocabulary

1. veterinarians: animal doctors
2. *disease: sickness
3. germs: tiny things that cause sickness
4. parasites: small animals that live on other plants or animals
5. prevent: keep from happening

*repeat word

Questions for Thought



1. Are zoos just for fun?
2. How else can they help you?
3. How can they help animals?
4. Why are zoos important?

To do . .

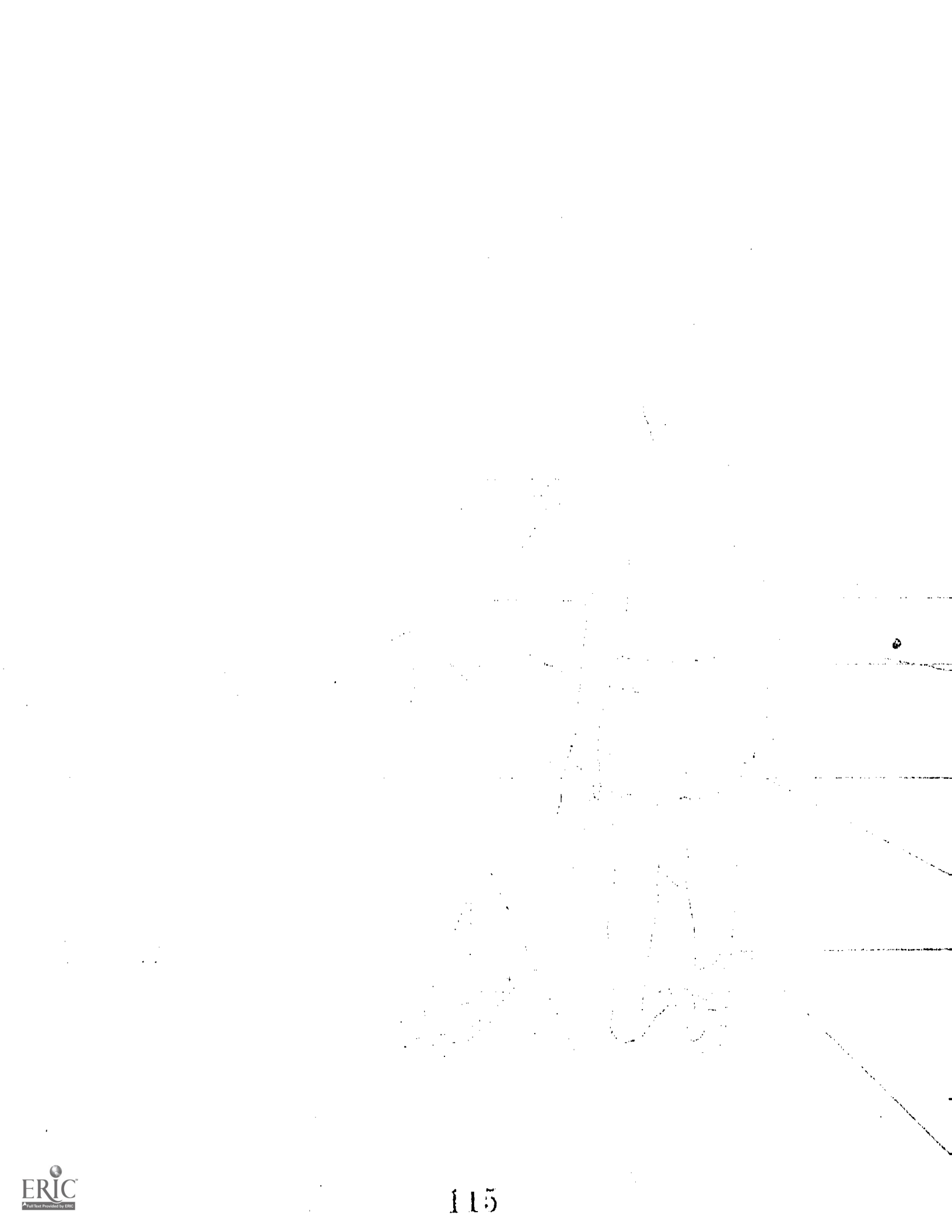
Read or listen to "Do I Have to Take a Bath?" Do all animals groom? Do they all groom the same way? Why is grooming important?

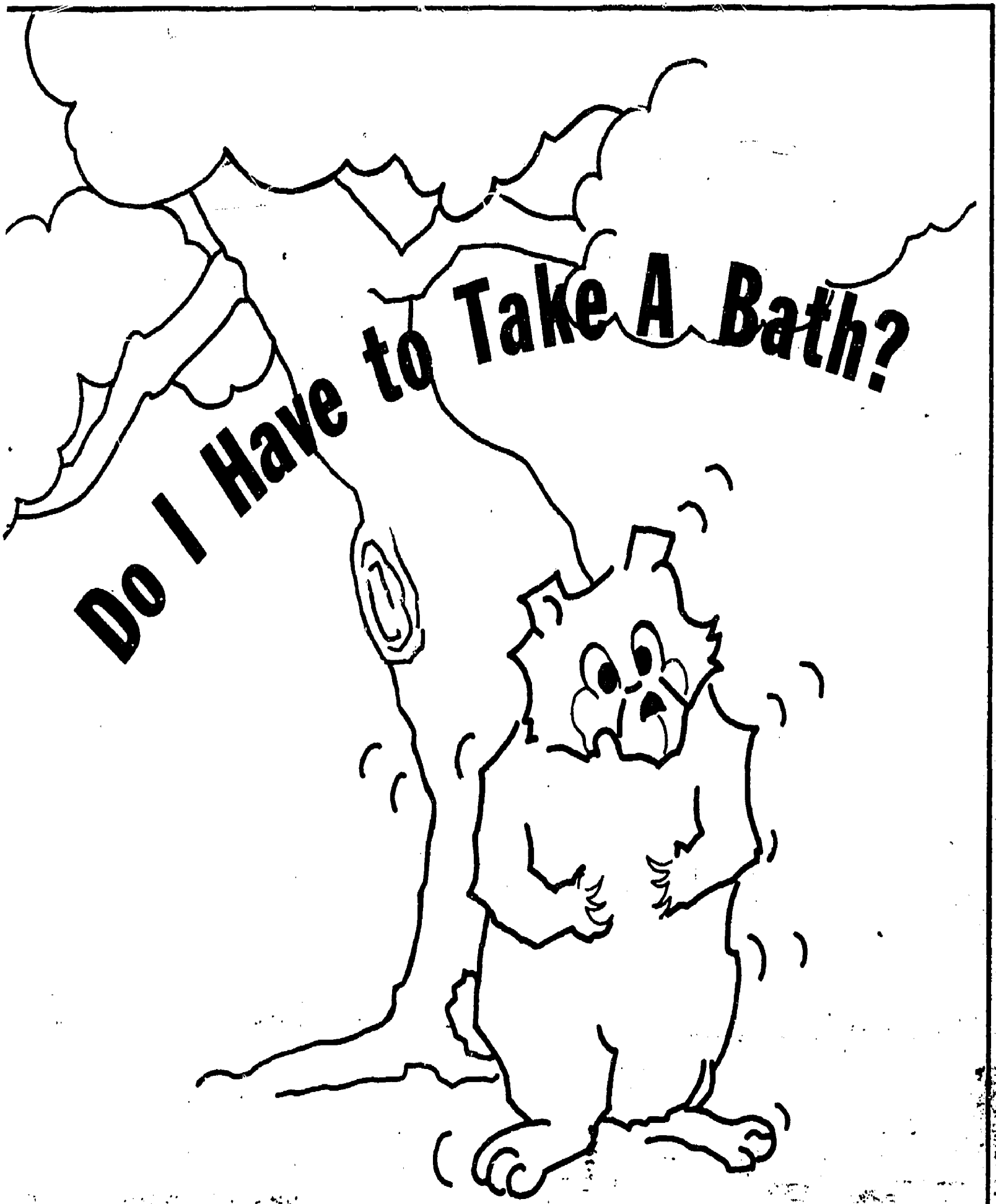
Do more . do more . .

- Make your own pictures of animals grooming.
- Put on a puppet show. Show how animals groom.
- Make a list of grooming words. Match the word with the animal.
- Watch animals in your neighborhood. How do they groom?
- What did you learn about their other habits? What foods do they eat? Where do they live? How do they protect themselves?
- Act out the grooming of one animal. Have someone guess what you are.

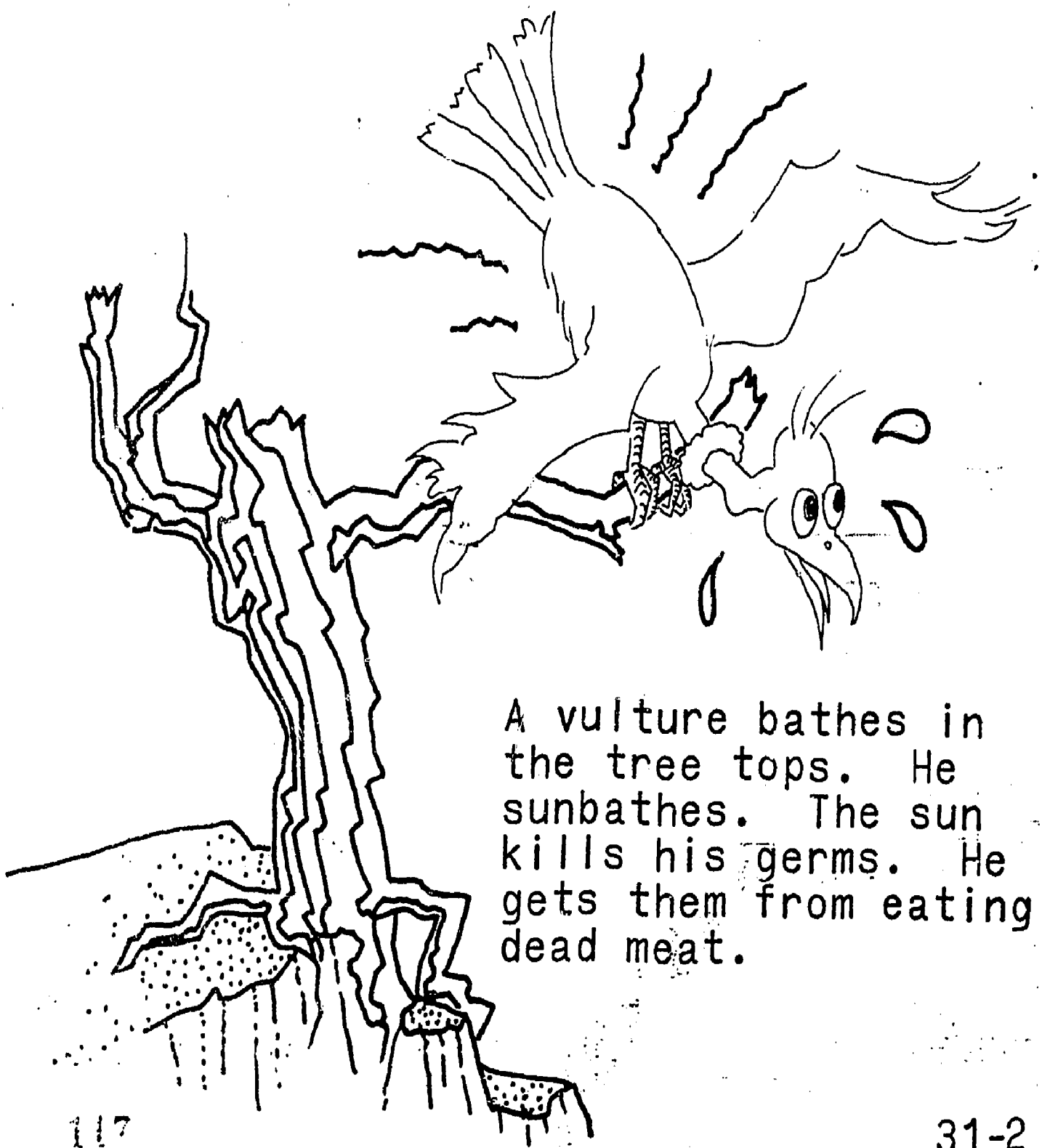
What now?

Name at least two animals. Show the way they clean themselves.




Do I Have to Take A Bath?

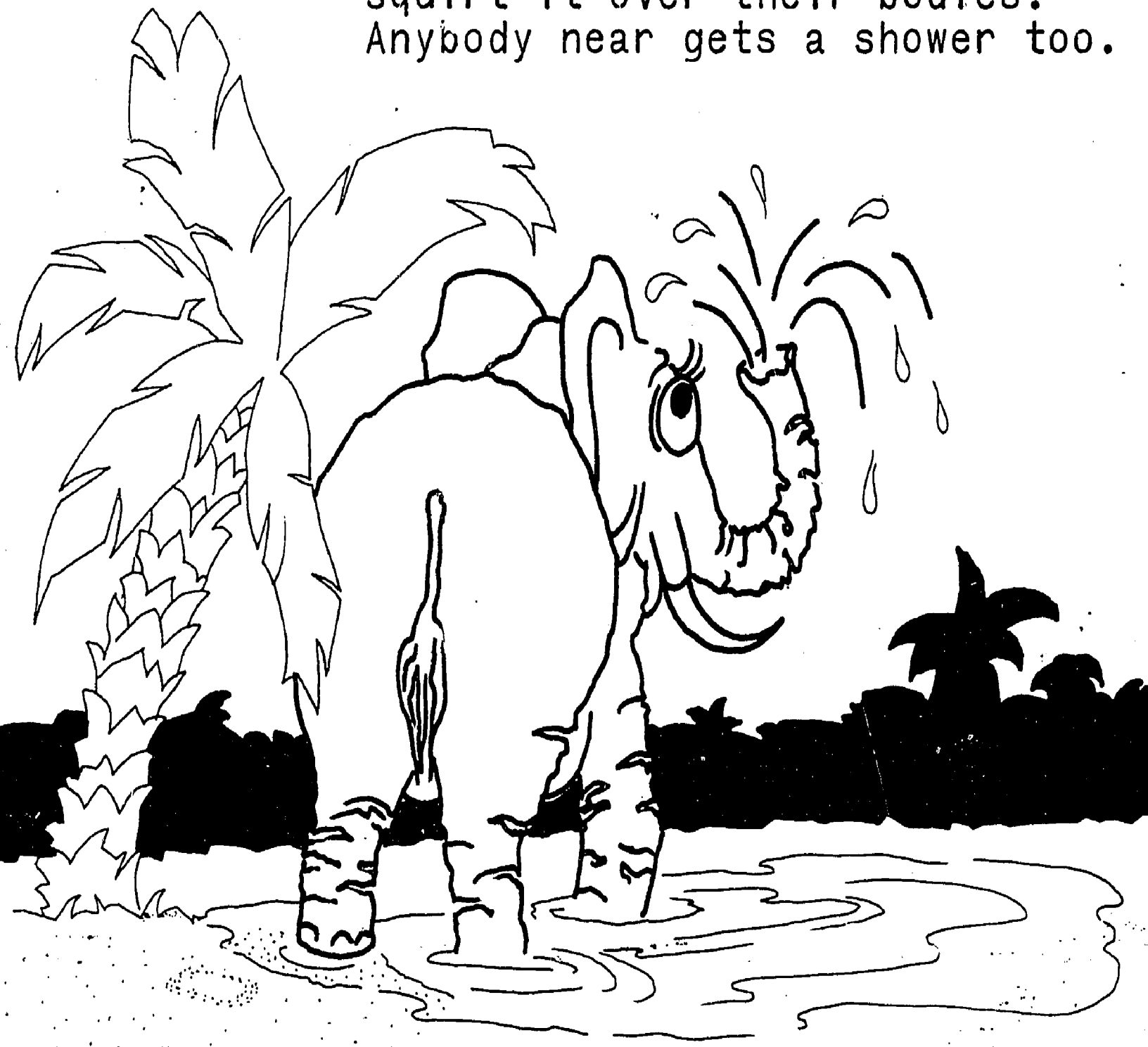
Does that sound familiar? Animals have the same problem. Surprised? How do animals solve their grooming problems?



A vulture bathes in the tree tops. He sunbathes. The sun kills his germs. He gets them from eating dead meat.

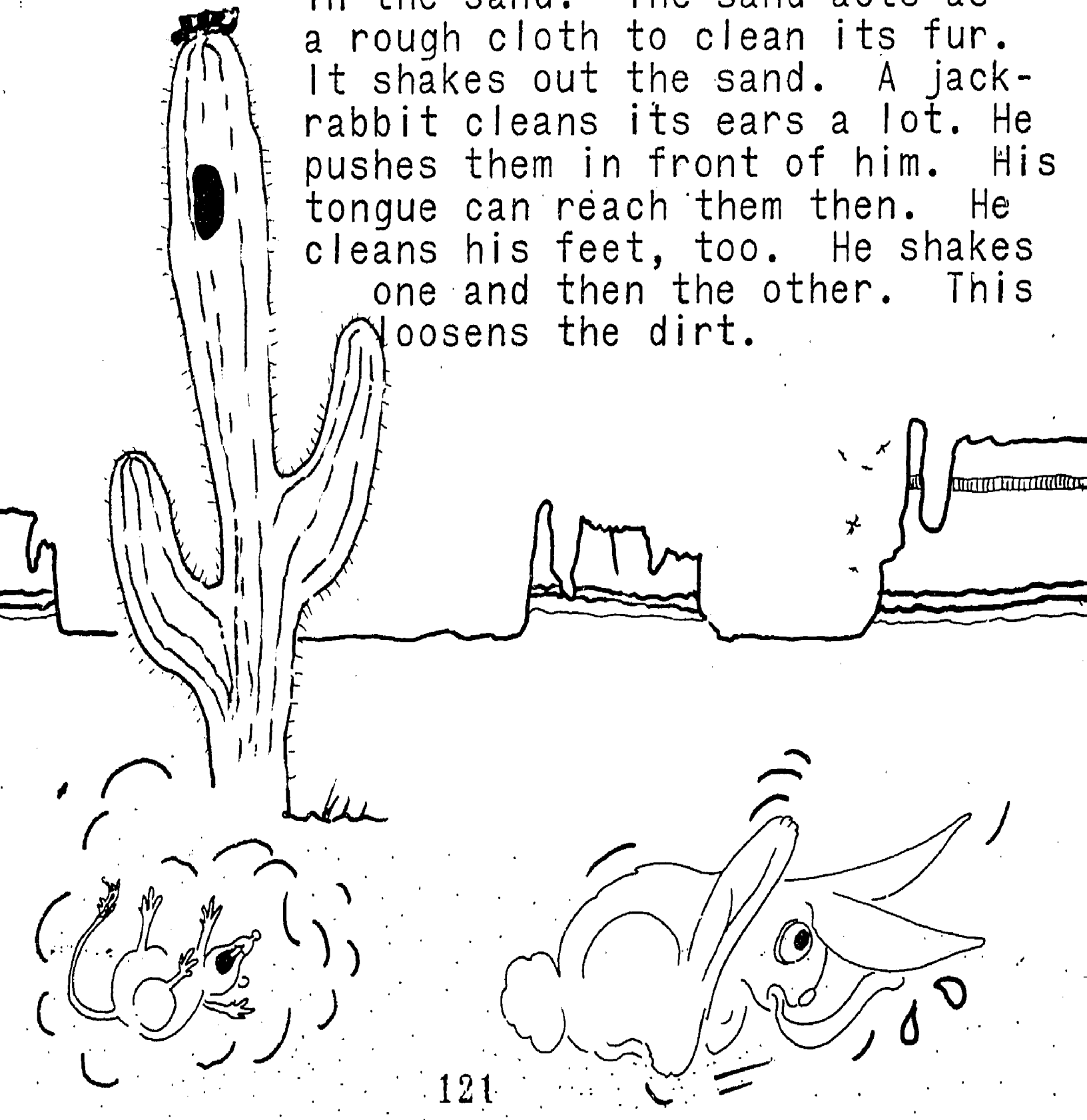
The earthworm bathes in the dew. He bathes at night.

Elephants take cool mud baths. They like showers better. They wade into the water. They suck water into their trunks. They squirt it over their bodies. Anybody near gets a shower too.



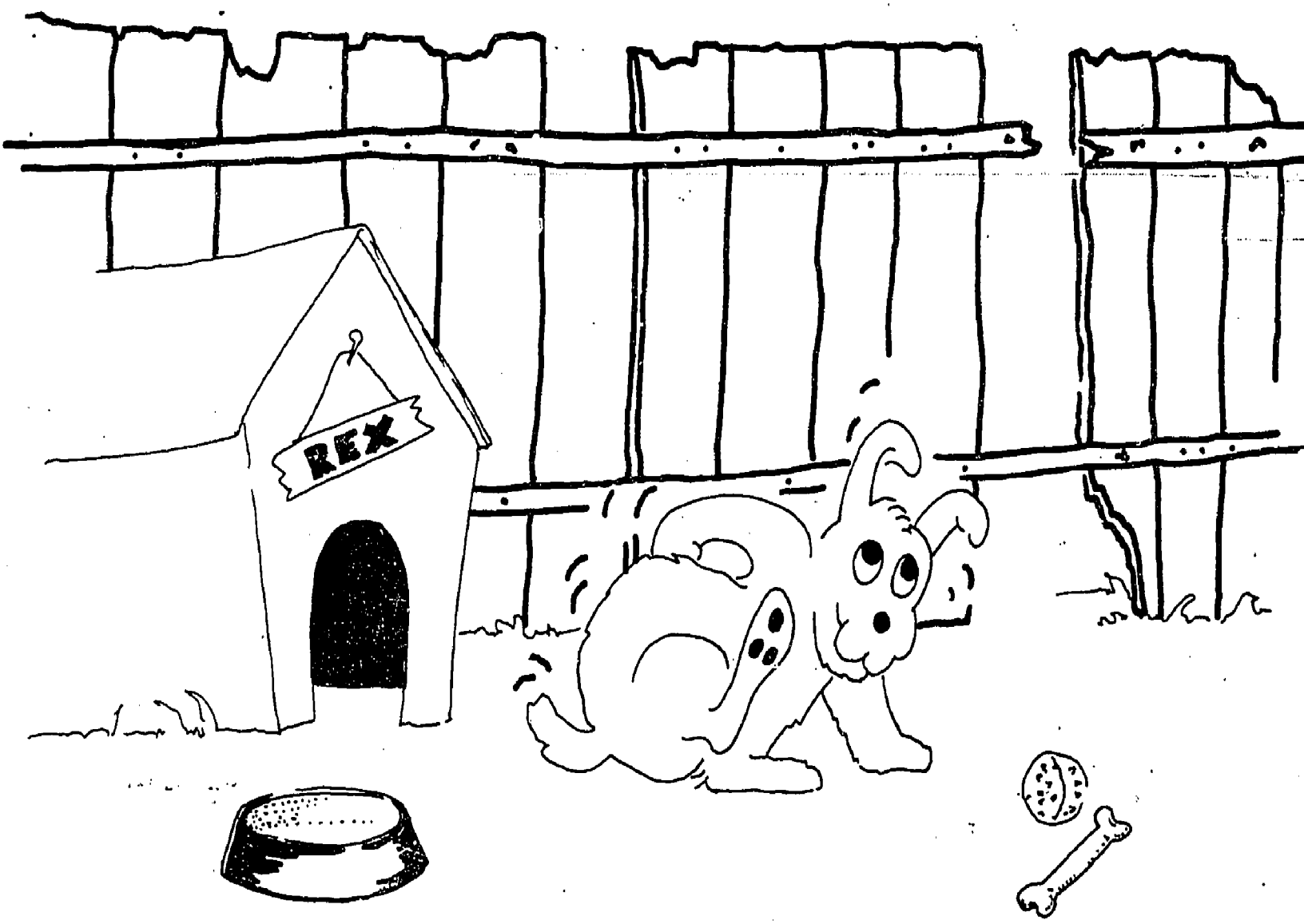
A tiger's tongue is very rough. She licks dirt off her (or her baby). Cats use their tongues the same way. Watch a cat. She wets her paw. She rubs it over her fur.

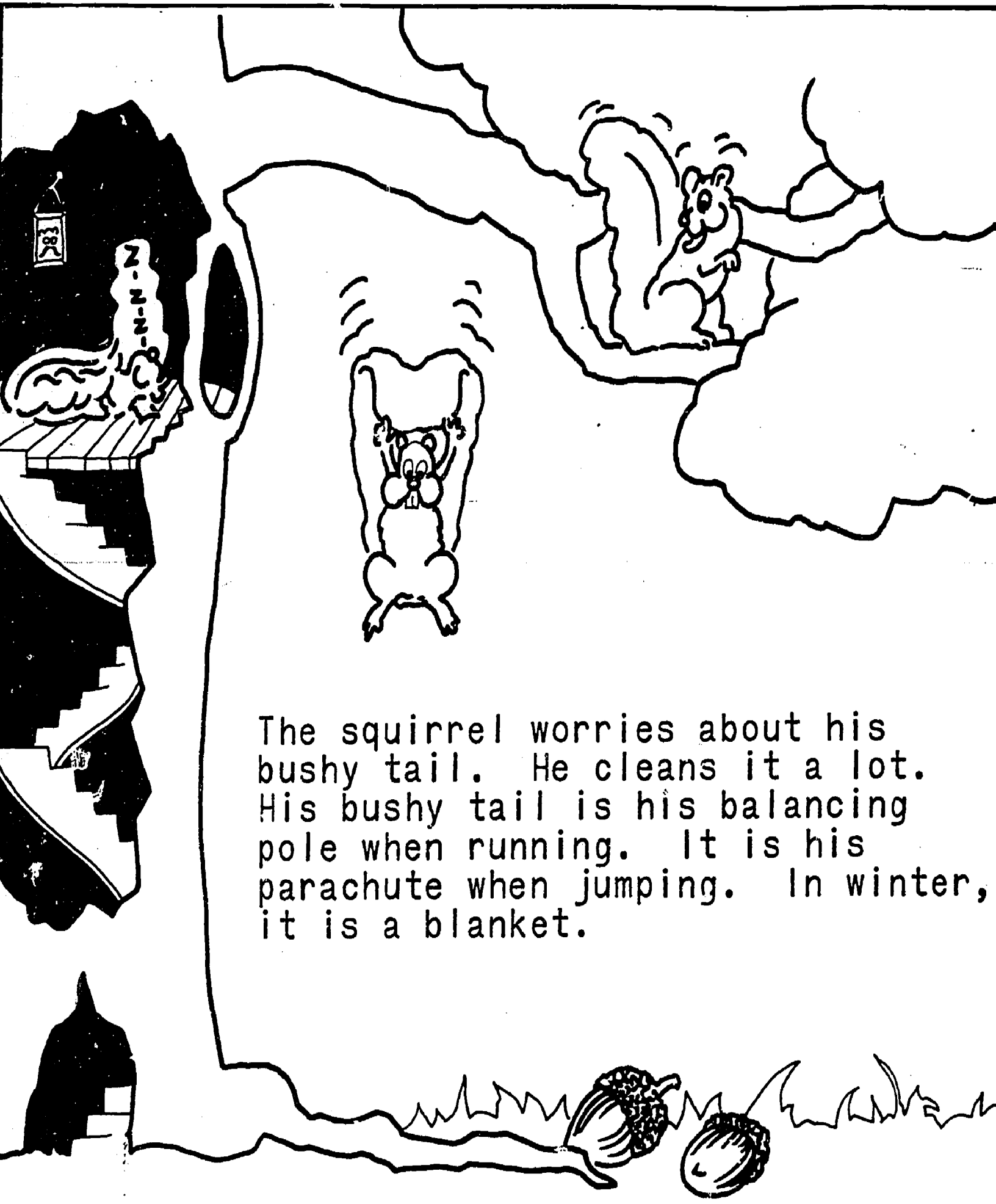
A kangaroo rat takes dust baths. It bathes in the sand. The sand acts as a rough cloth to clean its fur. It shakes out the sand. A jack-rabbit cleans its ears a lot. He pushes them in front of him. His tongue can reach them then. He cleans his feet, too. He shakes one and then the other. This loosens the dirt.



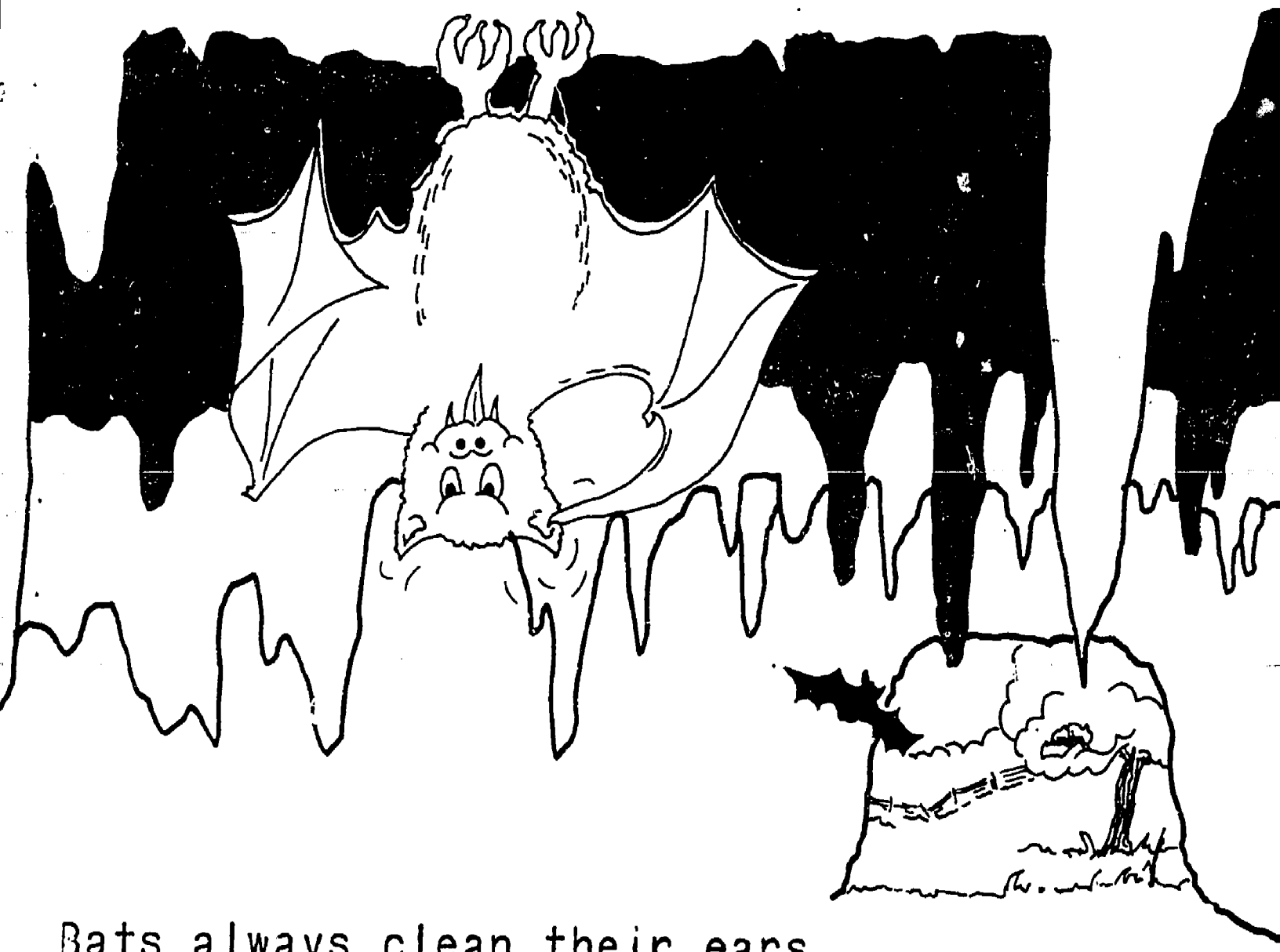
Dogs like to scratch. Scratching removes loose hair. Dogs need very few water baths. Water dires a dog's skin. It may crack..

Bears use their claws as combs. They comb their fur. They clean and sharpen their claws on tree trunks. Trunks are also good for scratching posts.





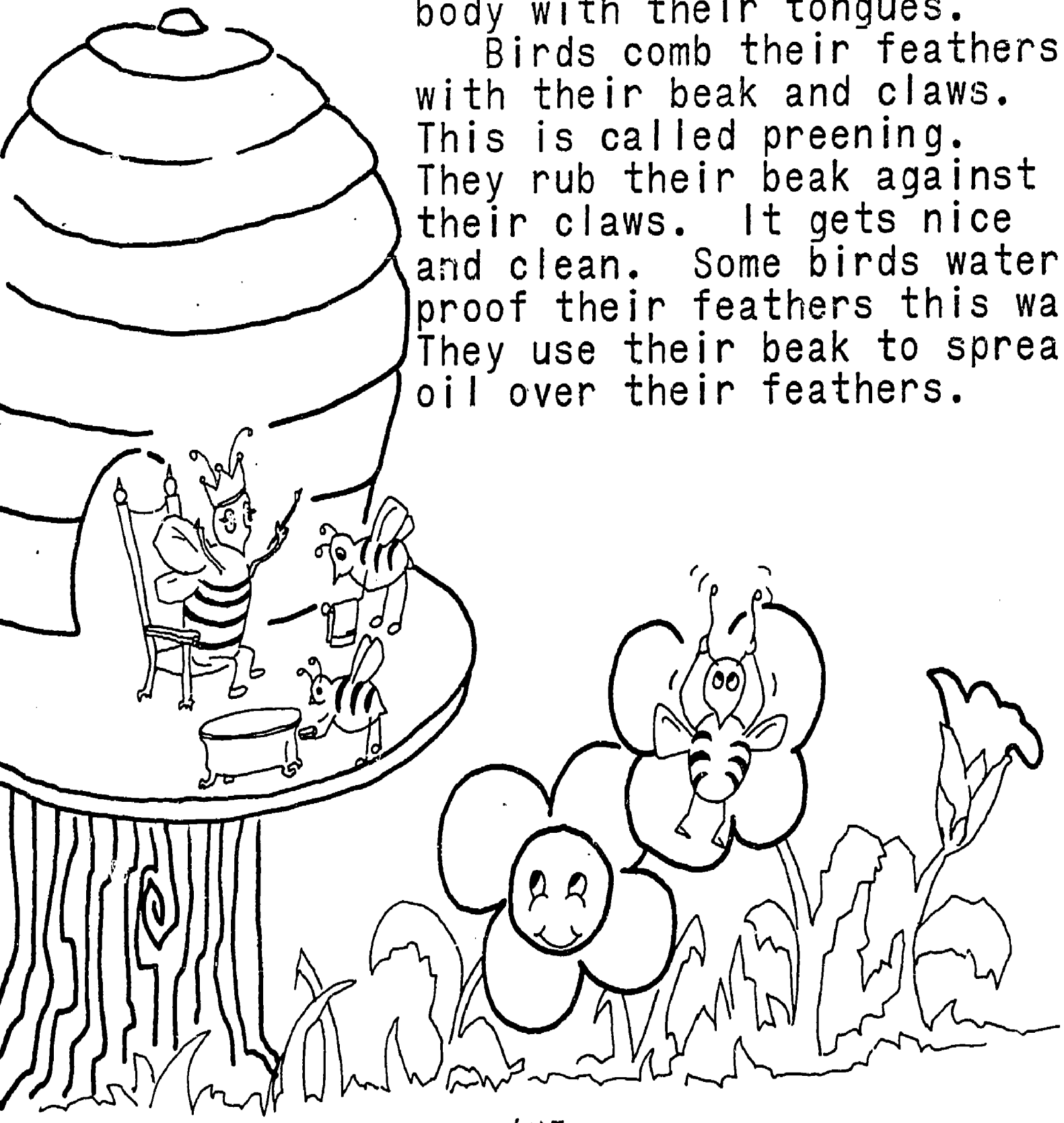
The squirrel worries about his bushy tail. He cleans it a lot. His bushy tail is his balancing pole when running. It is his parachute when jumping. In winter, it is a blanket.



Bats always clean their ears. Their ears are important. Bats use echoes to find their way around. A bat puts its "thumb" on its ear. It twists around to loosen dirt. It cleans the rest of its body, too. It licks with its tongue.

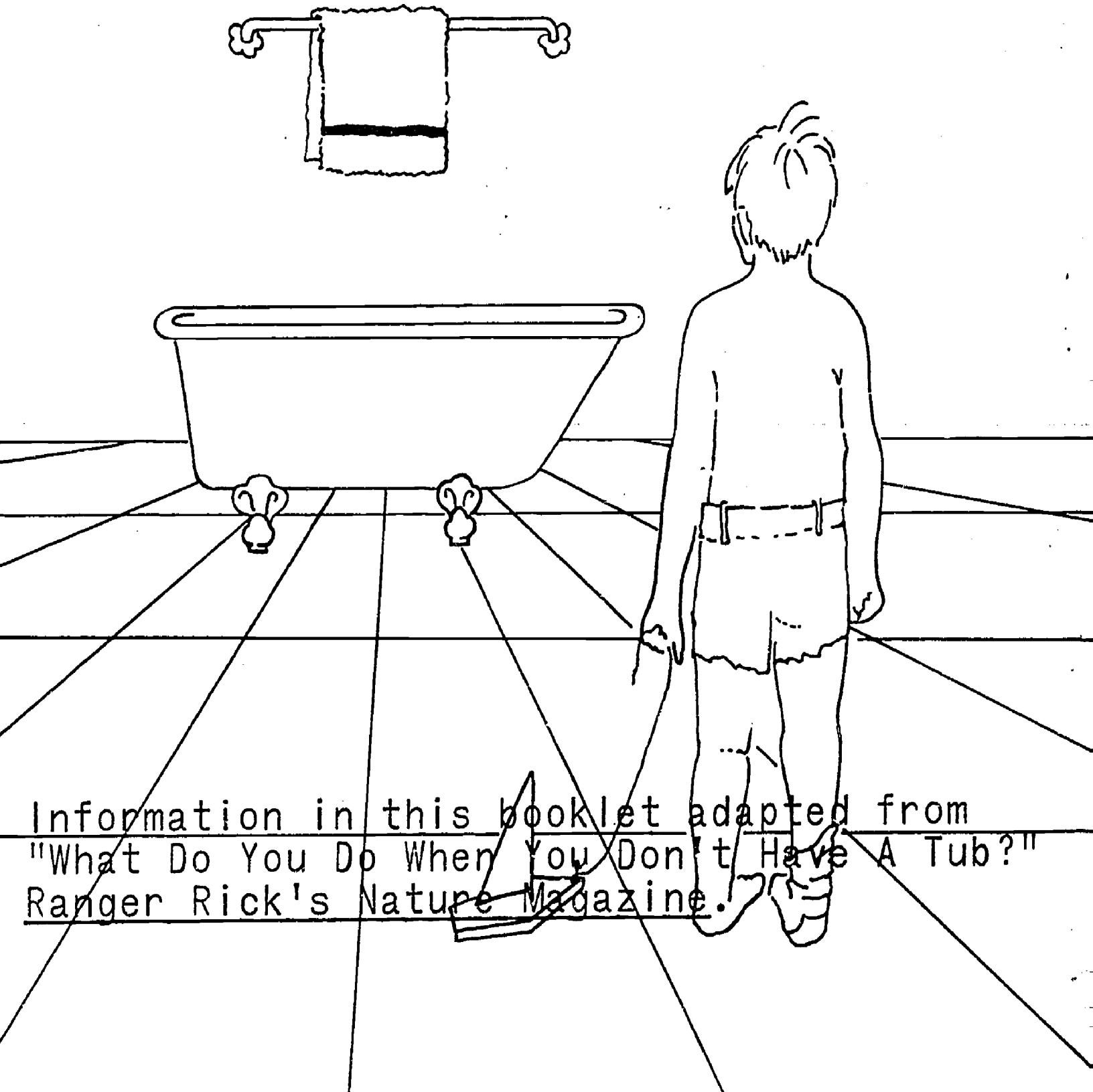
Bees have combs too, They are on their front legs. They clean their antennae with these. They lick the rest of their body with their tongues.

Birds comb their feathers with their beak and claws. This is called preening. They rub their beak against their claws. It gets nice and clean. Some birds water-proof their feathers this way. They use their beak to spread oil over their feathers.



Some animals, don't clean themselves at all. Someone else does it for them. The moray eel opens its mouth. Many small fish, called wrasses, swim in. They eat the sea lice that are in the eel's mouth.

THE END



Information in this booklet adapted from "What Do You Do When You Don't Have A Tub?" Ranger Rick's Nature Magazine.

To do . .

Mix clean sand with tempra powder. Put it in a salt shaker. Put glue on heavy paper. Shake the colored sand over it. Let it dry. Feel the sand.

Do more . do more . .

. Look at a sand grain. Use the magnifying glass. What do you see?
. Make some sand. Rub two pieces of loose rock together. What happens? How does nature do the same thing?
. Visit a beach. What animals and plants depend on sand?
. How do beaches protect people? How do plants help beaches?
. Look around you. Find other ways sand is used.
. Some beaches lose sand. Where does it go?

What now?

How important is sand in your area? Find some way to show the importance of sand.

To do . .

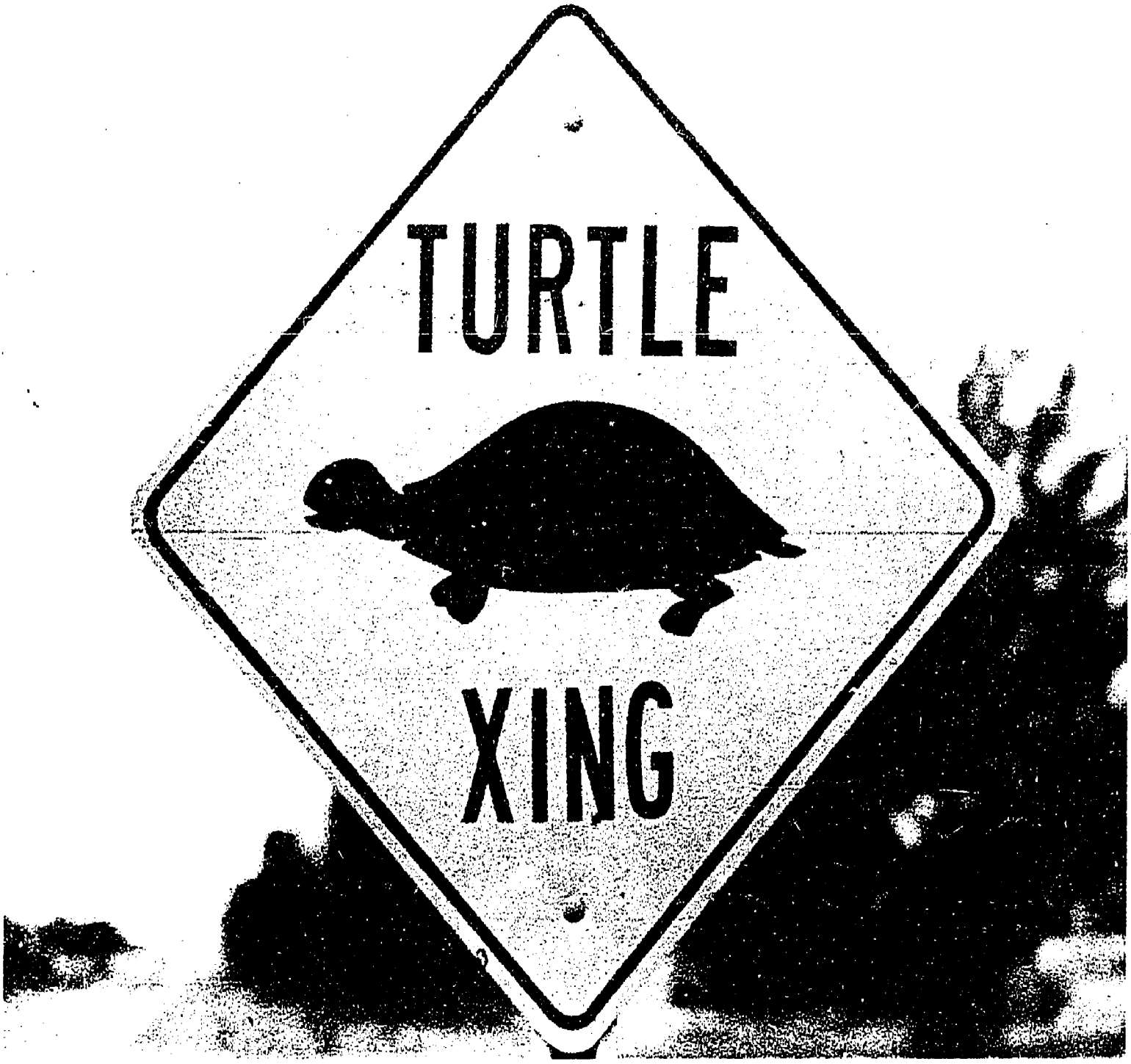
Want to make the summer exciting? Be a turtle-watcher! Go to the beach. Go late at night. Take your family. Look for turtle tracks. Watch for turtles.

Do more . do more . .

- Read the card on sea turtles. Who are their natural enemies?
- How do baby turtles find the sea?
- Draw a turtle's life cycle.
- Sea turtles are protected by law. Find out why. Who protects them in your area?
- What kinds of sea turtles are found in the U.S.?
- Turtles are reptiles. What other reptiles live in your area? Find out about reptiles.

What now?

Pretend you are a turtle. Write a letter. Tell why you are dying out. Tell people what can be done to save you.


TURTLE
XING

THE CASE OF THE DISAPPEARING TURTLES

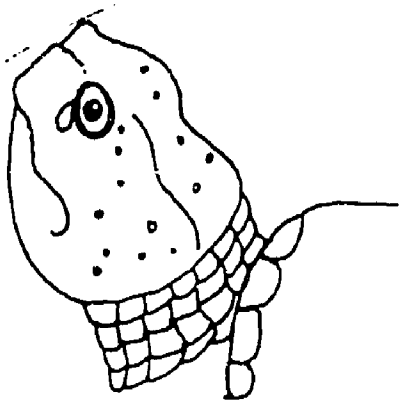
The female sea turtle may lay 100 eggs. Only one of these will become an adult. What happens to the others?

In the summer, female sea turtles lay their eggs. They come ashore late at night. They drag their heavy bodies onto the beach. They climb above the high tide line. Then the work starts. Using her flippers, she digs a pit. The digging takes about two and one-half hours. Then she lays the eggs. They look like ping-pong balls. When she is finished, the turtle fills the hole. Her flippers put the sand back. She pats it down carefully. Then she returns to the sea.

It takes the eggs two months to hatch. Some nests are destroyed. The eggs are eaten by predators. If the eggs are left alone, the turtles will hatch. The turtles work together to break out of the nest. They hurry to the water. Many do not make it. Some are eaten by birds. Other predators are waiting, too. Even in the water, they are not safe. Sharks or crabs may eat the young turtles.

Adult sea turtles have few enemies. Still, they are disappearing. Why? The reason seems to be man. The sea turtle's worst enemy is man. Most of the adult turtles killed are nesting. They are killed for their meat or shell. Man also robs the nest for eggs.

Florida protects these gentle giants. It is illegal to take a turtle egg. It is also illegal to kill a turtle. These laws are hard to enforce. There are many miles of beach. There are very few men to protect the turtles.



--Carr, Archie, "How Turtles Find the Sea," Nature and Science, Jan. 6, 1969.
--Carr, Archie, "One Hundred Turtle Eggs," Nature and Science, Dec. 16, 1968.
--McQuillan, J.R., The Story of Sea Turtles. Dept. of Natural Resources, State of Florida. (Free upon request)

Vocabulary

1. predators: animals that kill others for food
2. illegal: against the law
3. enforce: carry out (to enforce a law means to make people obey it)
*4. protect: keep safe

*repeat word

Questions for Thought

1. Why do you think sea turtles lay so many eggs?
2. What is the worst enemy of the sea turtles? Why?
3. What has Florida done to protect the "gentle giants"?
4. Has it worked? Why?

To do . . .

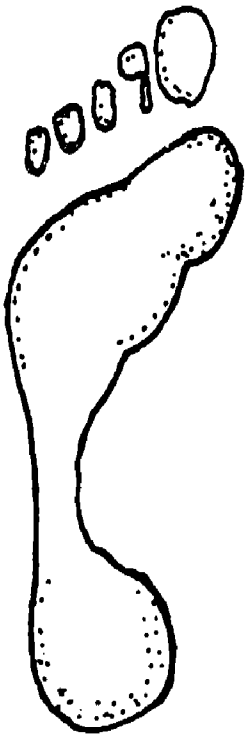
Take a piece of colored construction paper. Trace around one of your feet. Cut out the shape of your foot. Use the shapes to make a trail.

Do more . do more . .

- Follow the trail your teacher has made.
- Listen to the story. How are footprints used in this story?
- Compare your footprint with other people's. How are they alike? How are they different?
- Can you identify a human footprint?
- Can you identify animals by their footprints?
- Write a story where tracks are important.

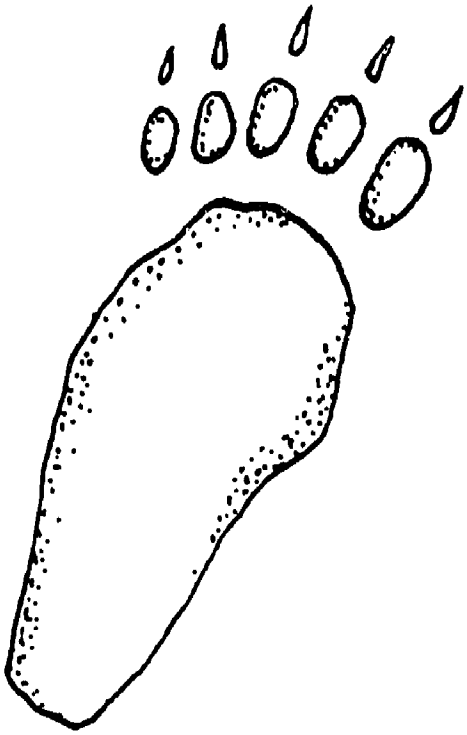
What now?

Your teacher will give you a sheet. Find the human footprint.



WHICH PRINT IS

Yours?



To do . . .

Can you be a detective? Smooth a sandy area. Choose one in the woods or near water. Leave some food (bread, apple, etc.) overnight. Later, look for animal tracks. What made them? Keep a record.

Do more . **do more** . .

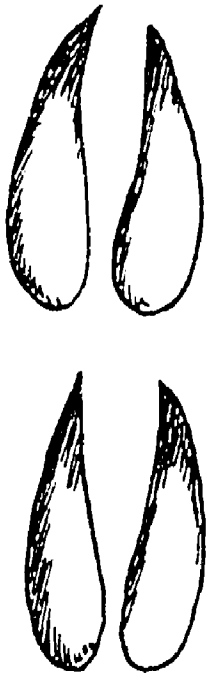
- Make plaster casts of tracks. (Your teacher has directions.)
- Try dampening a pet's paws (but don't upset it). Stand it on white flour. Let it walk on black damp paper.
- Smooth the ground around a bird feeder. Compare the tracks of different birds.
- What can you tell from tracks? How large the animal was? How fast it was going? If it was hurt?

What now?

Make a scrapbook of tracks. Find pictures of animals they belong to.

HOUSECAT

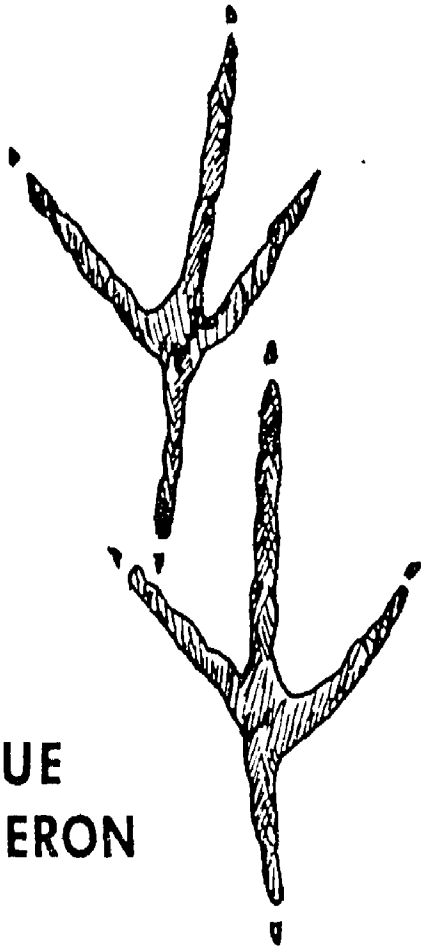
COTTONTAIL RABBIT



DOG

WHITETAIL DEER

BLUE HERON



To do . .

Take a walk. List the animals you see. What animals could have been hiding? Why didn't you see them?

Do more . do more . .

- Have a hidden animal hunt. Your teacher will give you a sheet. Color all the animals. How many can you find?
- Make pictures of animals in hiding. Try to fool your friends.
- Go on a toothpick hunt. Pretend you are a bird. Pretend the toothpicks are insects. What color insect would you rather be?
- Bring a chameleon to school. Watch it change color. How does this help it survive? What other adaptations does it have?
- What other animals have special tricks?

What now?

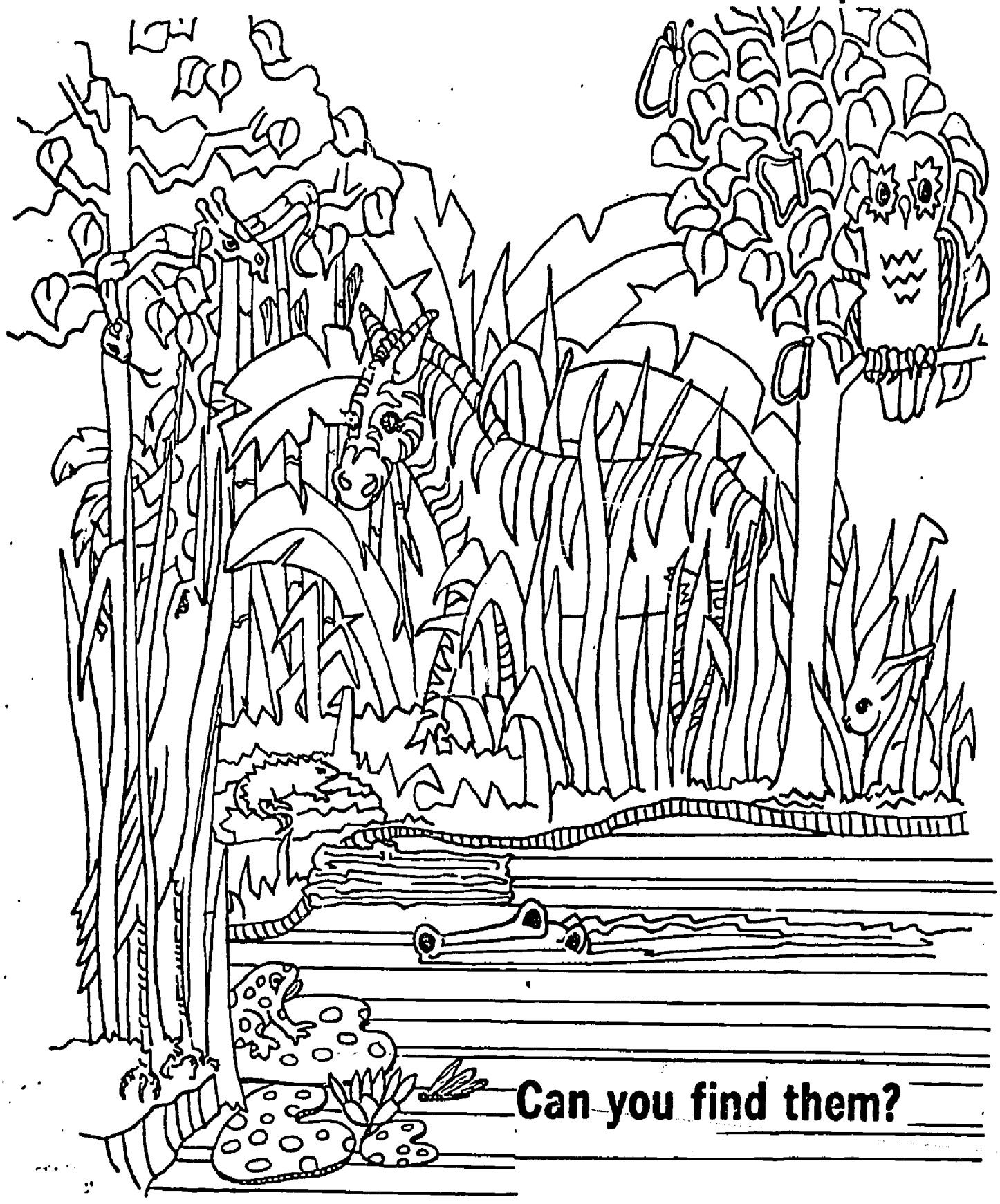
Take your first walk again. Find five animals you didn't see before.

Do you know Why elves wear green?

Well, it's so

They can't be seen.

There are thirteen animals hidden in this picture.



Can you find them?

To do . .

Some scientists study the past. Fossils help them. Fossils are traces of plants and animals.

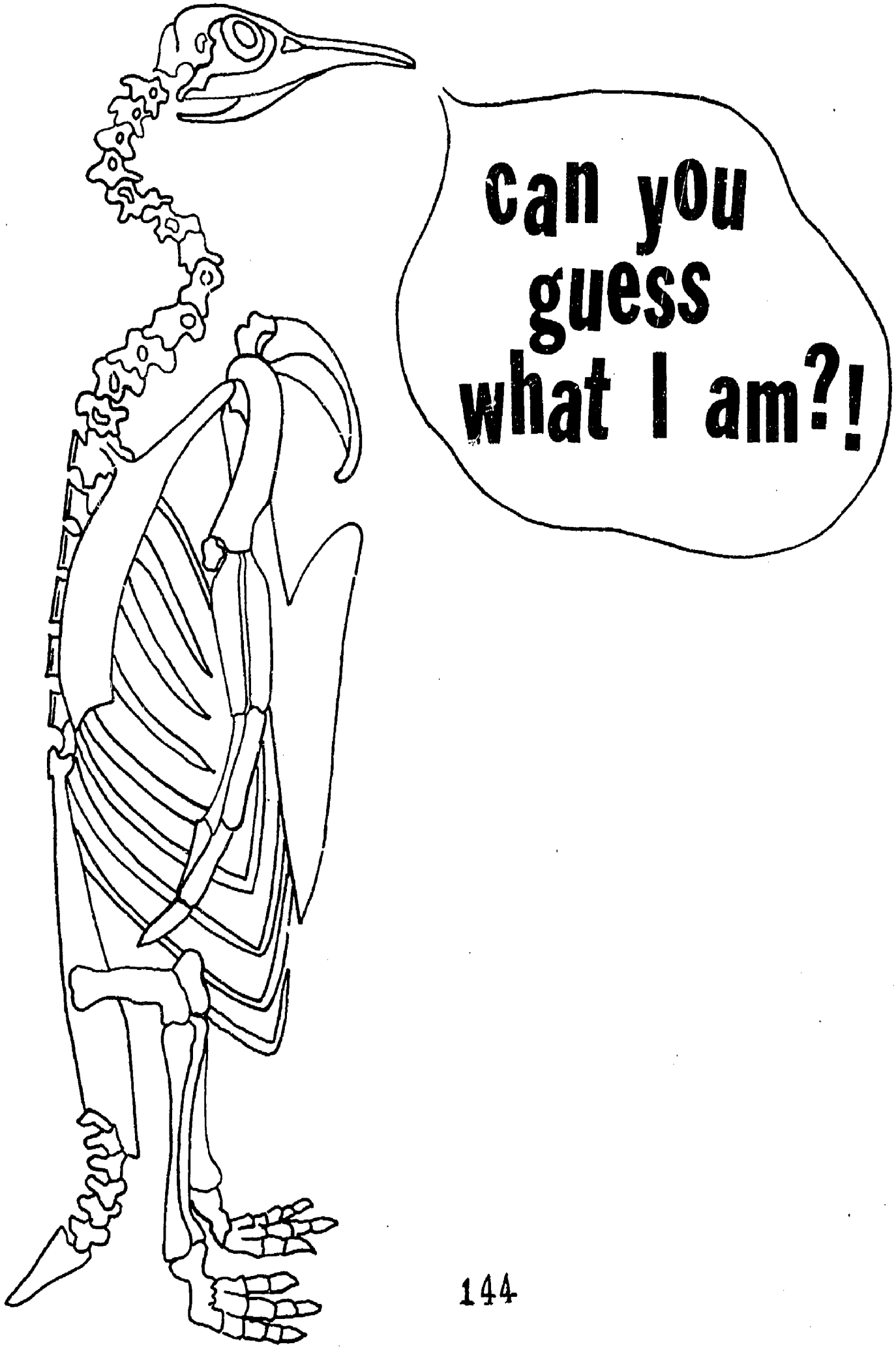
Some fossils are prints. Make a print. Put a leaf between two layers of clay. Press. Remove the top layer and the leaf. What do you see?

Do more . do more . .

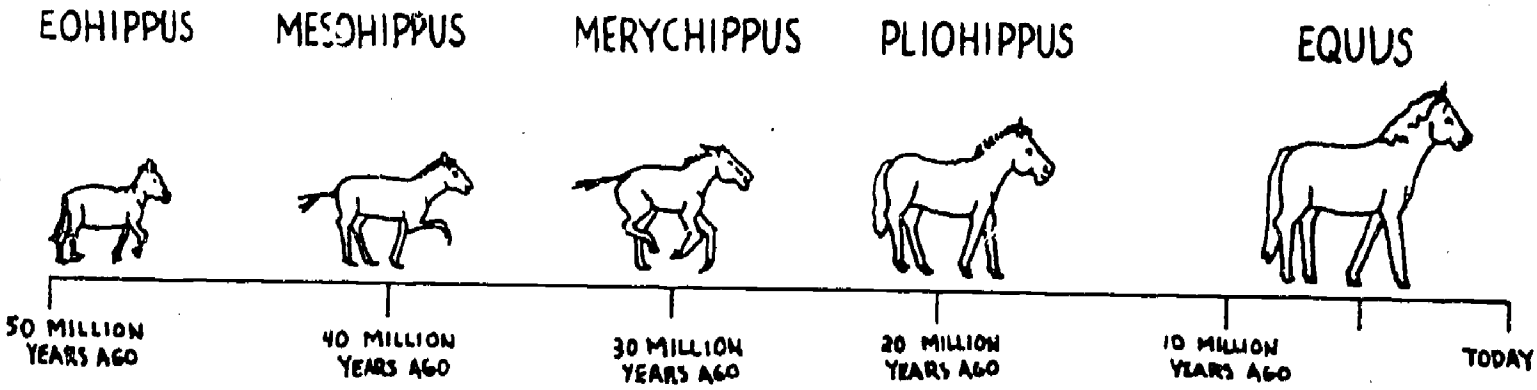
- Examine coquina limestone. Can you find any prints?
- Some fossils are animal bones. Scientists put them together. Scientists try to decide how the animal looked. Try it. Draw an animal from its skeleton. Your teacher will give you a picture.
- Read "The making of a Horse." How did scientists use skeletons?
- Read the card, Fossil Huntin'. Try it. Be patient.
- What things can not be found out from fossils?

What now?

Write a story. Use fossils in it.


can you guess what I am?!

THE MAKING OF A HORSE



Time Line

Do you know what an Eohippus (E-o-hip-us) is?

Give up?

Eohippus was a horse. You probably wouldn't recognize it. The Eohippus was very small. It was less than a foot tall. Do you think you could ride one?

Eohippus may sound like a strange name. It is taken from two Greek words. EO means first. HIPPUS means horse. What does Eohippus mean?

Eohippus lived 50 million years ago. This was long before man appeared. Scientists learned about Eohippus by studying

its bones. Some of the Eohippus skeletons have turned to rock. They are fossils. By using fossils, scientists have put together a history of the horse.

When Eohippus lived, the climate was warm and rainy. The land was covered with forests and plants. Eohippus had toes and soft, padded feet. He also had short, soft teeth. He was fitted for his environment. His feet were good for walking on soft forest soil. His teeth were good for eating the juicy plants.

As time passed, the weather changed. It got cooler and drier. The palm trees died. The soil got hard. The juicy plants died. Hard grasses began to grow. The environment was changing. Animals that could not live in the new environment died.

Eohippus faced other problems, too. A fierce new animal appeared in the grasslands. It was a saber-toothed cat. It liked to eat horses. Eohippus' feet were not good for running. The soil was too hard. There were no forests to hide in. His favorite foods had disappeared. Many horses died.

Nature seemed to be on the horse's side. Some horses were born with harder feet and teeth. They survived. They had babies. Some babies had even better feet and teeth. Millions of years passed. These little changes added up. The horse looked different. It was a different horse. Scientists called it Mesohippus.

Mesohippus was adapted to the grassland. It was taller. It could run faster. It had harder, longer teeth.

Each time the environment has changed, horses have, too. They have been able to survive. Scientists know a lot about the horse. They have been able to write its history. Most of their information has come from fossils.

Adapted from "Fifty Million Years of Horses" by John Vivian, Ranger Rick's Nature Magazine.

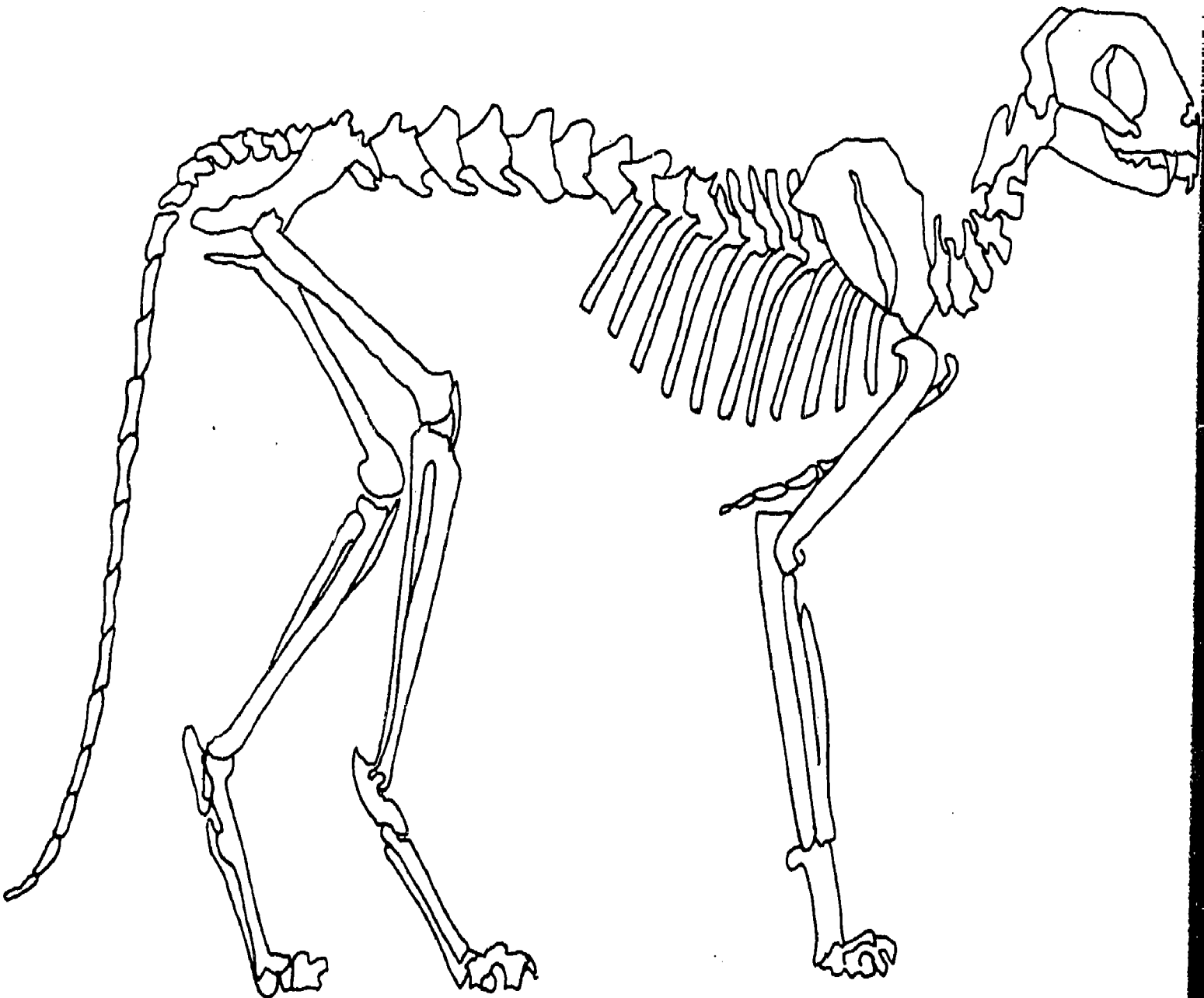
Vocabulary

1. fossils: animal bones that have turned into stone
2. climate: weather
3. environment: the things which are all around something (Our environment is the land, air, and water where we live.)
4. fierce: mean, unfriendly
5. saber: a very sharp kind of knife
6. survived: lived

Questions for Thought

1. Why did Eohippus become extinct?
2. What changes made Mesohippus better able to survive in a new environment?
3. Do you think horses will always look the same as they do today? Why?
4. If our environment changes, what will happen to us?
5. Does this story give you any clue as to what might have happened to dinosaurs?

37-5



To do . .

Dinosaurs lived long ago. They were very large reptiles. They disappeared. We learn about dinosaurs from fossils.

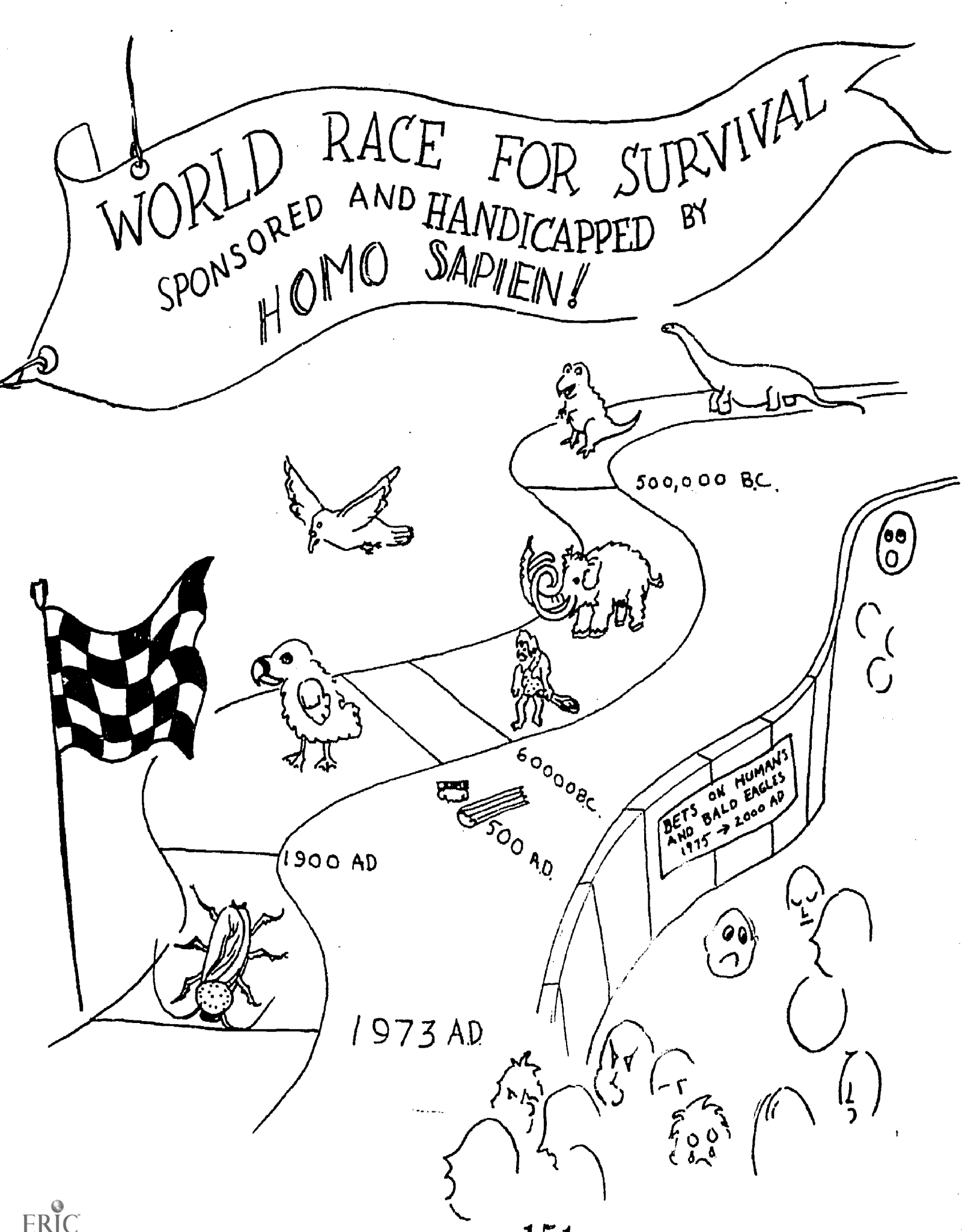
Go outside. Mark off the size of a dinosaur. Your teacher will help you. Would you like to be stepped on by a dinosaur?

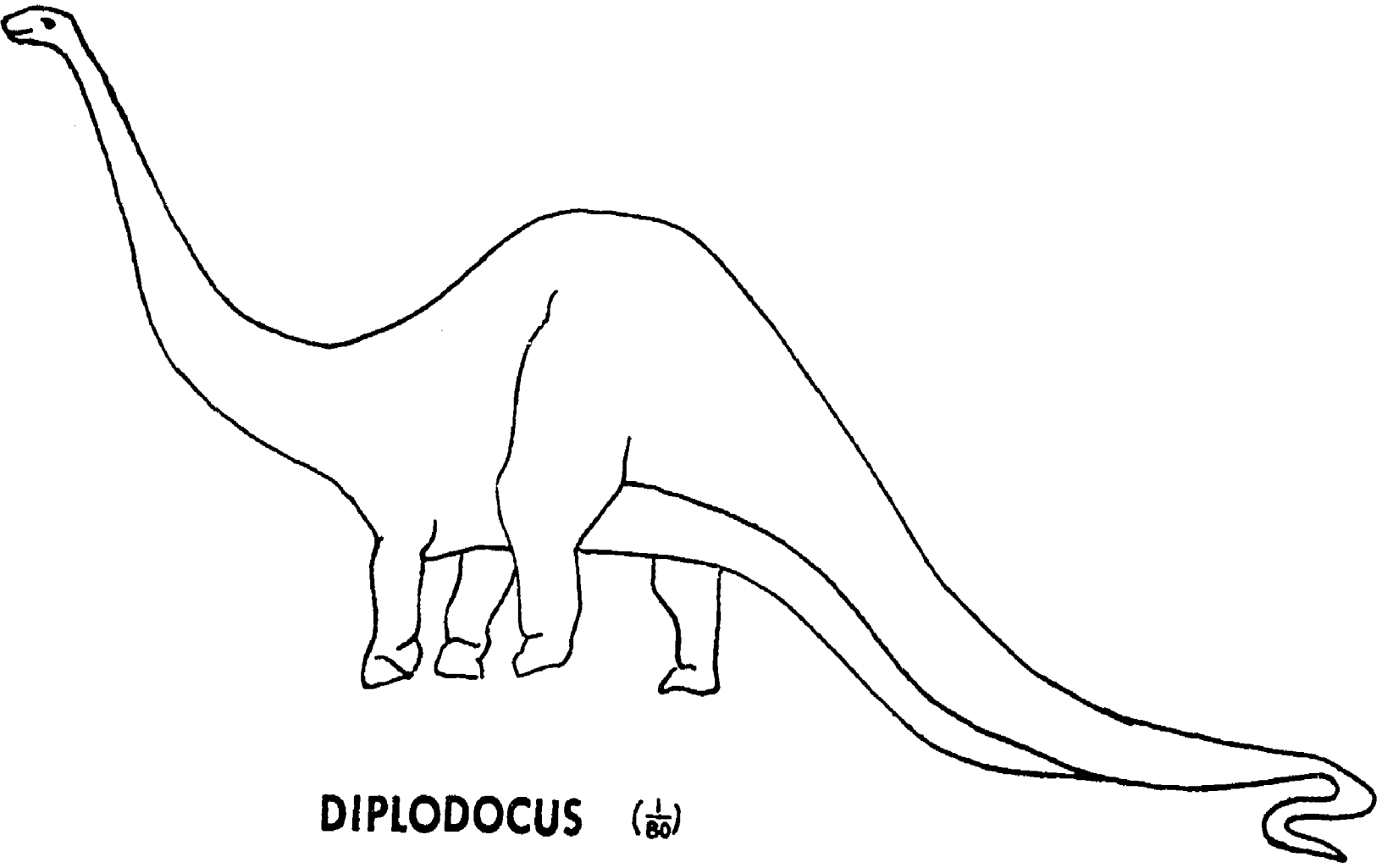
Do more . do more . .

- Do we know what color a dinosaur was? Use your imagination. Color your dinosaur. Add an environment to the picture.
- Dinosaurs have disappeared. Reptiles have not. Find pictures of reptiles. Do any of them look like dinosaurs?
- What was the earth like when dinosaurs lived? Has it changed? Make a before/ after picture.
- What happens to an animal when the environment changes?

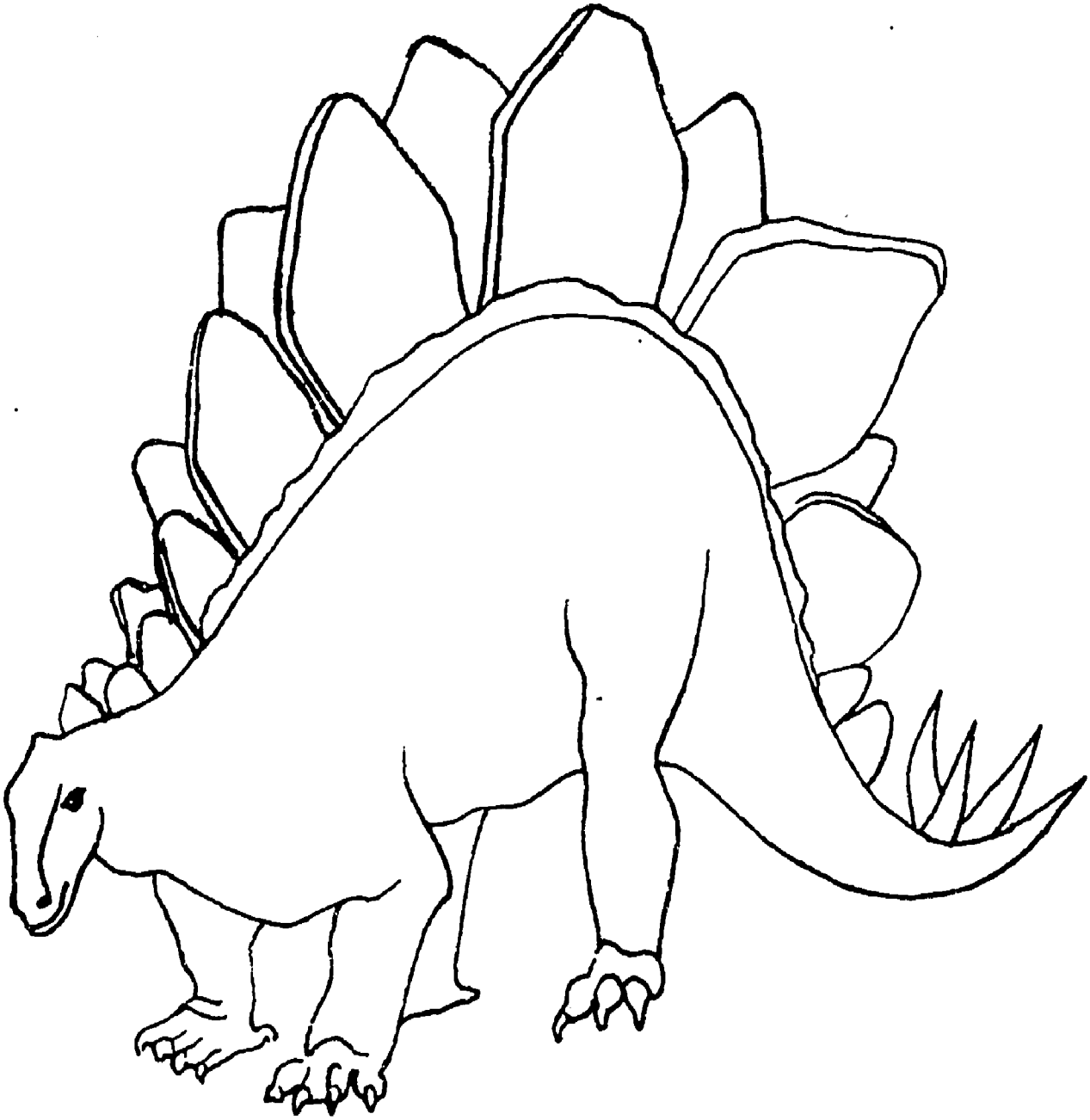
What now?

Write a story. Tell why you think dinosaurs died out.


WORLD RACE FOR SURVIVAL
SPONSORED AND HANDICAPPED BY
HOMO SAPIEN!
500,000 B.C.
60000B.C.
500 A.D.
1900 AD
1973 A.D
BETS ON HUMANS AND BALD EAGLES 1975 → 2000 AD



DIPLODOCUS ($\frac{1}{80}$)



STEGOSAURUS ($\frac{1}{30}$)

FOSSIL HUNTIN' BY: FRANK WOLKING*

Looking for fossils is easy, once you get the hang of it. In time, you'll even be able to tell where to look in one quick glance.

Looking on Dredged Islands

Islands are my favorite. To begin hunting, go over the surface of the island. You won't need to dig. Walk along. Pick up anything colored black, brown, yellow, or blue. If you think you've found a fossil, show it to someone with experience. They will make sure. Next, put on a pair of good shoes (never go barefoot). Wade into shallow water. Stay within five feet of the island. Again, pick up any black or brown rock you see. Be very careful of the oysters. Don't step on stingrays.

Dredged Land Fill

Before going on these areas, make sure you are not trespassing. These places are

usually pretty large I find it a good idea to bring ice water to drink. You can really get thirsty fossil hunting!

Take a small trowel and a bucket. Start walking. Pick up any dark rocks. Show them to a person with experience. Watch out for snakes. Look wherever there are a lot of rocks. Good fossils have a way of turning up there.

Be careful. Have fun. By all means, good luck!

*The author of this article is a high school student in Brevard county. He has found many fossils in this area.

Vocabulary

1. experience: knowing what you are doing
2. trespassing: walking on other people's land without asking
3. trowel: small shovel

To do . .

Can you pick out seed foods? Your teacher has six things. Four are from seeds. Guess which ones they are. Use these things.

Make Magic Cookie Bars. Try to find the seeds in the baked cookie.

Do more . do more . .

- Bring pictures of seeds or seed parts you eat. Make a collage.
- Other animals eat seeds. Make a list.
- Make a mosiac. Use different seeds.
- Soak bean seeds overnight. Examine them. Cut them in half. What do you see?
- Plant corn or bean seeds. Watch them grow. How is the food in the seed used?
- Read about George Washington Carver and the peanut. How many ways did he use peanuts?
- Study one other seed. List all its uses.

What now?

List your foods for two days. Which ones are seeds? Which are parts of seeds?

FINE COOKIES

1 and 1/2 cups of corn flake crumbs
3 tablespoons of sugar
1/2 cup of butter
1 cup of nuts
1 cup of cocoa bits
1 and 1/3 cups of flaked coconut
1 can of condensed milk

Mix corn flake crumbs and sugar and butter into a pan and make a crust.
Put nuts all over crust.
Put coconut all over crust.
Put milk all over crust.
Bake 25 minutes at 325° F.

To do . .

Cook something you like. Use a recipe. Do you understand what a recipe is?

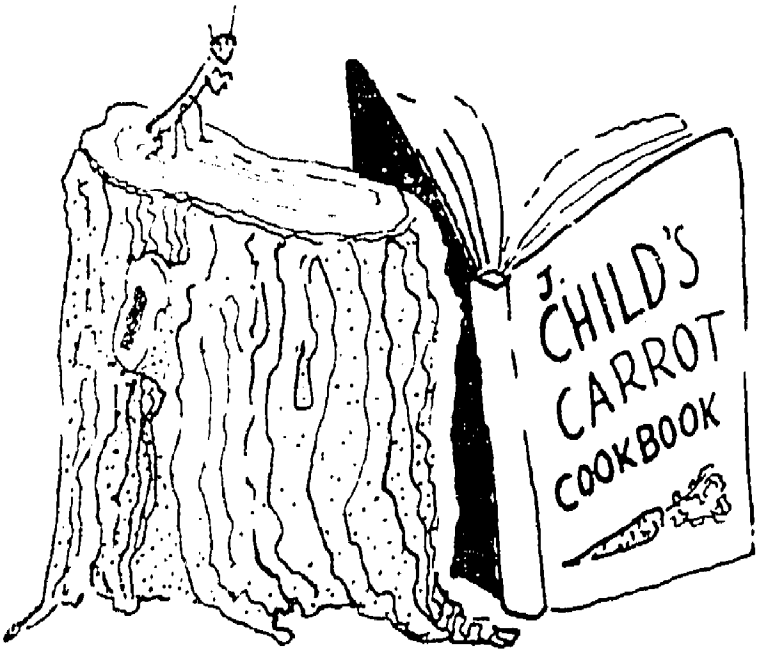
Make a recipe a rabbit would like. What are his favorite foods? How does he like them? How is he adapted to eat these foods?

Do more . do more . .

- Make recipes for different animals. Find out what they like first.
- Have a mix and match game. Use the recipes you made. Match the food to the animal.
- Make a collage. Use your favorite foods.
- A venus flytrap is unusual. What does it eat? How is it adapted to catch its food?
- Observe local animals. How are they adapted for finding food? For eating food? Draw pictures.
- Draw a cartoon of an animal. Have it dreaming of its favorite dinner.

What now?

Name the favorite foods of one animal. Show how it is adapted for eating these foods.


J. CHILD'S
CARROT
COOKBOOK

To do . .

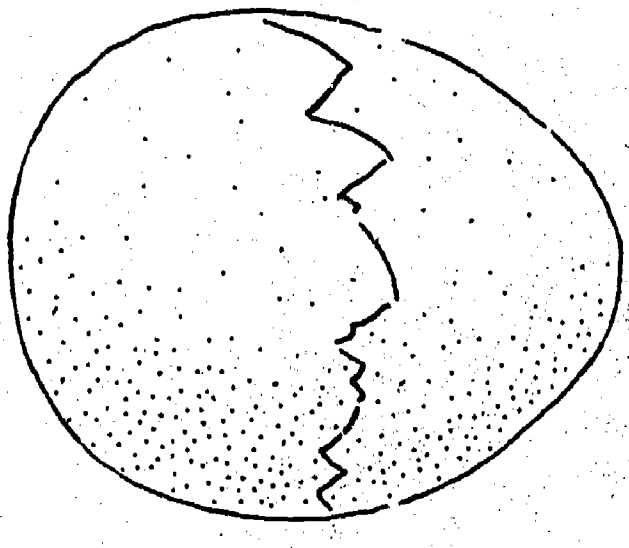
Read "Links of Life." Think of the foods you eat. Choose one food. Trace the energy in the food. Go as far back as you can. (Example: milk-cow-grass-sun) This is called a food chain. Make a poster of your food chain.

Do more . do more . .

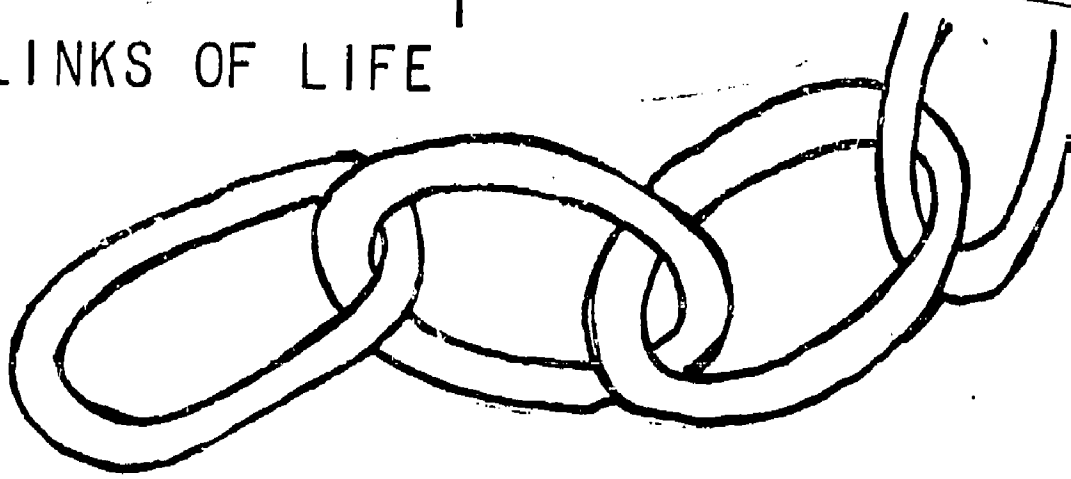
- Make a food chain for another food. Make a mobile from the things in the chain. Put the sun in the center.
- Does all food energy come from the sun?
- What if all the plants disappeared? Could you survive?
- How do the animals in a food chain depend on each other? Interact with each other?
- What happens when the animals in the food chain die?
- Have a puppet show about your food chain.

What now?

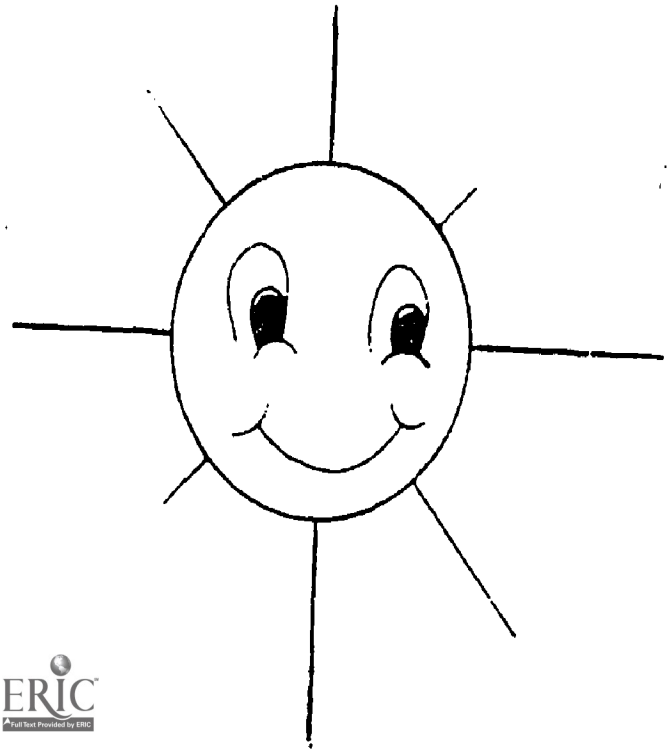
Your teacher will give you some pictures. Cut them out. Make a food chain from them.



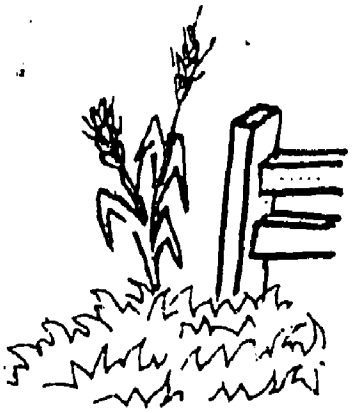
LINKS OF LIFE[1]



In some way, every living thing depends upon other living things. Nothing lives without the help of something else. We are like links in a chain. Some links are between parents and their young. You depend upon your parents. They care for you. Some links are between groups of living things. You and your parents depend upon firemen, policemen, and teachers. They also need you.

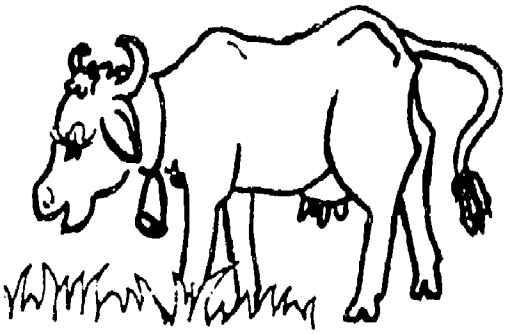


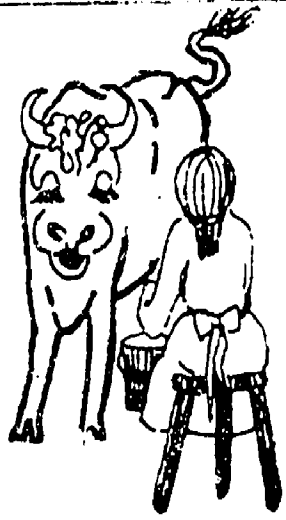
Some links are between a living thing and what it eats. These links form a special chain. It is called a food chain. A food chain starts with the sun. The sun supplies energy for all living things.



The plants use this energy. They produce food. Only green plants can do this. Try to think of some foods you eat. Are any plants? Some animals eat only plants. Can you think of one?

All other living things get their food energy from plants. Animals use the energy to live.

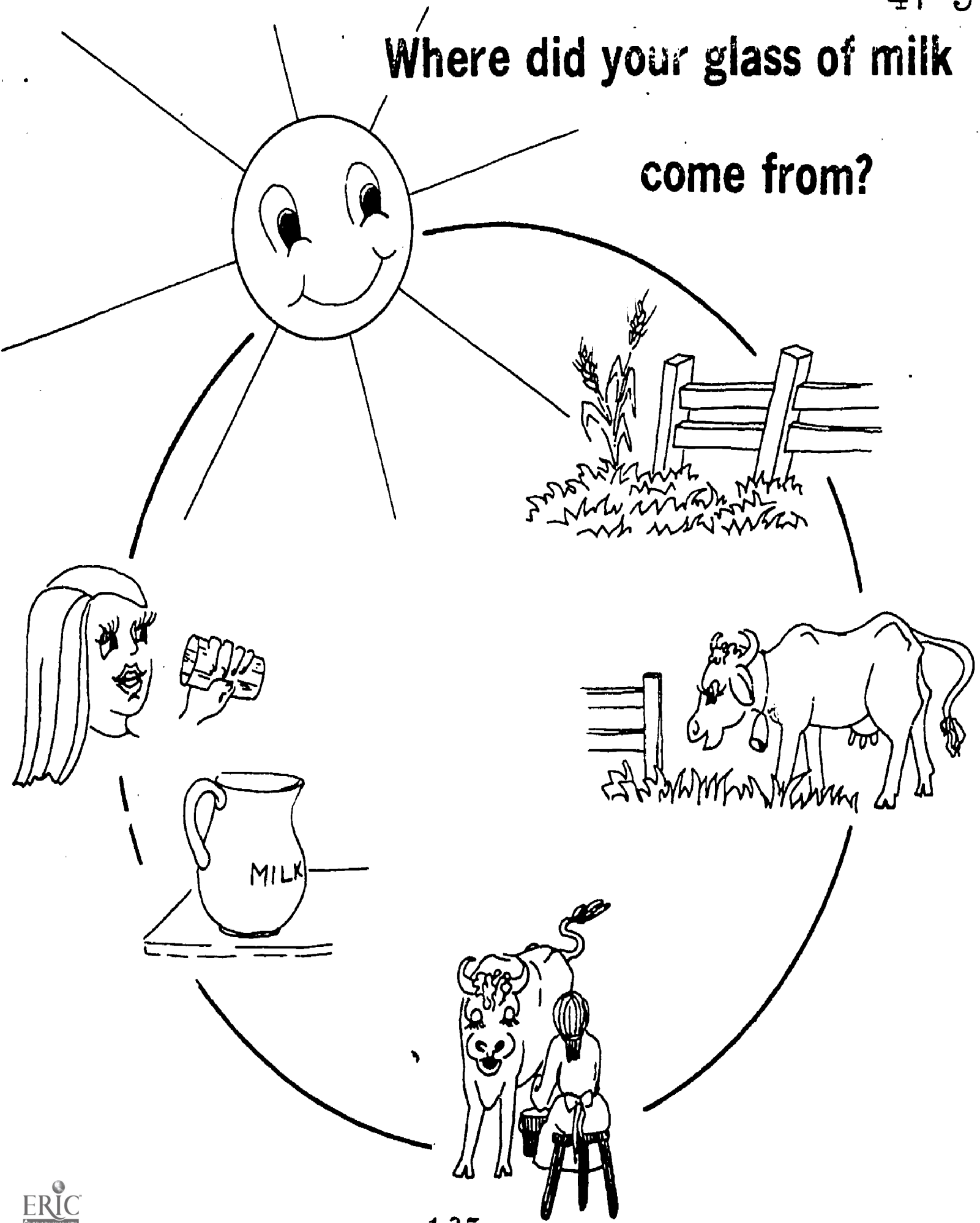


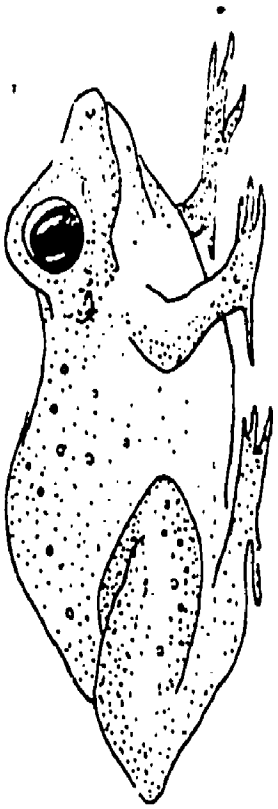


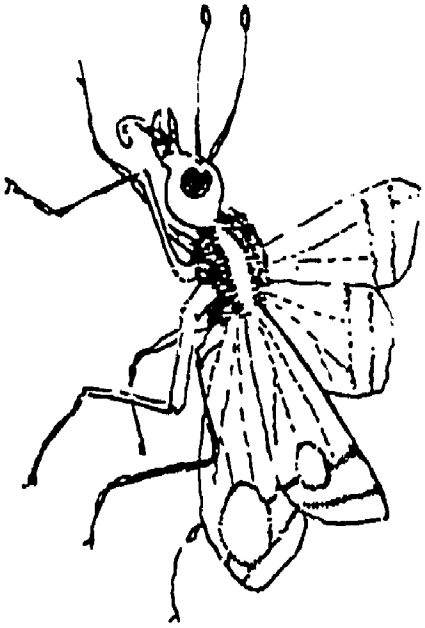
Other animals eat the animals that ate the plants. Some may take food-like milk or eggs- from the animals.

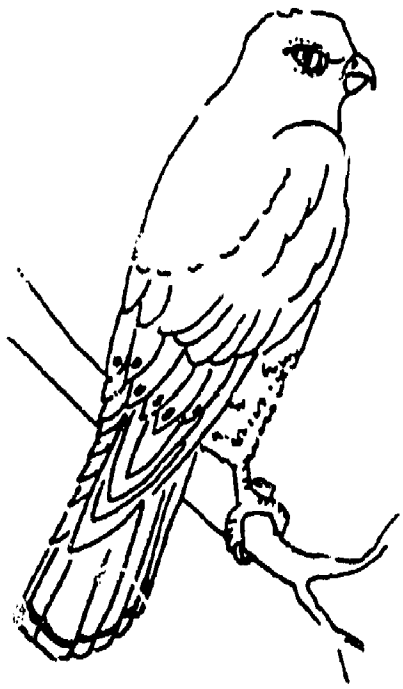
The links of the chain start with the sun and plants. In a way, it will end with the making of a new plant. The waste from animals fertilizes the plants. This helps plants grow.

Where did your glass of milk come from?









EVALUATION FOR FOOD CHAIN

CUT OUT PARTS OF THE FOOD CHAIN ABOVE. PASTE THEM IN ORDER ON ANOTHER SHEET OF PAPER.

To do . .

Cut out your energy wheel. Start with a producer. They are green plants. They use the sun's energy. They make food.

Add a consumer. Consumers use this food energy.

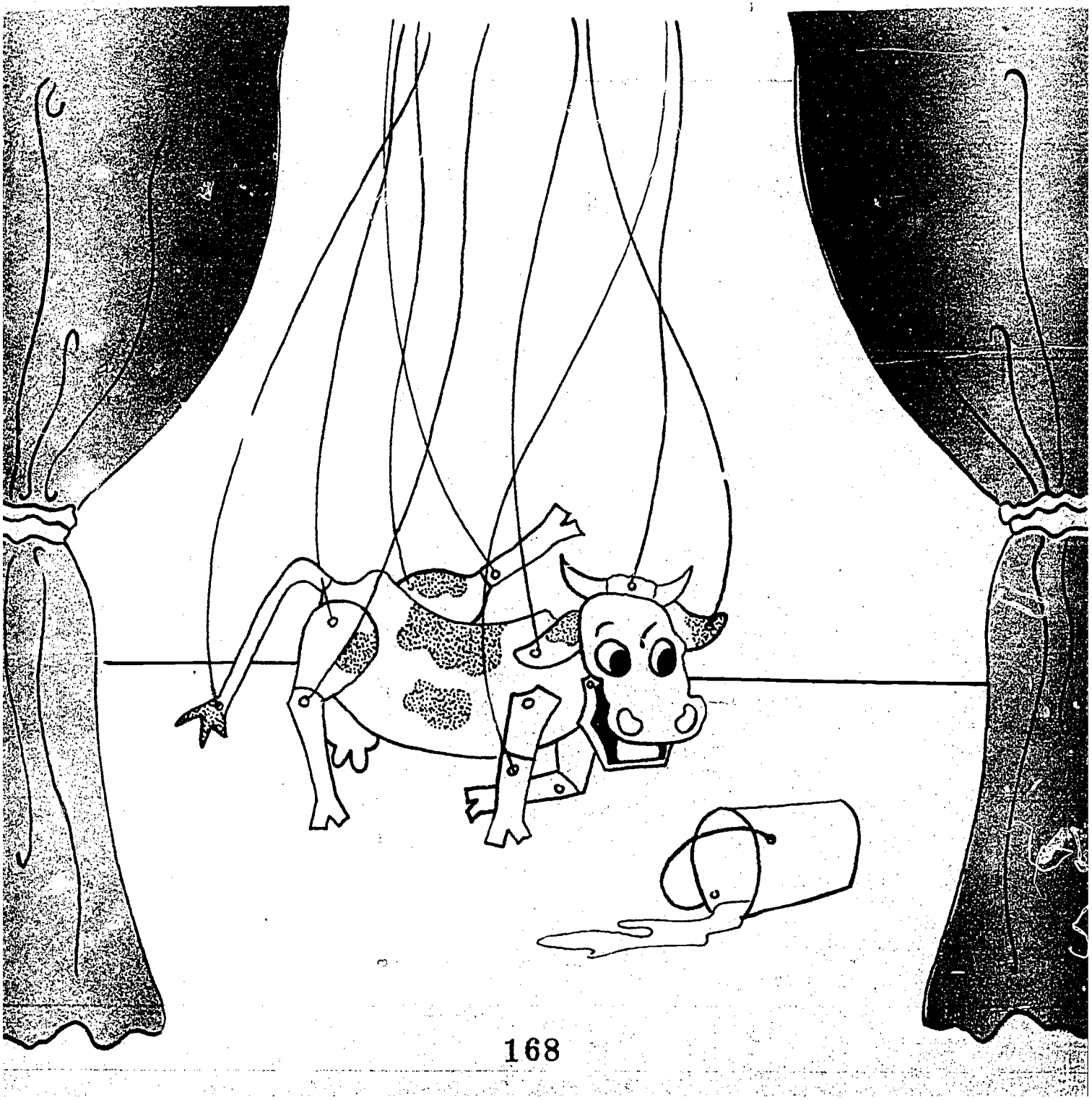
Add a decomposer. Decomposers break down waste materials. Then they can be used again.

Do more . do more . .

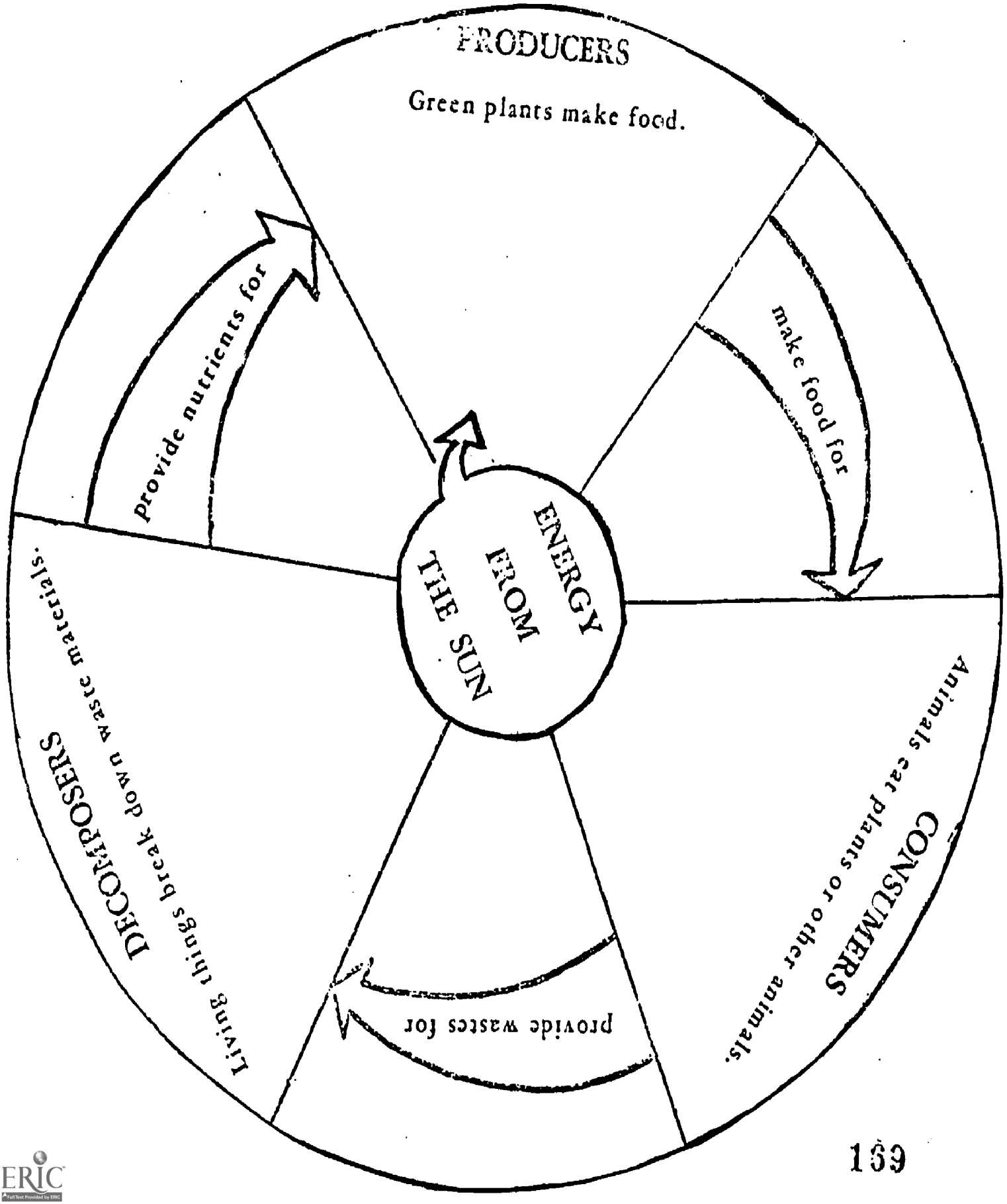
- Trace the energy around the wheel.
- Look around your school. Find producers. Find consumers. Can you find decomposers? Make a chart. Where do you fit?
- What would happen if all the producers died?
- Write a story about decomposers. Call it "Silent Heroes."
- Make a food chain. Identify producers, consumers, and decomposers.
- Make a matching game. Use pictures of plants and animals. Identify producers, decomposers, and consumers.

What now?

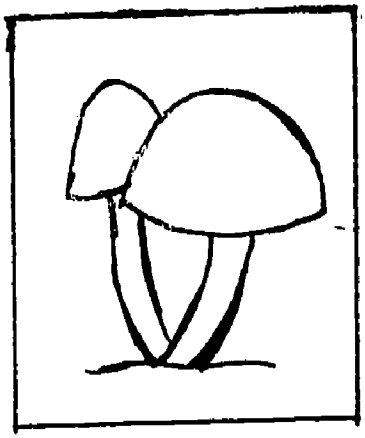
Take the name of a plant or animal. Is it a producer, consumer, or decomposer? Tell the class.



ENERGY WHEEL



Parts for Energy Wheel: Cut out each of the squares. Paste each in the correct place on the energy wheel.



To do . .

Put two food chains together. They form a food web.

Look at the cover of this card. Can you find two food chains? Can you find more?

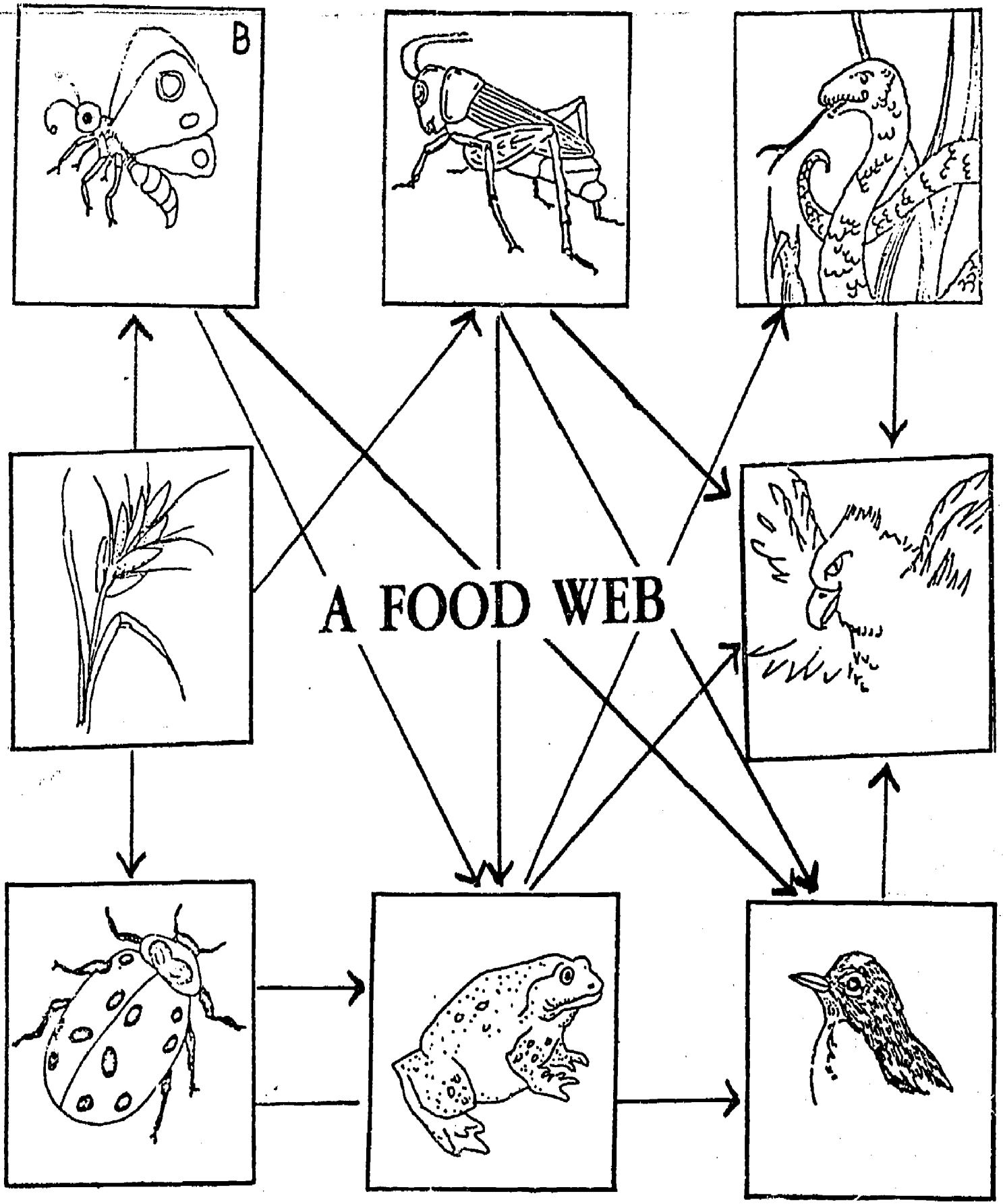
Trace the flow of energy. How are the animals interdependent? What if all the hawks are killed?

Do more . do more . .

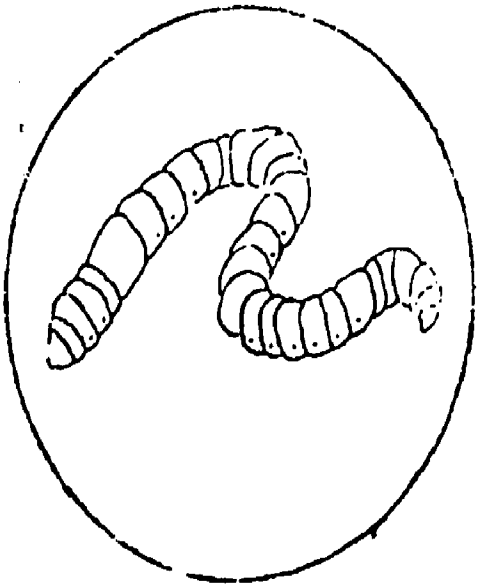
- Take a name tag. Look at the others in the group. Start with a plant. What eats it? What eats that animal? What breaks down waste materials?
- Trace the pattern of interaction. Use string. Does it form a web?
- Have a plant die. What else is affected?
- Identify producers and decomposers in the web.
- Make a food web poster. Include yourself.
- Are there any predators in the web? Scavengers?

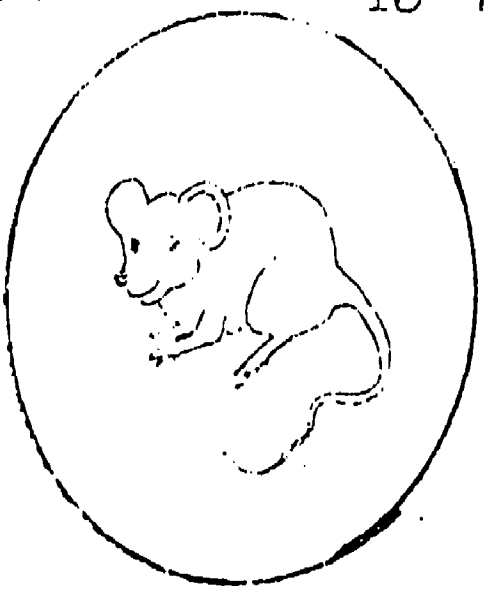
What now?

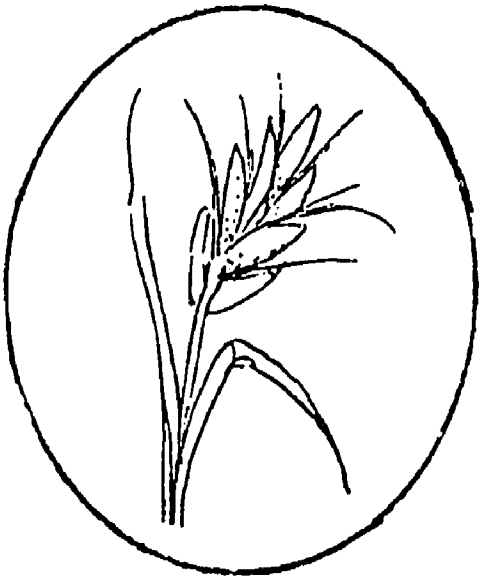
Take a sheet with several plants and animals on it. Connect them in a food web.

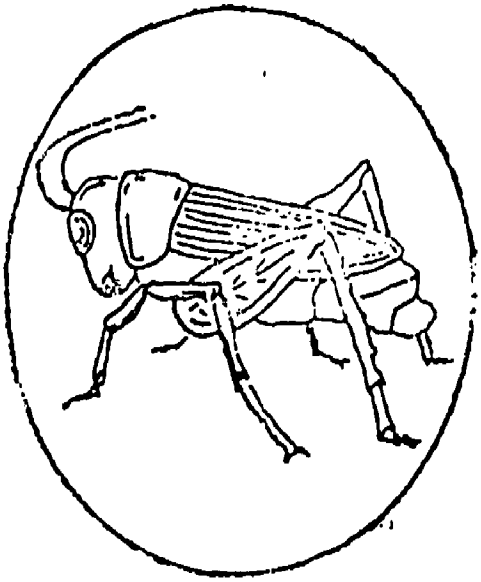

A FOOD WEB

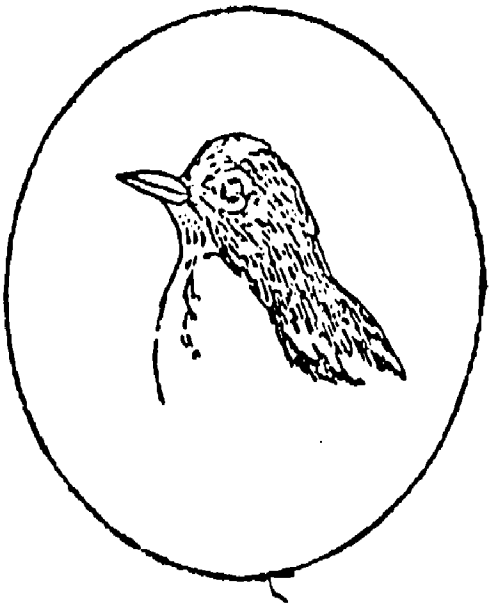
Connect these living things to make a food web.

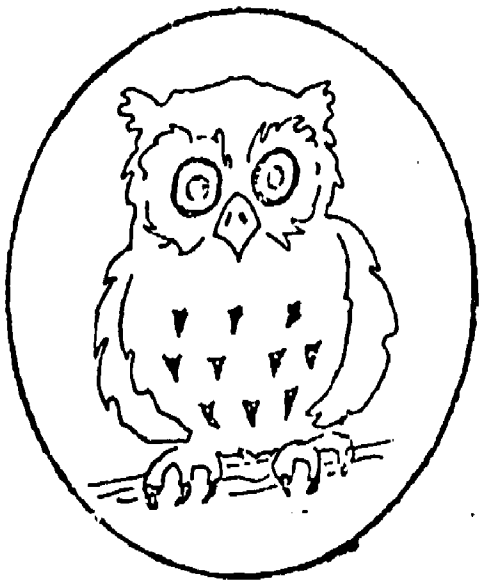












To do . .

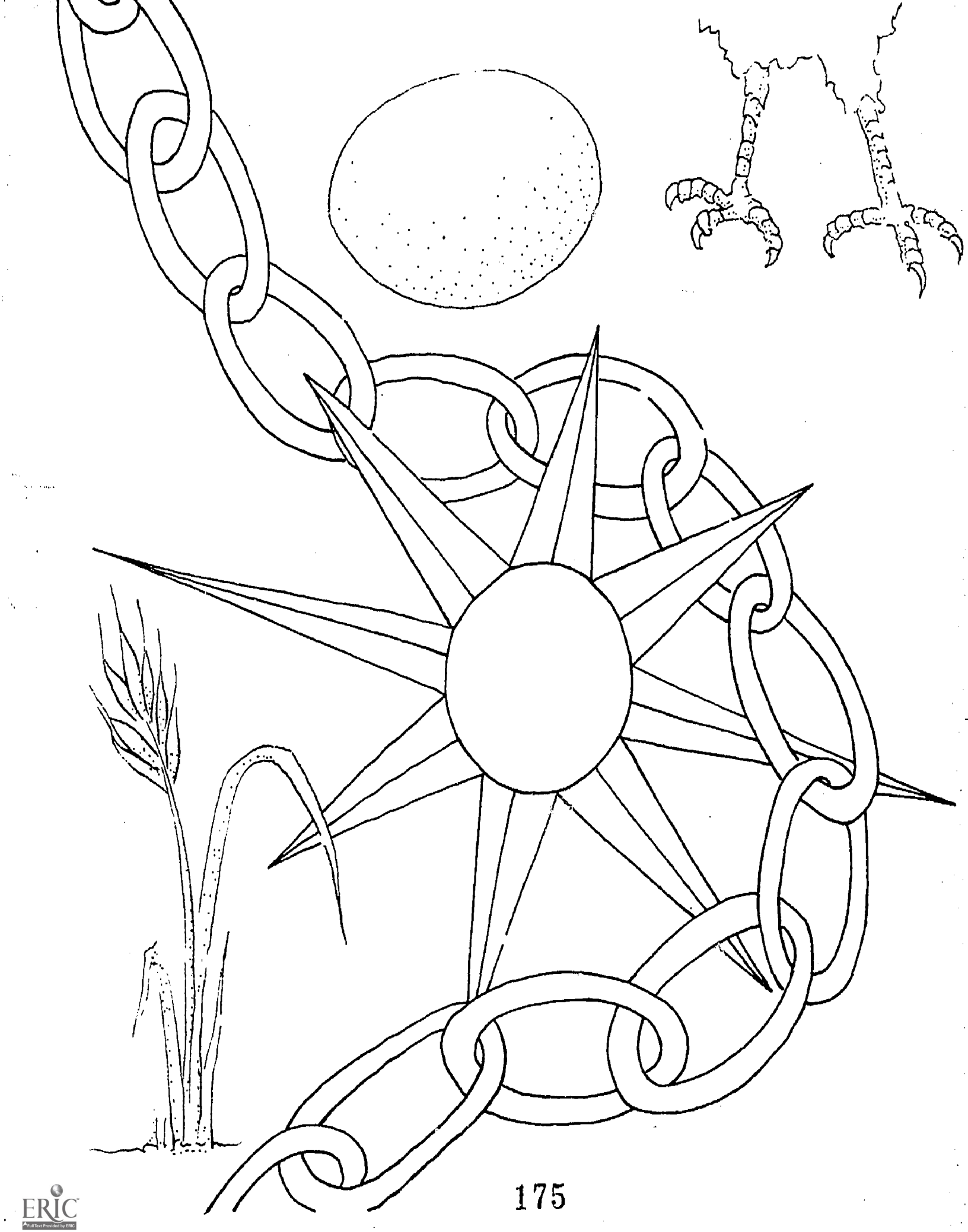
Read this play. Practice it. Put it on for your class. You don't have to remember the lines exactly. It's the idea that's important.

Do more . do more . .

- Make your own "props." (Props make the play look real.)
- Add sound effects. Tape them.
- Why weren't decomposers mentioned in this play?
- Rain didn't get a very big part in this play. Read Rain Makes Applesauce (it may be in the library). Its part is bigger there.

What now?

The farmer might be also called a final consumer. Where does his energy go?



Hen - My, My. Look at all the corn!

Farmer - (He puts more corn in her dish.) Yes, Mrs. Hen. It's the best corn I could grow. I thought you'd like it.

Hen - Oh, I do, I do. Did you grow it all by yourself?

Farmer - es, I did. It was a lot of work too - planting, and weeding and cutting the corn.

Hen - Well, I don't know how to thank you. You went to so much trouble for me. Your corn gives me a lot of energy. You're a fine man. Here is a little present. I made it just for you (reaches down and presents him with an egg, then pats him on the shoulder with her wing).

Farmer - (bending his head, blushingly) Oh, thank you, Mrs. Hen. This egg will be my breakfast. It will give me energy to work in my garden. You are a lovely hen and a wonderful bird. (He pats <u>her</u> on the shoulder.)

Corn-Stalk - Oh, good grief. Man! What's all this patting each other? I produced the energy that kept you guys going. Why doesn't anyone thank me?

Hen - What do you mean? What work did you do? Farmer and I do the work, don't we?

Corn - Farmer, you planted me and for that I thank you. Hen, you gave me a little fertilizer and for that I thank you. But really, I'm the one who had to dig myself from under the ground. I'm the one who had to stretch taller and taller every day whether I felt like it or not. And I'm the one who had to hold all those bushels of corn till they were ripe. I'm the one who gave hen the energy to make that eff. It is in the corn kernal. Honestly! Gee Whiz! Good Grief! Doesn't anyone around here know I'm the producer of all that energy you guys keep yakking about? All you do is sit around and consume it. First you (points to hen) - then you (points to farmer). It's my energy you know.

Hen - Oh, well, I didn't know. You must work very hard. Thank you for thinking of me and Farmer Brown. Really, you're both wonderful (pats Corn and Farmer).

Farmer - (not so sure) Well, Corn, I have to do a little more for you than just plant your seed, you know.

Corn - Right. But tell me, who did all the growing? Who really made the corn? If you think you can make a corn ear from a seed and a little dirt, go ahead and try it.

Farmer - Yes, it does sound as if you had a pretty hard time. Thanks a lot for producing such great corn for hen and me. You're really a nice kid. And you too, Hen (pats Hen and Corn).

Corn - Well, I guess you are both pretty hard workers, too. Nice to be working with you (pats Hen and Farmer).

Sun Comes Out - sprinkling yellow confetti and looking a little irritated (tinkle sound in the background).

I can see right now that no one told you and you and you (points to each of them) where your energy really comes from. Well, it really comes from me. You might almost say I am energy (flexes his muscles and throws out yellow confetti). I give it first to you (sprinkles confetti on Corn). With it, you produce food energy to give the Hen. (Corn sprinkles ear of corn with confetti stuck to it). He gives it to Farmer. (Hen produces confetti-covered egg.) And Farmer uses the energy to help you both.

Corn - Thanks a lot, Sun, for making Farmer and Hen think I don't do anything.

Hen - Really, Sun, now Corn and Farmer will think I just cluck all day.

Farmer - Are you trying to make Corn and Hen think a man doesn't work?

Sun - Of course not. You all work very hard with the energy I give to Corn. I just wanted you to understand how it all starts. Here - I have something nice for all of you. It will show you that I know just what you do. (Hangs a sign "Producer" on Corn.) You are the only one who really uses my energy as food. (Hangs a sign "1st Consumer" on Hen.) You were the very first consumer of corn's food energy. (Hangs a sign "Final Consumer" on Farmer.) You all used my energy very well. Thanks a lot.

All - Thank-You Sun - (they all clap at Sun) and then:

Farmer - Thank you, Hen and Corn (pats their shoulders at same time).

Hen - Thank you Corn and Farmer (pats their shoulders at same time).

Corn - Thank you Hen and Farmer (pats their shoulders at same time).

They all link shoulders and look smiling on either side and up at Sun who sprinkles confetti on them smiling.

(Crack of thunder and sound of rain, and flash of lightning).

Rain - (in an angry voice) Well, all of you forgot me, so here's a present to make you remember (throws blue confetti on all of them).

FINIS.

To do . .

Look at the picture on the cover. It is a food pyramid.

Can you find the producers? Where are they? Are there many of them? Find the consumers. Where are they? Are there many?

What happens if all the producers die? All the mice? The hawk?

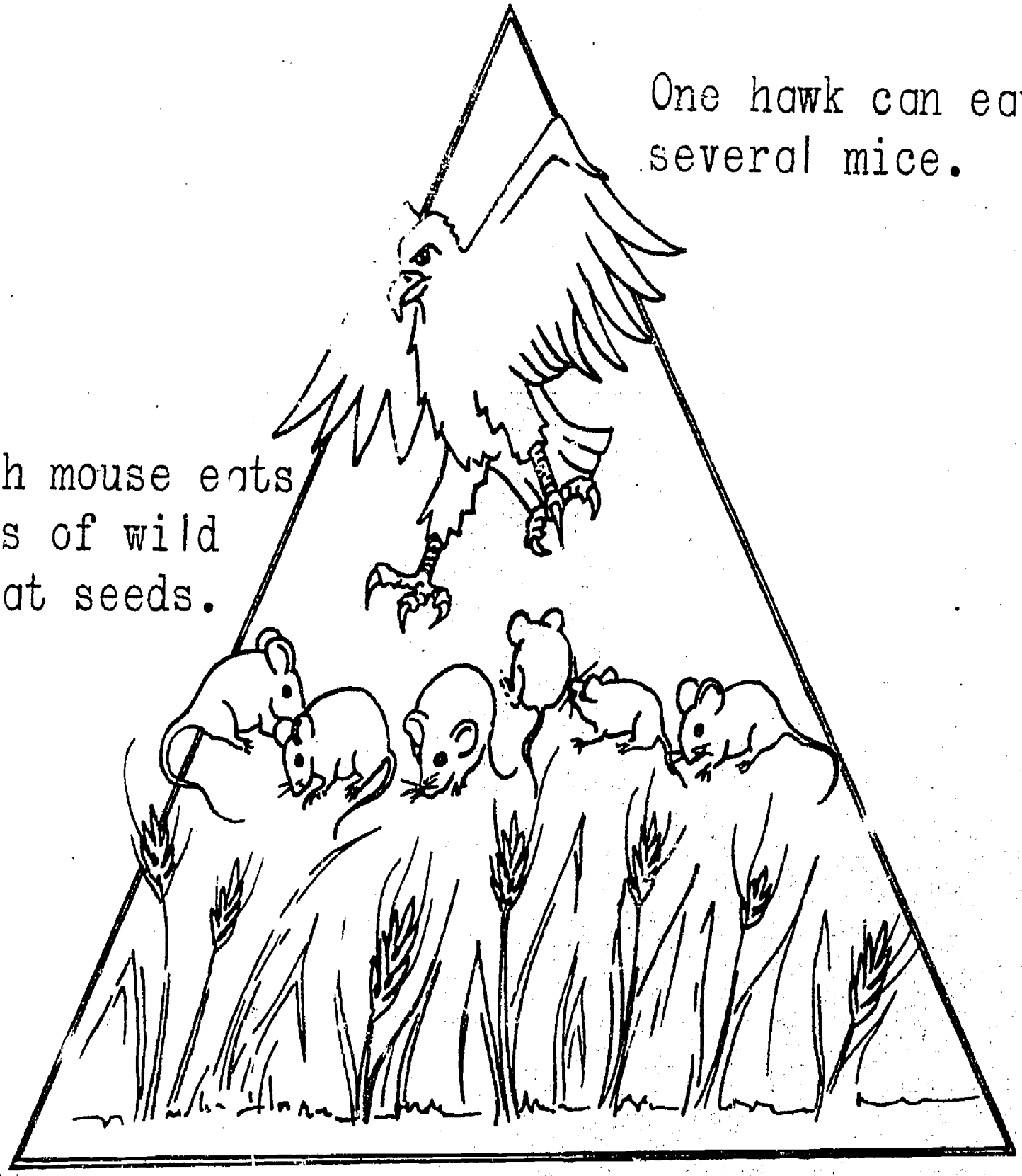
Do more . do more . .

. Make a food pyramid. Use a pelican as the final consumer. What do pelicans eat? Trace the food back to the producer.
. Some plants are sprayed with DDT. What happens to the consumers?
. The hawk is a predator. Some farmers kill predators. What will happen to the food pyramid? Will this help the farmer?
. Write a story about some animals. Fit them into a food pyramid. Give them names. Have something happen to the pyramid.

What now?

List one meat you like. Put it in a food pyramid. Complete the pyramid. Have at least three levels.

A FOOD PYRAMID



What happens to the mice if the wheat dies?

What happens to the hawk then?

What happens if someone shoots the hawk?

To do . .

Wolves are predators (PRED-ah-terz). Predators kill other animals for food. Read "Wolves are Necessary." Why are they necessary? What would happen if all the wolves were killed?

Do more . do more . .

- Collect pictures of predators. Look closely. What special tools does each predator have?
- Write a paragraph about each predator. Include the prey. Make a scrapbook.
- Make a mix and match game. Match the predator with the prey.
- Make a food chain. Include a predator.
- Why do ranchers want predators killed? Do you think they are right?
- Identify 5 predators in your community.
- Predators help maintain a natural balance. How do they do this?

What now?

Write a letter. Tell why predators are important. Send it to someone you think should know.

WOLVES ARE NECESSARY

Do you remember the story about Little Red Riding Hood? Or the three little pigs? Who was the <u>villain</u> in these stories? Right. It was the wolf.

Since the first stories, wolves have been the bad guys. They were the killers. They <u>stalked</u> the deer and cattle. Few men thought wolves were good. Wolves were shot and poisoned. They were trapped. They were killed in every possible way.

Wolves once roamed all of North America. They lived in hot and cold places. They lived in the forests. They were even found in <u>prairies</u> and mountains. When man came, the wolf was in trouble. Wolves sometimes attacked man's animals. Their goats and sheep were easy prey. They were easier to catch than deer or rabbits. As far back as the 1600's, settlers paid <u>bounties</u> for wolves. This started in the eastern United States. Soon, there were few wolves in the east. By 1900, there were only 200,000 wolves in the U.S. and Canada.

About 30 years ago, scientists began studying the wolf. They found wolves were intelligent. They were also loyal. They worked together in packs to stalk their prey. Many people thought wolves killed for fun. Scientists found they killed only for food. They also found wolves were important. They helped to control the numbers of grazing animals. They kept the herds of animals small. This way, the animals had enough food. The scientists thought the wolves should be protected. Then they would not all be killed.

Not everyone agreed. Ranchers and farmers didn't like the idea. They were afraid there would be too many wolves. They thought the wolves would wipe out the deer. They might start attacking sheep and cattle.

It was hard for the scientists to prove their idea. They thought wolves helped keep the balance of nature. Finally, they found a perfect place. They could study the relationship between predator and prey. It was an island in Lake Superior called Isle Royale. Once, Isle Royale had had many moose. Many of them had starved to death. Soon only a few hundred were left.

Later, a fire destroyed most of the forest there. There was a new growth of bushes after the fire. There was plenty of food for the moose. The herd began to grow again. Scientists worried. They thought the moose would starve themselves to death again. In the winter, a strange thing happened. Wolf packs crossed the ice. They raided the moose herd. Some wolves stayed on the island permanently. Scientists were able to study this very carefully. They looked at the relationship between the wolf pack and the moose herd. A healthy moose could defend itself against the wolf pack. The wolf pack killed sick, young or old moose. The wolves hunted only for food. The moose herd stayed at about 600. There was enough food for all. The scientists expected this. Something else surprised them. The size of the wolf pack remained at between 20 and 30. It did not grow. There was plenty of food for the wolves. The wolves seemed to control their own numbers. Scientists are not sure how they did this.

These studies are important. Scientists believe the wolf is an important part of

nature. They hope to communicate this to other people. Some people still think the wolf is an enemy. That he must be killed. Many people still think the wolf is the villain. Unless their beliefs are changed, there may not be any more wolves. That might be a good thing for Little Red Riding Hood. Would it be good for nature?

--"Should We Protect Predators?", Ecology: Habits and Habitats, Book B, American Education Publications, Middletown, Conn., 1971, pp. 42-43.

Vocabulary

1. villain: the "bad guy"
2. stalked: hunted
3. prairies: grasslands, plains
4. bounties: rewards
5. intelligent: smart
6. loyal: faithful
7. crazing: feeding on grass and plants (cows graze)
8. herd: a group of grazing animals
9. protect: keep safe
10. relationships: the way people or things get along (relate)
11. predator: the hunter
12. prey: the animal which is hunted
13. permanently: "for keeps"
14. communicate: exchange (give back and forth) ideas or facts
15. beliefs: thoughts, ideas
16. destroyed: wiped out

Questions for Thought

1. Why have many men always tried to kill wolves?
2. Would you want a wolf pack living in the woods near you? Why?
3. Why did wolves almost become extinct?
4. Do ecologists think wolves are important? Why?
5. Why was Isle Royale a perfect place to study the relationship between predators and prey?
6. What happened to the moose herd on Isle Royale BEFORE there were any wolves? Why?
7. What happened to the moose herd AFTER wolves came to the island? Why?
8. What happened to the wolf population on the island? Why?
9. Will the wolf become extinct? Explain the reasons for your answer.
10. What can be done to prevent the wolf from becoming extinct?
11. Is it possible to protect the wolf and also protect farm animals and people? How?

To do . .

The owl is a hunter. Read "The Owl's Story." What special tools does the owl have? These are called adaptations. How do they help him hunt?

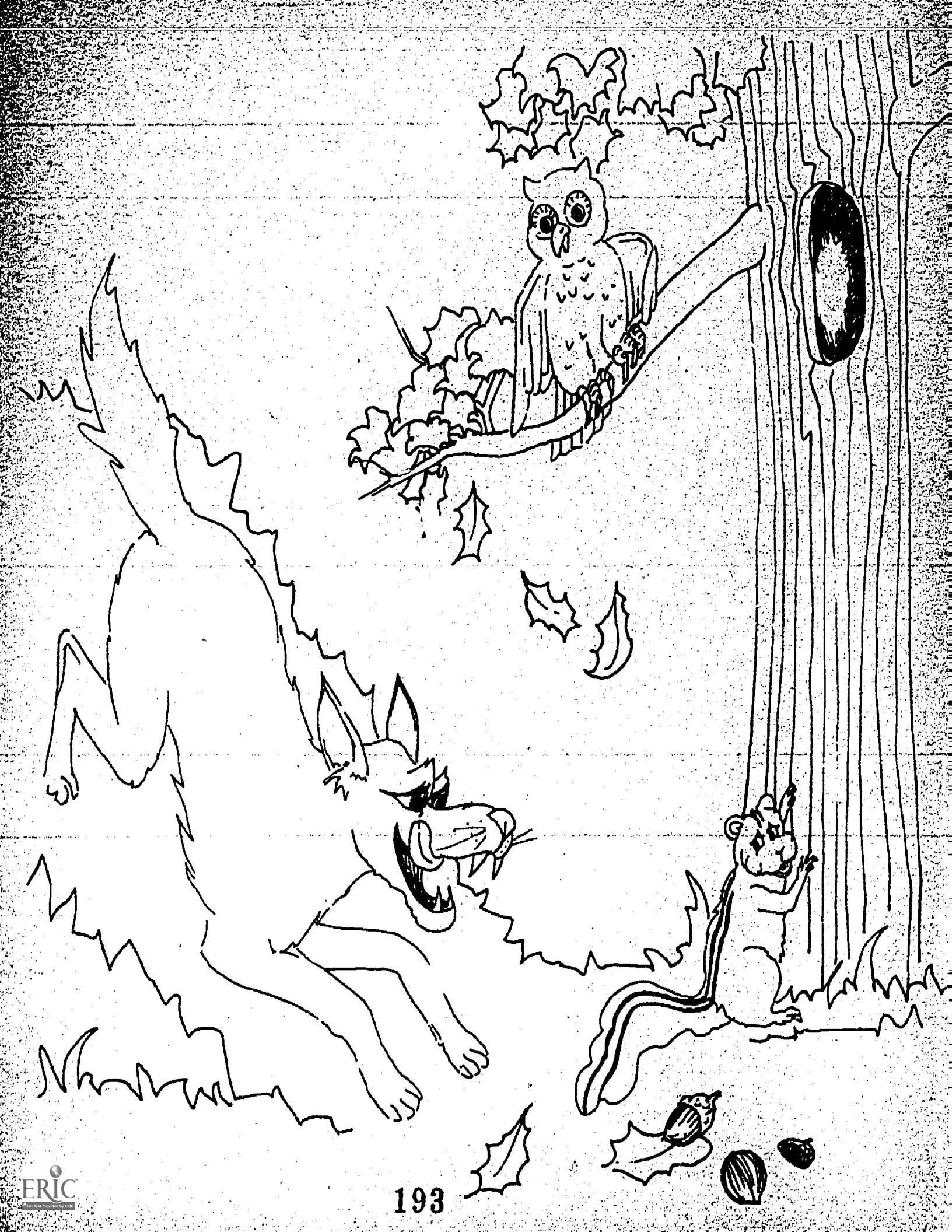
The owl hunts at night. What adaptations make the owl a good nighttime hunter?

Do more . do more . .

. The owl is a predator. Find out what its prey is. Would a farmer like an owl?
. For almost every owl, there is a hawk. The owl works nights. The hawk works days. They work the same teritory. What adaptations does the hawk have?
. Make rock critters. Your teacher will help you. Write a paragraph about owls. Display the two together.
. What animals are active at night? Make a list. How many are predators?
. Some owls and hawks are endangered. Can you help save them? How?

What now?

Write a paragraph about owls. Tell why they are important.



THE OWL'S STORY

History is mostly about man. That is why it is called "his-story"! Other animals have histories. The owl is one. The owl's story goes back to the days of cave men. The first bird drawing was of a snowy owl. It was done during the Stone Age. Man scratched it on a cave wall in France.

Man has had many ideas about owls. Some of them were good. Many were bad. Most of them were wrong!

Man saw the owl as a magical creature. Some said the owl had black magic. They believed his hoot warned of danger. It might signal death or doom. Other people said the owl was lucky. They believed he had good magic. Having an owl near you might keep danger away! They were wrong -- and right.

An owl's hoot does often signal danger -- to a mouse. The owl plans to eat the mouse. Having an owl near can protect you. It protects baby owls. It protects farmer's crops.

Farmers have been unkind to owls. They claim owls eat chickens. Sometimes, this is true. Owls prefer mice. If there are many owls in an area, there are many mice, too. A Great horned owl eats about 1,500 mice a year. Think what those mice could do to the farmer! Owls deserve more credit for their work.

Owls are predators. They kill other animals. They eat meat. Owls are nocturnal. They hunt at night. Owls have good eyes and ears. They can find their prey in total darkness.

Life is hard for baby owls. The mother owl warms each egg as it is layed. The baby owls hatch at different times. The oldest owl is the strongest. If there is not enough food, the weaker owls die. In bad years, only a few owls live. Sometimes there are many mice. Then all the babies survive. Nature makes sure there are not too many owls.

Man tries to help nature. He kills owls. He may poison them. Other farmers shoot them. Some people take the owls' land

away. Some men kill owls for fun. Others think the owl will harm them.

The owl must have some magic. He has survived a long time. More people need to know his story.

--"Man and Owl," Audubon, November 1971.
--"Owls," Audubon Ecology Study Program, New York: National Audubon Society, 1972.

Vocabulary

1. creature: an animal; a living thing
2. protect: keep something safe
3. claim: say
4. predators: animals which hunt other animals for food
5. nocturnal: living or hunting at night
6. prey: the animals which are hunted by predators
7. survive: stay alive

Questions for Thought

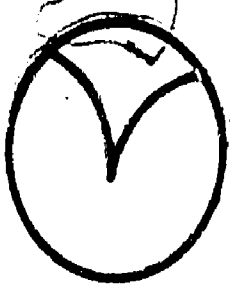
1. What was the first bird picture?
2. What did people once believe about owls?
3. Was it true? Was it true the way they meant it?
4. How do owls help farmers?
5. How has nature made the owl such a good nighttime hunter?
6. Why are some baby owls smaller and weaker than the others?
7. What sometimes happens which causes some of the smaller owls to die?
8. When do they all survive?
9. Does nature have a reason for this? Explain.
10. Who is the owl's greatest enemy? Why?
11. Will the owl be able to survive? Who will have to help him?

STONE CRITTERS

Would you like a pet owl or frog? Don't catch one. (They wouldn't like it.) Make one instead. You will need these things:

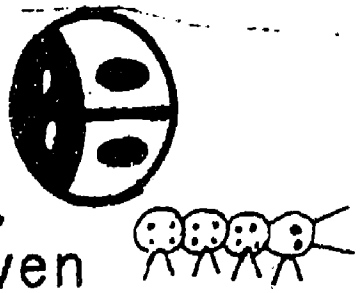
- round or oval stones
- tempra paint, magic markers, water colors, or enamel
- a small paint brush
- glue

An owl is about the easiest critter to make. Start with a round stone and follow these steps.



- Use a pencil to lightly draw a V-shape in the center of the forehead.
- Draw large round eyes and eyelids under the V.
- Add feather marks on the body.

. Paint the critter with almost any paint and a small brush. If you use tempra paint, add a little glue to it first. This keeps the paint from rubbing off. If you use magic markers or water colors, add a coat of shellac or clear lacquer later. This keeps the paint from rubbing off and gives the stone a nice finish.



Don't stop now! Try a lady bug. Try a caterpillar. Use small stones. You can even glue on wire for antennae and feet.

Now you are really on the track! Try creating animals on your own. You can place them in a setting decorated to look like their habitat.

To do . .

Some animals do a lot of changing. Watch a frog develop. Start with eggs. Look closely. Can you tell what is inside? Watch the eggs develop. Keep a daily log. Record how they change.

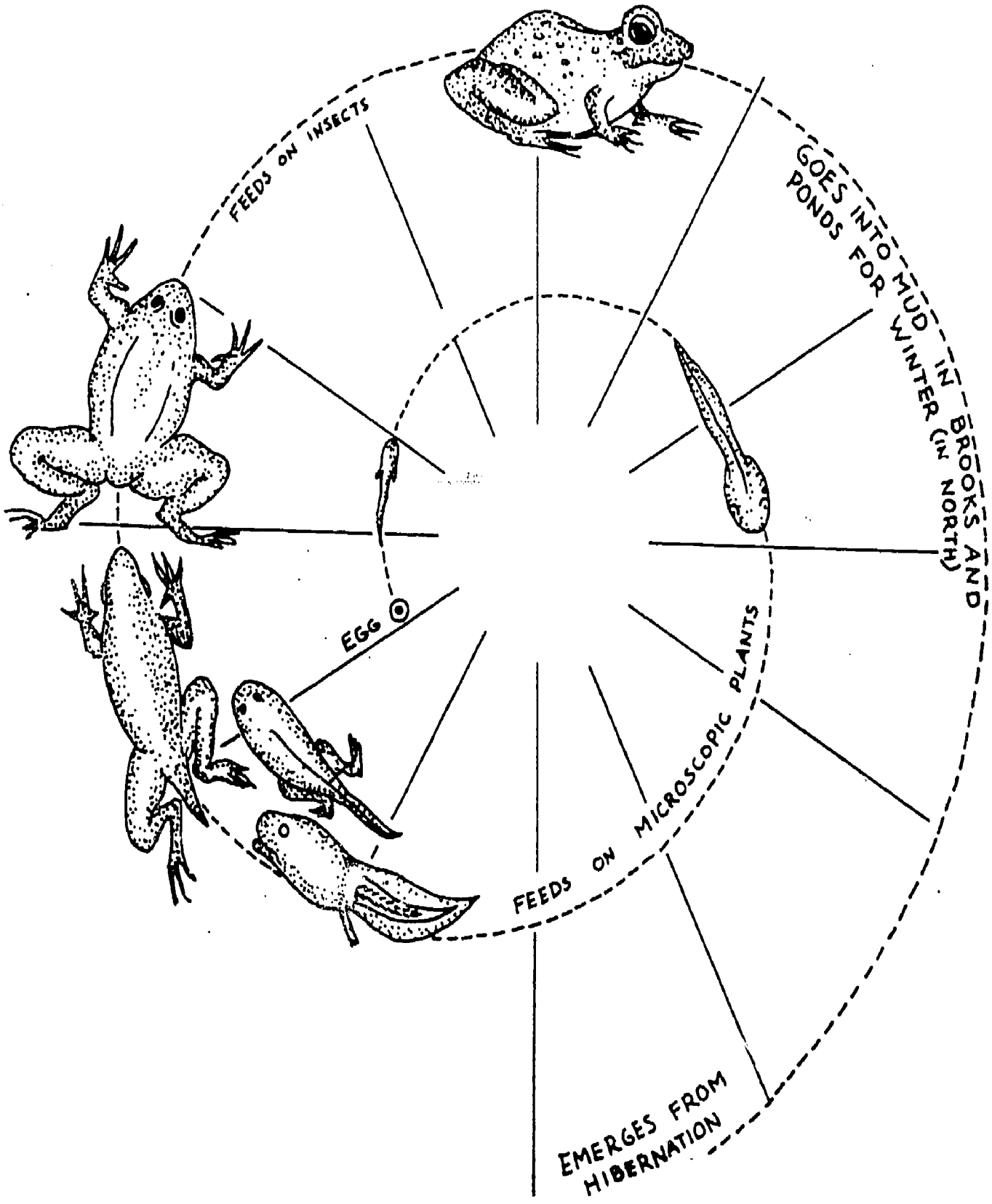
Do more . do more . .

. How do the tadpoles breathe? Move? How are they adapted to their environment?
. Do tadpoles look like their parents? Will they ever?
. How are adult frogs different? How is their environment different?
. Frogs are amphibians. Find out what this word means.
. What do frogs eat? What eats frogs?
. Can you find other amphibians in your area? Keep a record.
. Make a food chain. Include an amphibian.

What now?

Draw the life cycle of one amphibian.

LIFE CYCLE OF BULLFROG[1]



[1]"Amphibians," Minature Charts, New York: National Audubon Society, 1959.

To do . .

Read the card on estuaries. (S-tu-wear-es). Look at a map of your state. Are there any estuaries? Color them in red. (If your state doesn't have an estuary, find the one nearest you.)

Do more do more . .

- What do we get from estuaries? Make a poster. Show the things that come from estuaries.
- Get a menu from a seafood restaurant. Pick out the items that might come from an estuary.
- What things might endanger an estuary? Make a list. Discuss it. Can you stop some of these?
- Visit an estuary. Look for signs of life.
- Make a food chain picture. Include some things from an estuary.

What now?

Write a letter to an adult. Tell him (or her) why we need estuaries.

ESTUARIES

An estuary (S-tu-wary) is a quiet place. It fools many people. They think nothing is happening. It is quiet, but a lot is happening.

Rivers have fresh water. Oceans have salt water. When the two meet, they form an estuary. Estuaries are protected. Sand dunes and islands protect them. They keep out strong waves. This is why they look quiet.

Estuaries are filled with life. The water is shallow. This helps very small plants grow. Small animals eat the plants. Animals come to the estuary. Some come just to eat. Others come to lay their eggs. They raise their young in estuaries.

An estuary feeds many animals. Twenty (20) times more animals feed in estuaries than the open ocean. Look at an acre of estuary. It can support more life than an acre of hay!

Many types of food comes from estuaries. Can you guess some?

Did you guess oysters? Shrimp? Crabs? Scallops? Fish?

We eat these animals. So do birds. Many birds live in the estuary.

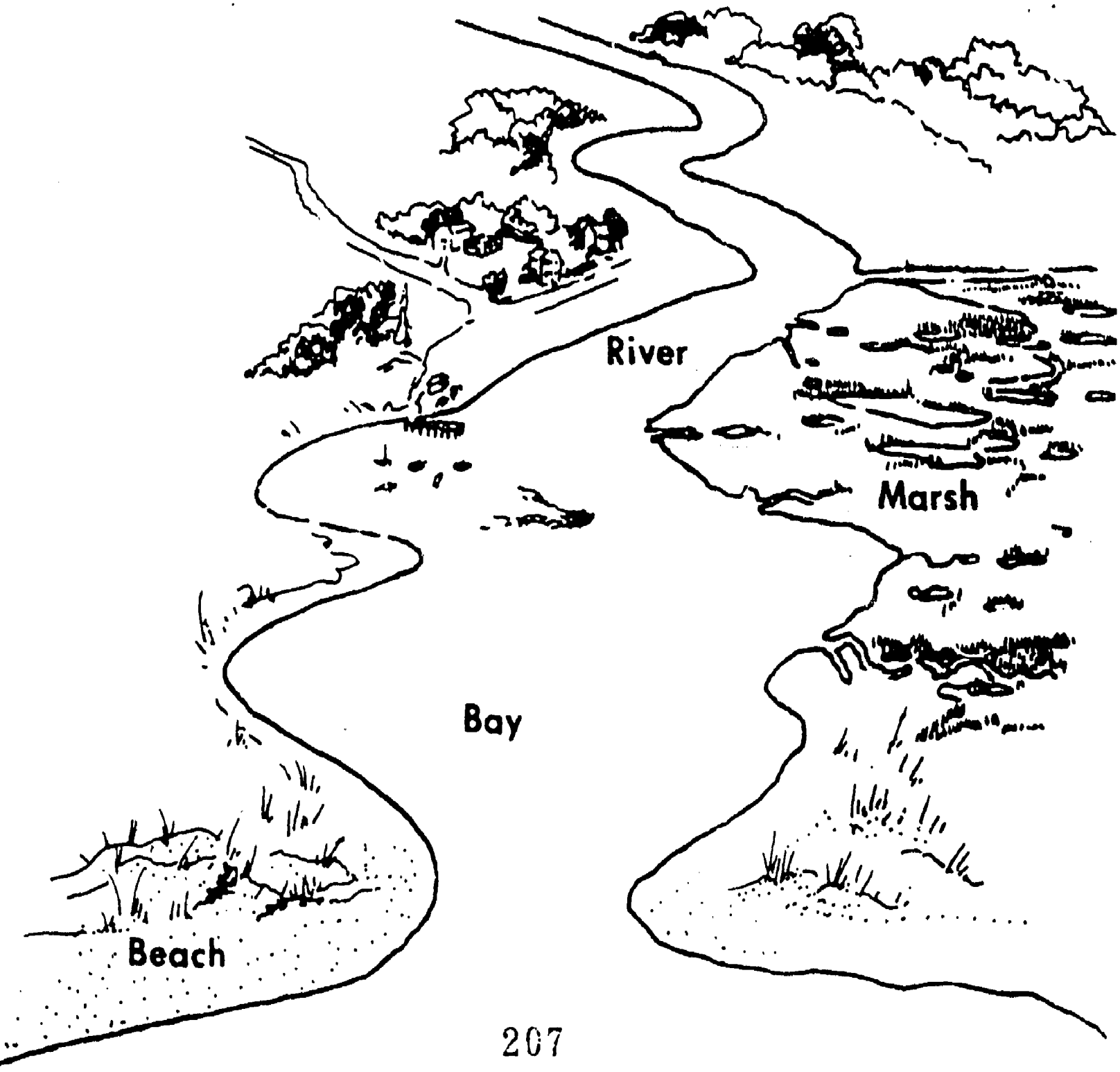
As you can see, estuaries are very important. Many things can destroy estuaries. Towns and industries dump waste in the water. This destroys much of the life there. Dredging (digging mud from the bottom and and sides) covers oyster beds. It upsets the balance of the estuary. People take undersize fish and animals from the estuary. They may also take too many fish. This takes a link from the food chain of the estuary.

"Estuary," Ranger Rick's Nature Magazine, November 1971.

Vocabulary

1. protected: kept safe
2. dredging: digging on the bottom of a lake or river
3. undersize: too small

THE Estuary



To do . .

Go to a vacant lot. Look for evidence of living things. Keep a record. What do you see? Hear? What other evidence can you find?

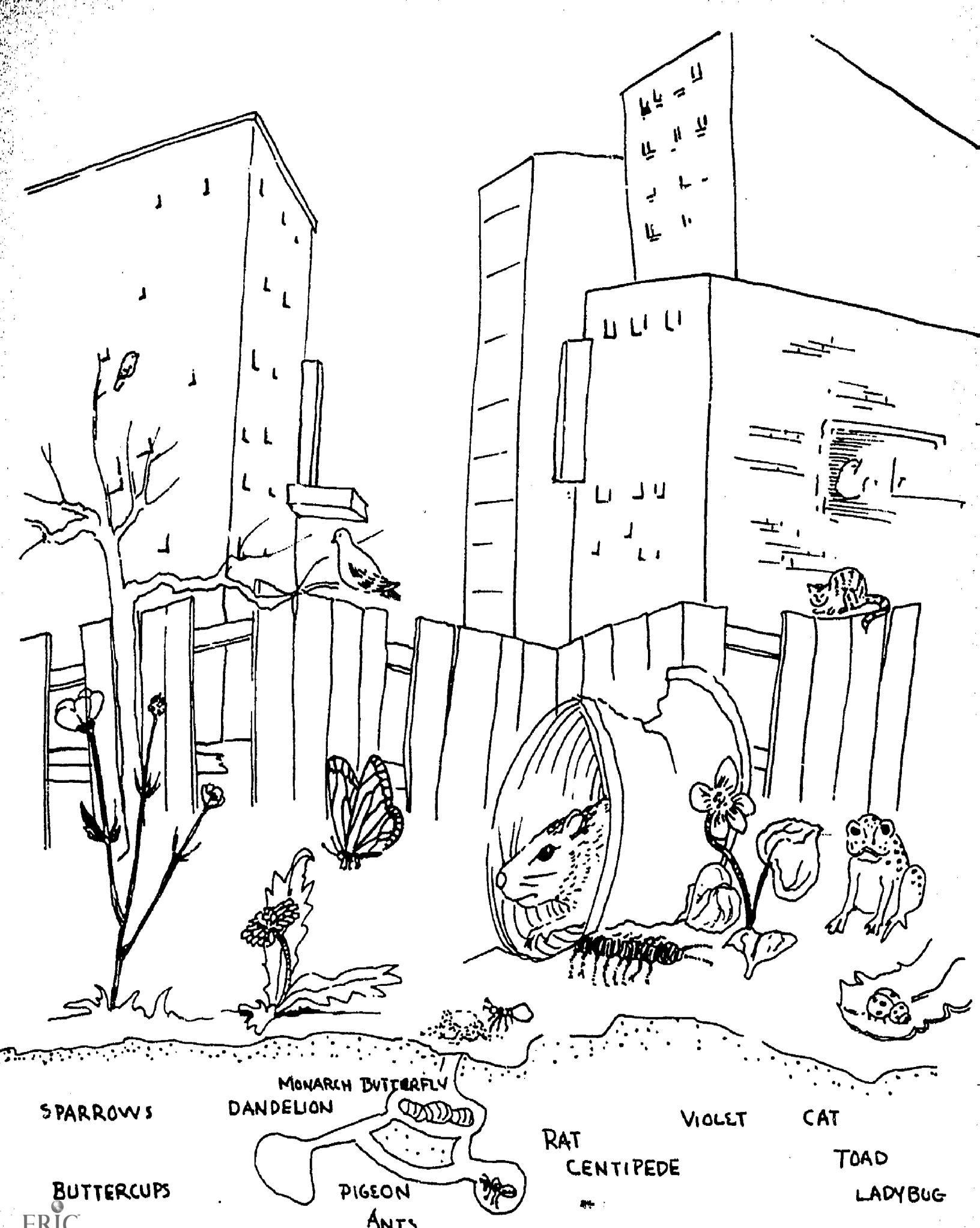
Collect traces of animals, plants and soil. Record where you found them. Carry them back to class. Report to the class.

Do more . do more . .

- Look in the soil for living things.
- Do the plants and animals need each other? What evidence can you find?
- Is the area changing? How do you know?
- Make a map of the lot.
- Make a food web. Use the life in the vacant lot.
- Look at the things you found. Divide them into producers, consumers, and decomposers.
- Pretend you are a mushroom. How do others depend on you?

What now?

Make a mural of the lot. Include pictures of the things you found. Try to identify as many as you can.


SPARROWS
MONARCH BUTTERFLY
DANDELION
VIOLET
CAT
RAT
CENTIPEDE
TOAD
BUTTERCUPS
PIGEON
ANTS
LADYBUG

LIFE IN A VACANT LOT

Where can you study nature? Do you need a forest? A green meadow?

No. You just need a <u>vacant</u> lot. It is filled with life.

Look for old boards or rocks. DON'T put your hands under anything until you LOOK first. Here are some things you might find.

SNAILS look like tiny shells that move. Their relatives live in the water. The ones you find are land snails. They still need a lot of <u>moisture</u>. They travel at night. There is less heat then. There is also more moisture. In the daytime, they stay in the shade. Snails slide on a carpet of slime. Look for their trails. Don't be afraid to pick them up. Snails won't bite.

SLUGS look something like snails. They don't have a shell. They are slow

moving and sticky. They have to stay where it's moist. Slugs like to eat tender green plants. Your garden looks like Sunday dinner to a slug!

Note: Snails and slugs spin tiny eggs. They are covered by a white, jelly-like coating. Look underneath damp boards and rocks.

SOWBUGS look like small army tanks. They hide where it's dark and moist. Look under rocks and logs. They are scavengers (SCAV-n-gerz). Scavengers eat dead plants and animals. Sowbugs like decayed plants (like dead leaves).

Sowbugs have their skeleton on the outside. Touch them. They will curl up in a small round ball. They are protecting themselves.

You can make a home for sowbugs. Start with a clean shoebox. Put your sowbugs in the dirt. Lay leaves over the dirt. Sprinkle a little dirt over the leaves. (You can kill leaves by boiling them for a minute.)

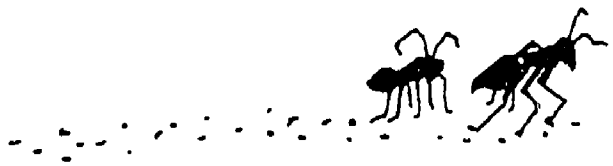
Keep the box of dirt in a cool, dark place. Keep it away from the heat and sunlight. If it starts to dry out, sprinkle it with water.

CENTIPEDES have from 35 to 175 legs. This means they move pretty fast. Some of them bite.

MILLIPEDES have twice as many legs. Sometimes they curl up and play dead.

EARTHWORMS take in moisture through their moist skins. They are eaten by frogs, snakes, and birds. Earthworms "digest" soil. They take it in through their mouth. They pass it through their body. Then they leave it on the surface of the ground.

The earthworm burrows through the ground. This loosens the soil. This helps the plant roots grow. The earthworm's deposits add food to the soil (they are called castings). This also helps plants grow. Want to do more activities with earthworms? Read the activity card on earthworms. It will give you suggestions.



ANT NEST. As you search, you may disturb an ant colony. A colony includes worker ants. They carry eggs and pupae (young ants) through tunnels. Some ants are soldier ants. They may hide in the tunnels. They protect the queen. The queen is much larger than the other ants. Would you like to study ants? Find the activity card on interaction. There are directions for building an ant house.

OTHER THINGS TO LOOK FOR. You may also look for a chameleon. The chameleon looks like a lizard. He lives on insects. He can

absorb moisture through his skin. The chameleon can change colors. Then he blends in with his environment. When he is on a leaf, his skin turns green. When he is on the trunk of a tree, his skin turns brown. This helps protect him from predators. Chameleons are also very fast. This helps them escape their enemies.

Look for a toad. He is probably the largest predator in the lot. Toads burrow into the dirt. This way they escape the daytime heat. Also look for snakes (grass snakes or garter snakes) and butterflies. Don't touch the snakes. Most snakes are helpful to man. Be sure you know the poisonous snakes in your area before you go.

Notice the flowers and trees. See if you can identify them. Find out why the animals depend on plants.

Be sure to get permission before going on private property. Also, be careful! Wear closed shoes. Wear clothes which will protect your skin. There may be thorns, sharp stones and insects. Protect yourself against the bright sun.

Adapted from Ranger Rick's Nature Magazine, March 1971.

Vocabulary

1. vacant: empty
2. moisture: wetness
3. moist: wet
4. damp: wet, moist
5. scavengers: animals which eat dead animals or plants
6. digest: to change food into a substance which the body can use
7. burrows: digs
8. deposit: what is left
9. search: look
10. disturb: bother
11. pupae: baby insects
12. absorb: soak in
13. blend: mix
14. environment: everything all around you (or anything else)
15. predators: animals that kill other animals for food

Questions for Thought

1. Why do land snails come out at night?
2. What do slugs eat?
3. How are sowbugs useful to us?
4. Why must you be careful with centipedes?
5. List three ways in which earthworms are helpful to their environment.
6. What do worker ants do?
7. What other creatures might you find in a vacant lot?
8. Why shouldn't you touch snakes?
9. What two things should you do before you explore a vacant lot? Why?

To do . .

Read The House That Jack Built. What is making everyone sick? Can this happen?

Take a survey. What pesticides are used at your house? Have your parents help you. List what is in the pesticide.

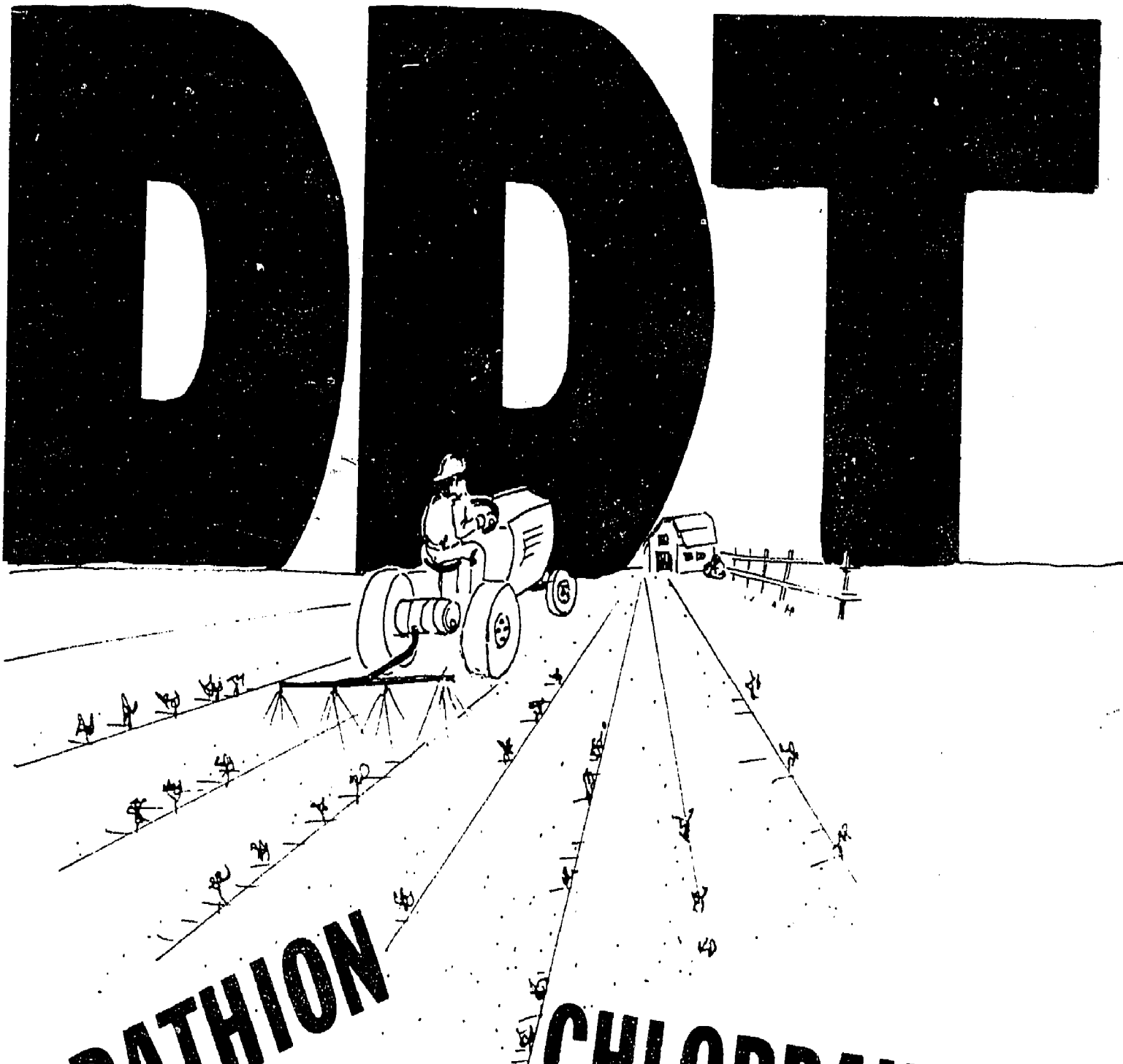
Read "Pesticides Are Poison." Do you use any of these? What can you use instead?

Do more . do more . .

- How should pesticides be applied? Stored?
- Read "The Cide List." How do pesticides travel through a food chain? Make a food chain poster. Show how pesticides can travel through it.
- Make a garlic pesticide spray. Test it. Set up a test area and a control area. Spray only the test area. Keep a record of both areas. Does the spray work?
- Try some of the other natural controls. How well do they work? Record your results.

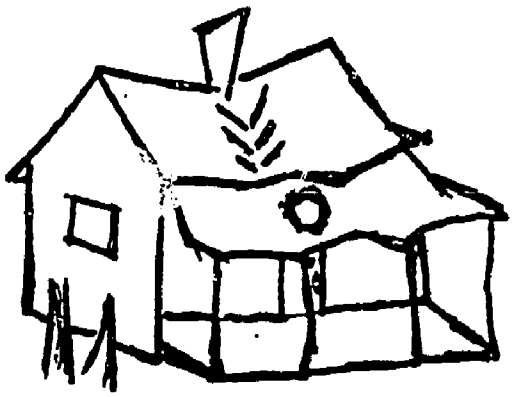
What now?

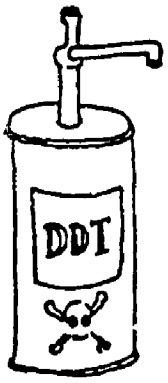
Write a paragraph. Tell why pesticides should be used with care.


DDT
PARATHION
CHLORDANE
ROTENONE

THE HOUSE THAT JACK BUILT

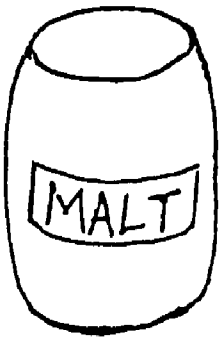
This is the house
that Jack built.





This is the spray
with the poisoned salt,
that lay in the house
that Jack built.

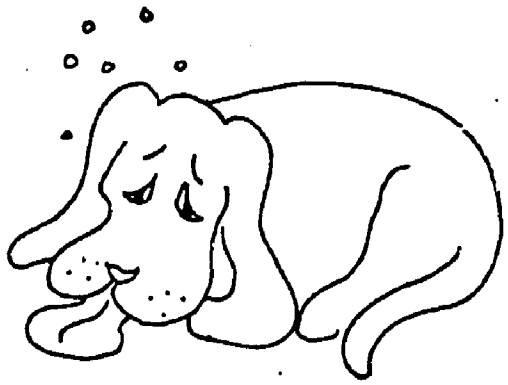
This is the malt
that was sprayed with
the salt,
that lay in the house
that Jack built.



This is the rat
that ate the malt,
that was sprayed
with salt,
that lay in the house
that Jack built.

This is the cat,
that killed the rat,
that ate the malt,
that was sprayed
with the salt,
that lay in the house
that Jack built.

This is the dog,
that helped the cat,
that killed the rat,
that ate the malt,
that was sprayed
with the salt,
that lay in the house

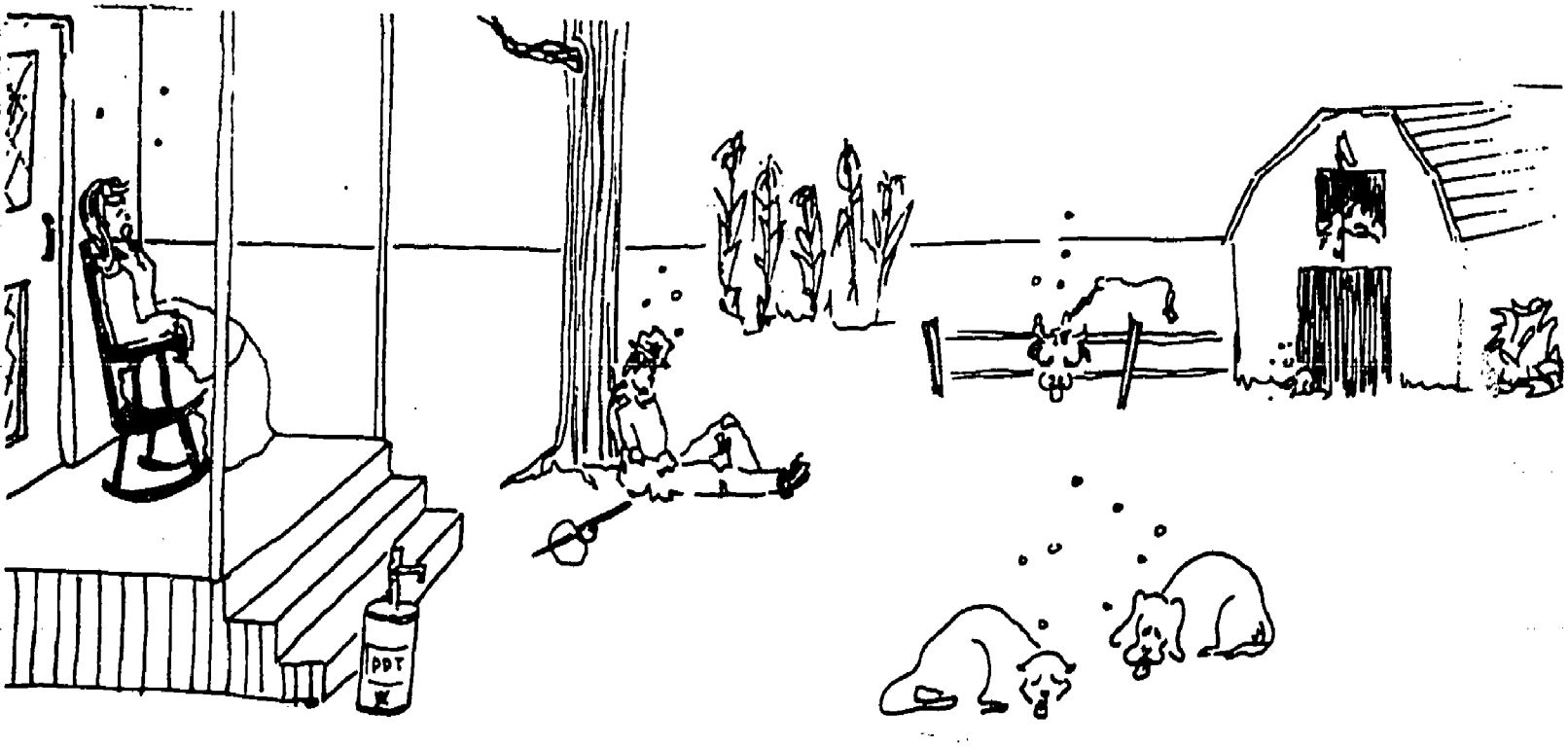


that Jack built.

This is the cow
with the crumpled horn,
who ate some malt <u>and</u>
some poisoned corn,
that tossed the dog,
that helped the cat,
that killed the rat,
that ate the malt,
that was sprayed
with the salt,
that lay in the house
that Jack built.

This is the maiden all forlorn,
that milked the cow with the crumpled horn,
who ate some malt,
and some poisoned corn,
that tossed the dog,
that helped the cat,
that killed the rat,
that ate the malt,
that was sprayed
with the salt,
that lay in the house
that Jack built.

This is the man all
tattered and torn,
that shared with the
maiden all forlorn,
that milked the cow
with the crumpled horn,
who ate some malt
and some poisoned corn
that tossed the dog,
that helped the cat,
that killed the rat,
that ate the malt,
that was sprayed
with the salt,
that lay in the house
that Jack built.



This is the farm full of poisoned salt.
That should be a sign for us all to halt
this spraying of grain with a poison aim.
That killing of pests and all the rest.
That spraying of he and the spraying of she
is really the killing of you and me.
That's all -- for the house that Jack built.

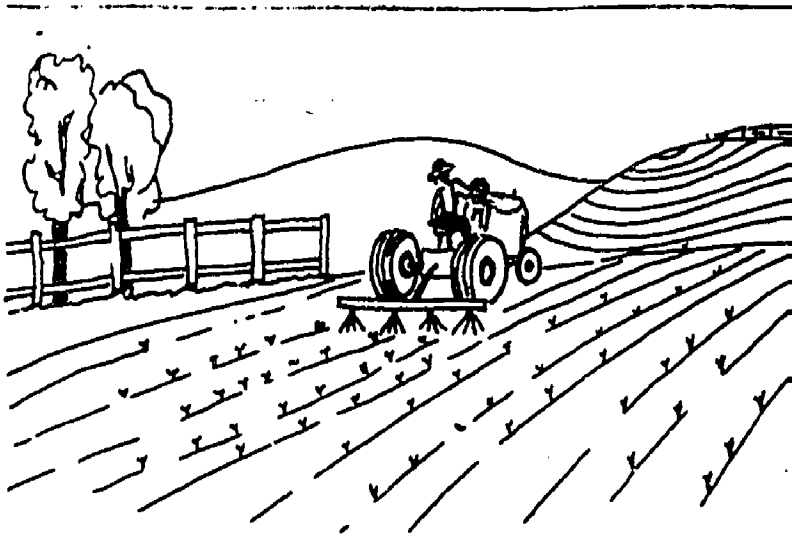
THE "CIDE" LIST

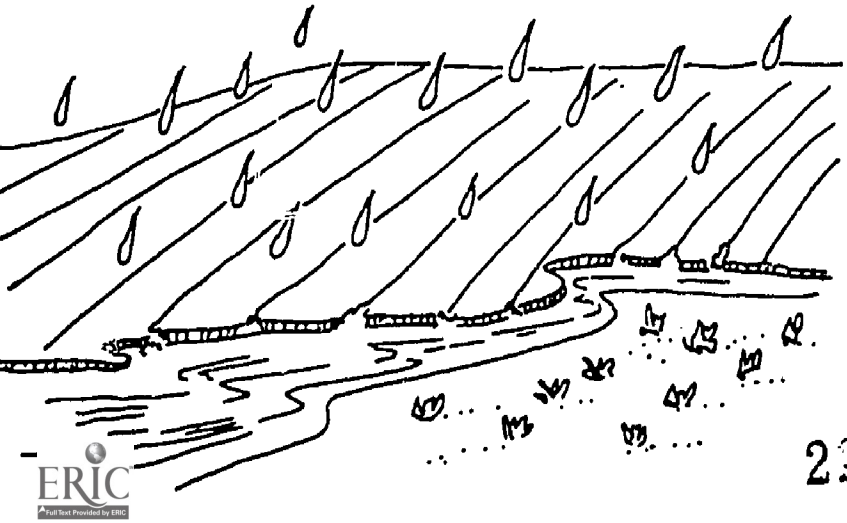
-Cide is part of a word. It's the part that means killer of. Here are some "cide" words:

Insecticide	-	killer of insects
Fungicide	-	killer of molds and fungi
Herbicide	-	killer of herbs and weeds
Rodenticide	-	killer of rodents
Pesticide	-	killer of pests (Includes many of the other "cide" words.)

Pesticides kill pests. They also kill other animals. It works like this:

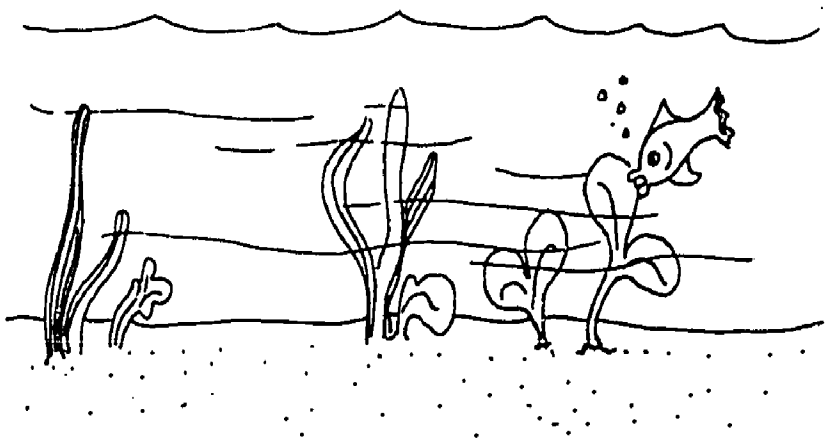
A pesticide is sprayed over a field.

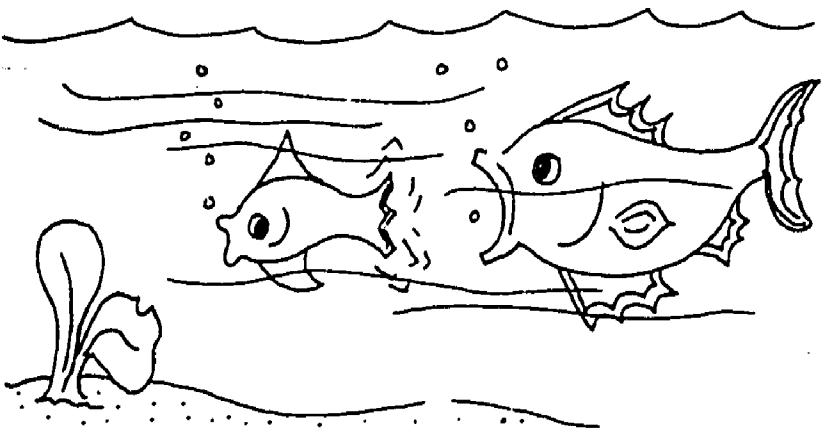




Rain washes some of the pesticide into the water.

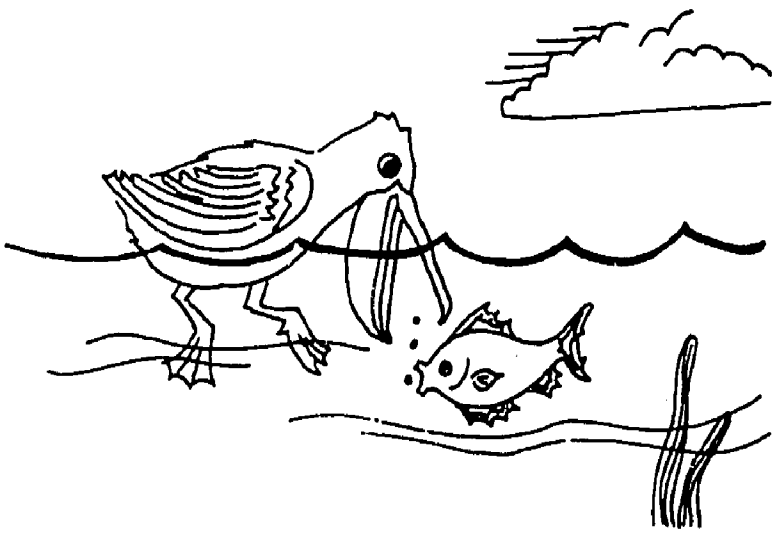
It is taken into small plants in ponds and streams. Small animals eat the plants.





The pesticide stays in their bodies. Many small fish are eaten by larger fish. The pesticide is passed on.

Animals eat these larger fish. A lot of the poison goes into their bodies. Sometimes they die. Some birds lay eggs with soft shells. The eggs break. The babies die. A whole species can die.



PESTICIDES

ARE

POISON

Try some of these natural controls:

PEST	NATURAL CONTROL
 Ant, cockroach	Mix equal parts of icing sugar and powdered borax Sprinkle in corners and along baseboards OR Use Dri-Die, Drione, or Silica Gel Spray
 Aphid	Same as for mealy bugs and thrips. Also plant nasturtiums in garden. OR: Cut up 3 pounds of rhubarb leaves or elder leaves. Boil ½ hour in 3 quarts water. Strain. Cool. Dissolve 1 oz. soapflakes in quart of water. Mix the two and spray.
Beetle, bug, caterpillar (other large insects)	Pick pests off and put them in a can of kerosene or oil.
Cabbage looper, carrot fly	Plant one of these herbs between rows of cabbage or carrots: sage, rosemary, mint, leeks, hyssop.
Cabbage worm 	Plant rosemary or thyme in garden. Yellow jackets are a natural enemy. OR: Cover plants with cheesecloth to prevent laying of eggs by the adult moth. OR: Sprinkle rye flour over and around plants when covered with dew.
Carrot fly	Plant onion sets (not seeds) between rows of carrots.
Cotton bollworm, tobacco budworm	Green lacewing larvae (aphid lion) or ladybug adults and larvae*. 
Flea beetle	Plant catnip here and there in border.
Japanese beetle	Plant garlic, rue, or tansy (herbs) near roses and raspberries.
Lice, mites on house plants Mealy bug, thrips, mite, red spider 	Spray plants with plain soapy water Green lacewing (aphid lion) adults and larvae. Ladybug adults and larvae*. Praying mantis** (collect egg sacs in winter and place in garden). 
 Millipede, wireworm	Punch holes in sides and bottom of tall juice can. Bury upright in garden border. Fill with potato or carrot peelings. Empty can weekly.
Mole	Plant an herb called "mole plant" *(Euphorbia lathyrus)* here and there in flower garden.
Mosquito	Dry up stagnant water to kill larvae. Put up a purple martin birdhouse in your yard.
Moths around lights	Use frosted-coated yellow or red outdoor light bulbs.
Onion fly	Plant onion sets, not seeds
Potato bug	Plant horseradish, dead nettle, or flax in potato patch.
Slug, snail, cutworm 	Place a cabbage leaf upside down on ground. They will gather underneath OR: Place a wide shallow pan of stale beer, sunk level with the ground. Clean out weekly
 Sowbug, earwig	Remove any piles of decaying garden refuse or trash, boards, bricks or logs.
Tomato worm	Plant asparagus or borage near tomatoes.

Reprinted from: Ranger Rick's Nature Magazine. Copies available upon request from National Wildlife Federation, 1412 Sixteenth Street, N.W., Washington, D.C. 20036.

Try to avoid any of these chemicals. They all have a long life. They don't dissolve very fast. They can remain as a deadly poison for years and years.

Insecticides

DDT, aldrine, dieldrin, chlordane, lindane, heptachlor, endrin, taxaphene and resin strips (dichtorvos).

Herbicides

2-4-D, 2-4-5-T or any compound containing lead, mercury or arsenic.

Fungicides

dinitro cresol, captan and folpet.

Rodenticides

antu

Adapted from Ranger Rick's Nature Magazine, National Wildlife Federation, 1412 Sixteenth Street, N.W., Washington, D.C. 20036.

To do . .

Read about the chickaree squirrel. He likes to have his own territory. Territory may mean his mate, his young, or an area. How has the squirrel's territorial behavior aided the growth of trees?

Do more . do more . .

- Read "A Different Language." How do animals warn others to keep out?
- Make a collage about things you consider your territory (clothes, room, toys).
- Do you ever feel you need more privacy? How is this your need for territory?
- Observe some birds in your area. Are they territorial? How do you know?
- Look around you. Watch for signs of territorial behavior.

What now?

Have a "What Things Bug You the Most" party. Try to keep it territorial. Discuss one territorial need of your own.

A TERRITORIAL ANIMAL

The chickaree squirrel is busy. He is a bustling little scamp. He is also very territorial. He lives alone. All other squirrels are his enemies. Chickaree squirrels spread out through a forest. Each lives in his own territory.

His bad temper has a good side. It has helped keep alive the giant sequoia. This is the largest of all living trees.

Its trunk might be as big as a whole house. Its seeds grow inside a cone. They are very small. It would take 1,200 of them to fill a teaspoon. As the cones dry out and fall, the seeds fall too. They do not often produce new trees. Up to 50% of the seeds in these new green cones can be fertile. (This means they can sprout and grow a new tree.)

The chickaree squirrel does not like the seeds. He eats the outside part of the new green cone. He spills the green seeds all over the ground. This helps new seedlings sprout, each year.

In the spring, the chickaree squirrel finds a mate. The female squirrel lets the male squirrel enter her territory for one day. Later, four to seven babies are born. By fall, the young ones are looking for their own territory.

The chickaree is very clean. He is still bothered by fleas and mites. He has to move away from them. He finds a new home. This gives seedlings a chance to grow in a new area.

Sometimes the squirrel skips the sequoia cones. He eats the seeds of the pine and fir trees. This helps the sequoia too. These seeds might have become trees. They would have taken the sequoia's moisture and sunlight.

Adapted from Ranger Rick's Nature Magazine, March 1972.

To do . .

Look at the front of this card. Who are these animals?

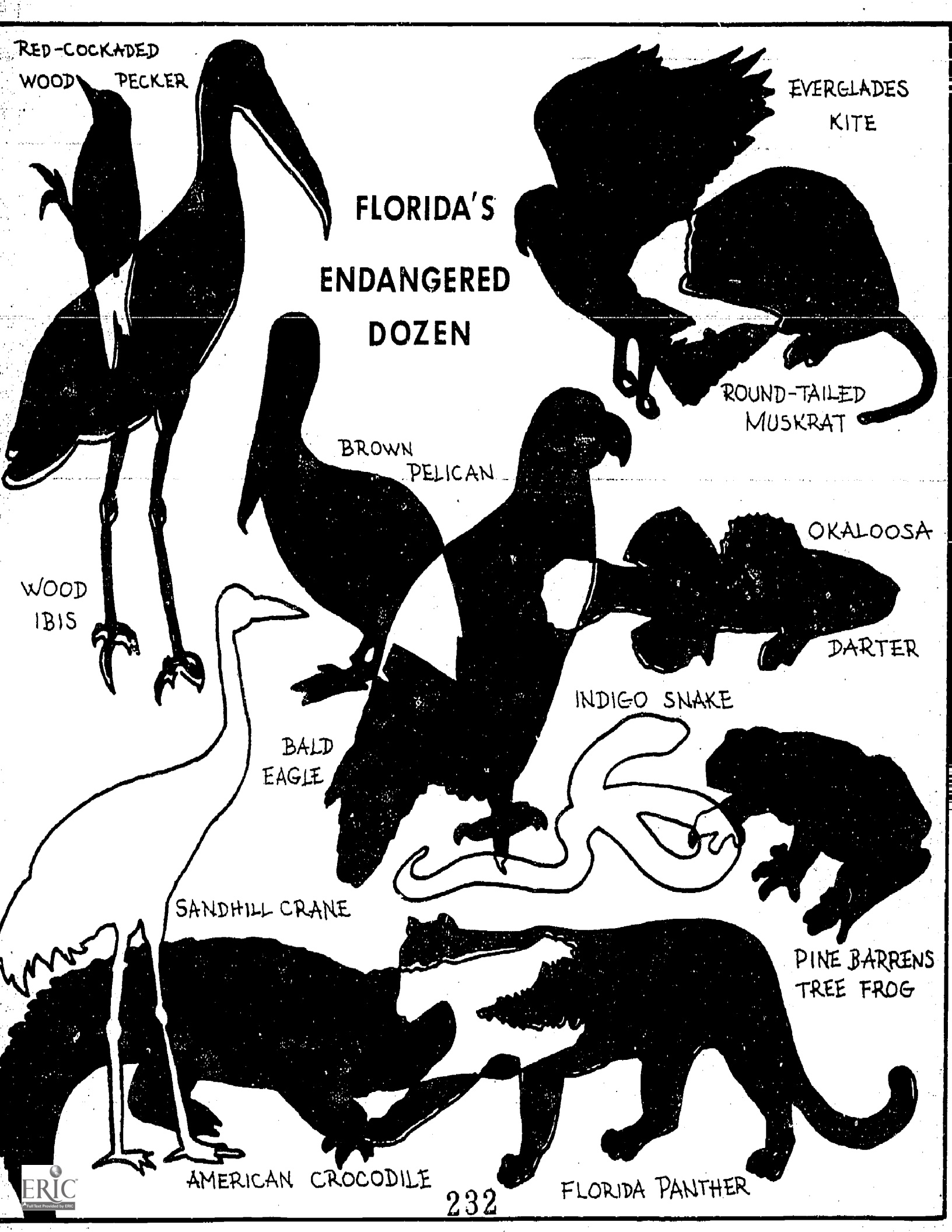
These are endangered animals. They live in Florida. They are disappearing. Read about one of them. Tell why the animal is endangered. How can it be saved?

Do more . do more . .

. What does the word endangered mean? Find other animals that are endangered.
. Keep a scrap book about endangered animals.
. Some predators are endangered. Why is this bad?
. Bald eagles nest in tall trees. When houses are built, the trees are cut. What happens to the eagles? What happens to the food pyramid?
. Are any animals endangered because of pesticides? How are they affected?
. How does the law protect endangered animals?

What now?

Decoupage a picture of an endangered animal. Tell why the animal is endangered. Tell how man can help.


RED-COCKADED WOODPECKER
EVERGLADES KITE
FLORIDA'S ENDANGERED DOZEN
ROUND-TAILED MUSKRAT
BROWN PELICAN
OKALOOSA DARTER
WOOD IBIS
INDIGO SNAKE
BALD EAGLE
SANDHILL CRANE
PINE BARRENS TREE FROG
AMERICAN CROCODILE
FLORIDA PANTHER

FLORIDA'S ENDANGERED DOZEN

Many animals live in Florida. Some are in danger. They may disappear. Why is this happening?

Many people come to Florida. They build houses. They fill in marshes. They change the environment. Look around. What changes can you see? Other changes are taking place, too. They are harder to see.

How do these changes affect the animals? They change the environment. Wild animals become fewer. Their health is affected. Today, many species may disappear. They are called endangered species. There are 12 of these in Florida.

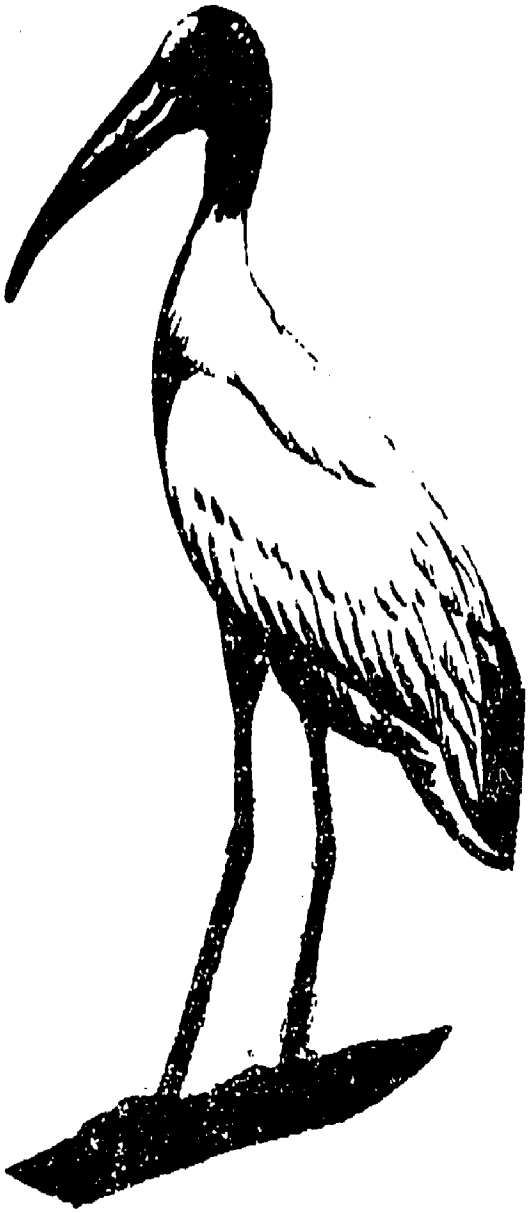
Studying endangered species may help them. It will also help other animals. It helps us. We can understand how we affect the environment. The environment affects us. We are inter-related.

These animals can be saved. Time is running out. Man must help.

Vocabulary

1. marshes: low, wet areas where grasses grow
2. environment: all the things, living and nonliving which are around you
3. species: kinds of animals or plants
4. inter-related: how two or more things get along together

WOOD IBIS



Look at this picture. Do you recognize the wood ibis? Many people call it a stork. This bird is in danger. Man is taking away its home.

The wood ibis breeds in the Great Cypress Swamp. It raises its young there. The ibis needs lots of fish. Its young do, too. The fish live in marshes. Much of the marshland is being drained. Man uses it for homesites.

There are a few sanctuaries left. These are in danger, too. The supply of food and water is threatened. Man is building around the area. The ibis must fly many miles for food. The ibis needs a large sanctuary. If man does not help, the wood ibis may disappear.

Vocabulary

1. marsh: a low, watery area where grasses grow
2. homesites: places where homes are built
3. sanctuary: a place which is safe

Question

Could the wood ibis be saved by keeping one sanctuary in the middle of the Great Cypress Swamp? Explain.

INDIGO SNAKE

Most people hate snakes. They are afraid of them. Not all snakes are dangerous. The indigo snake is friendly. It is not poisonous. It rarely bites. It is easy to tame.

The indigo is usually 5 to 6 feet long. It is a shiny blue-black color (indigo). Its chin and head may be orange-brown. The indigo eats rabbits, rats, and mice. Sometimes, it eats other snakes -- including the diamondback rattlesnake. Rattlesnakes are poisonous. They are afraid of indigo snakes. They usually stay away from them.

People have threatened the natural population of indigos. They collected them. This is no longer permitted. The indigo is fully protected. Many are still captured. Some are smuggled out of Florida. They are sold as pets.

The indigo snakes face another danger. People are taking away many of their living areas. People must start helping indigos survive. They must stay in their natural environment. There may soon be no indigo snakes to collect.

Vocabulary

1. rarely: not very often
2. threatened: endangered
3. permitted: allowed
4. smuggle: to move something from place to place illegally

Question

The indigo snake may be too friendly for its own good. Explain.

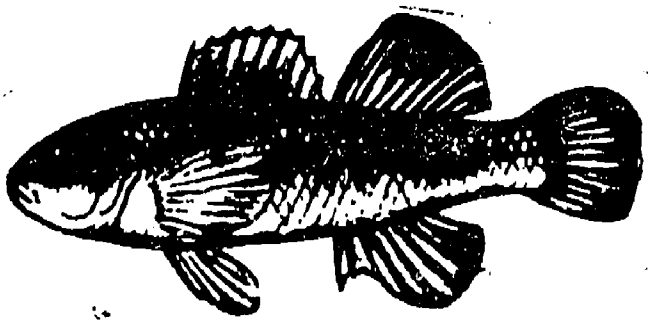
ROUND-TAILED MUSKRAT

The round-tailed muskrat can live on land. It can also live in the water. Some people call it the Florida water rat. It is a shy animal. It needs the marshes to survive. Man drains these marshes. He uses the land for farming. He builds homes there. This may cause the round-tailed muskrat to disappear.

The water rat's home looks like a small haystack. It sticks out of the marsh. Muskrats build their homes with twigs and leaves. Inside, there is one room. There are at least two doors leading into the water. The muskrat can escape in time of danger. Muskrats build feeding platforms. They eat their food there. They eat roots, stems and crayfish. These platforms also have escape tunnels. Muskrats have many natural enemies. These include owls, minks and otters. Weasels, snakes and alligators also hunt them.

Many other species depend on the round-tailed muskrat for food. It is an important link in the food chain of the marshland. Man may destroy the muskrat. He will destroy many other species as well.

OKALOOSA DARTER



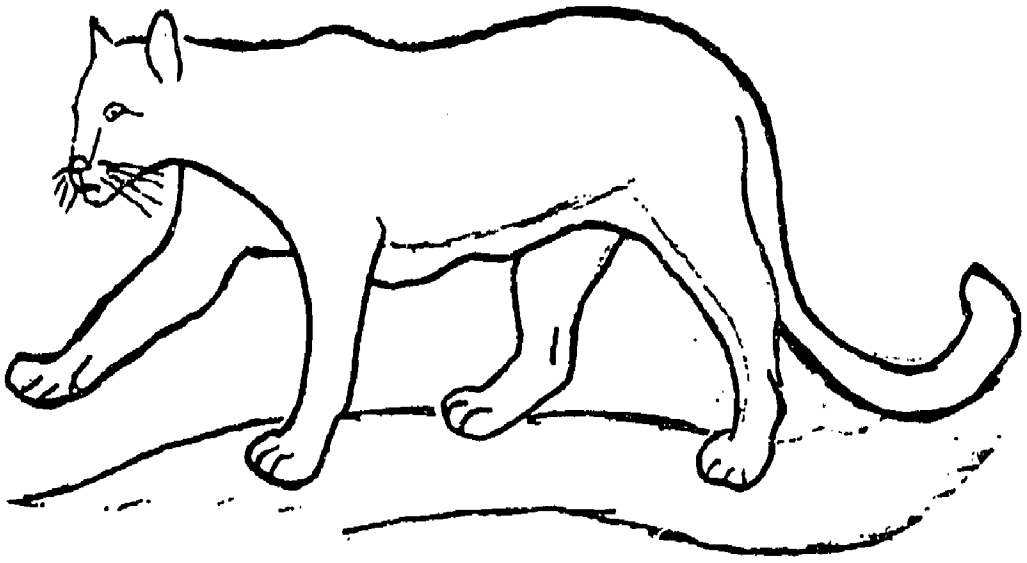
This animal is a slender little fish. Adults are only about two inches long. This fish is found mostly in Okaloosa County, Florida.

Little is known about this small green fish. It lives in sand-bottomed streams. Mining operations will affect the habitat of this fish. So will dredging or land filling. Water pollution could easily cause its disappearance.

Vocabulary

1. slender: thin
2. dredging: digging up dirt from the bottom of rivers to make them deeper

FLORIDA PANTHER



The panther once roamed over most of North America. Now the panther lives in the Everglades.

Panthers are carnivorous. They hunt deer and wild hogs. They also eat skunks, rabbits, and racoons. They cannot live where people do. Florida keeps adding people. The panther is being pushed into smaller areas.

Laws keep people from killing panthers with a gun. They are being killed in another way. Man is taking their home. This kills them. Only half of the cubs live to become adults. If man does not preserve large areas for the panther, you may only see this animal in the zoo.

Vocabulary

1. carnivorous: meat-eating
2. preserve: keep

Question

Using a gun is not the only way to kill a panther. Explain.

BROWN PELICAN

You may have seen brown pelicans. Maybe they were flying above the water. Were they diving for fish? About 20,000 pelicans live in Florida.

The brown pelican is in danger. The first threat is DDT. The story, "The House That Jack Built," explains how DDT reaches the pelican. The pelican eats fish that contain DDT. The fish will not kill an adult pelican. The DDT makes the egg shells thinner. If the shells get too thin, the young birds will die.

Scientists measure the thickness of pelican eggs. The shells in Florida are thick enough now. They have gotten thinner. If the DDT in the environment increases, the pelicans may die off.

There is a second danger. Mangrove trees in many areas are being destroyed. People destroy the mangrove trees. People

think they are ugly. They get in the way. People replace the trees with concrete walls. This takes away the natural habitat of the pelican. The slow-moving water between the mangrove trees contains food. Many animals depend on this food.

If man keeps destroying the mangroves, he may hurt the pelican. He may also hurt many species of fish and sprimp. They breed in these quiet waters.

Vocabulary

1. habitat: the place where something lives
2. breed: reproduce, bear young

Question

What might happen if man removes most of the mangrove trees along the coast of Florida?

EVERGLADES KITE

There are several species of kites. The Everglades kite is in the greatest danger. It has a very limited "menu." The Everglades kite eats only one kind of food -- the apple snail. These snails live in the marshes of the Everglades. When there is enough water, there are plenty of snails. The Everglades kites can feed themselves. They can feed their young. During droughts, the food supply decreases. The birds have to search very hard for their meals. Man has made this worse. He has cut off the natural flow of water. He stops the water into the Everglades. If the Everglades dry up, the kite will die. It will be one of the first species to go.

Everglades kites live in breeding pairs. Each pair has its own territory. They defend it against other birds. If man disturbs the nests, the parent birds may abandon them. This is leaving the young to

die. Man may take away part of their habitat. Then there will not be enough territory for all the kites. Some will not reproduce.

Everglades kites are also threatened by fires. These come during dry seasons. They are threatened by floods. These come during heavy rains. They have natural enemies. There are also people who break laws. They kill these beautiful, rare birds.

Vocabulary

1. drought: a dry spell (no rain)
2. decreases: gets less
3. disturbs: bothers
4. abandon: leave

BALD EAGLE

The bald eagle is our national emblem. It stands for strength and courage. Its picture can be found many places. Look on money, medals, public papers, and stamps. It is even on the "Great Seal of the United States."

The bald eagle is in serious danger today. These mighty birds reproduce well only in Alaska and Florida. They are threatened by man's activities. The use of chemical pesticides, loss of nesting trees, and shooting are three dangers.

Florida eagles usually lay two eggs. They lay them early in winter. The eagle eggs may become thin-shelled. This happens when DDT builds up. It takes about a month for the eggs to hatch. At six months, the young birds can travel north for the summer. Eagles feed mostly on fish. They are also scavengers. They eat animals killed on

highways. They even feed in garbage dumps.

Some people break the national laws. They shoot or capture eagles. These thoughtless hunters kill or injure many eagles. If this continues, the national bird may be found only in history books.

Vocabulary

1. emblem: symbol; something which stands for something else
2. scavenger: animal that eats dead things

Questions

1. What are the three main reasons the bald eagle is endangered?
2. Explain how DDT affects the bald eagle and the brown pelican. Where do they get it? How does it get to them?

SANDHILL CRANE

There are two kinds of sandhill cranes in Florida. The Greater Sandhill spends the winter in Florida. The Florida Sandhill lives and breeds in Florida. The number of these animals is getting smaller. The cranes live in wilderness areas. Man is invading these areas. He is destroying their breeding grounds. He is draining the wet prairies. He uses them as farmland.

Sandhill cranes lay only two eggs. Usually only one young bird survives. It is very important to protect the young birds.

Cranes choose open areas to build their nests. They can see enemies from far away. The wetlands also produce the birds' food. They eat roots, bulbs, and grains. They also eat insects, crayfish, lizards, frogs, and snakes.

Today, the sandhill cranes live in the marshlands of central Florida. Some of these lands must be protected against development. If not, the sandhill will disappear.

QUESTIONS

1. Why are wetlands so important to the sandhill crane?
2. What must man do to protect this species?

AMERICAN CROCODILE

53-19

The crocodile is a leftover from the past. It looks almost the same as it did 200 million years ago. It was bigger then. Crocodiles were once found as far north as Daytona Beach. Now they are found only in the Everglades and the keys.

Crocodiles may seem ugly. They look vicious and stupid. The crocodile is important. He helps other creatures survive. Crocodiles live in salt bays and estuaries. They are bordered with mangrove trees. The crocodile does not like fresh water.

Efforts to build the population have not been successful. In the early 1900's, hunters killed them by the thousands. They sold their hides for money. It is against the law to kill these animals now. Poachers still kill many of them.

The crocodile will probably never adjust to man. Unless we can set aside areas for this animal, it will disappear.

Vocabulary

1. vicious: mean, nasty
2. maintains: keeps
3. estuaries: bodies of water where salt and fresh water mix
4. poachers: people who kill animals who are protected by law
5. adjust: get used to

RED-COCKADED WOODPECKER

This bird has a small red ear patch. Another name for the patch is a cockade. This bird is about the size of a robin. It has a black and white "ladder" on its back.

This bird stays away from man. It looks for old pine trees. It builds its home there. The woodpecker drills through the living wood. Inside, there is diseased wood. It clears away the diseased wood. There, it builds its nest. Red-cockaded woodpeckers are friendly to each other. They may build as many as ten nests in one tree. They use the same tree each year. When the tree dies, they look for a new home.

This bird is in great danger in Florida. Most of the old pine trees have been cut. Each year, the lumber industry cuts many pine trees. The wood is used for many things. The men plant new trees. As the new trees grow, they are

cut too. This bird can live only in old, diseased pines. Only an old, untouched forest will do. Unless we save such forests, the species will soon die off.

QUESTIONS

1. Companies plant new trees after they cut the old ones. Does this help the red-cockaded woodpecker? Why?

PINE BARRENS TREE FROG 53-23

The pine barrens tree frog is very small. It is only two inches long. It is very rare in Florida. It was discovered until 1970. This frog has been found in only a small part of Okaloosa County.

Little is known about the way this frog lives. In New Jersey, this forg lives in swamps and bogs. Man does not know what might harm this frog. This amphibian has been put on the endangered list. This is because there are so few of them.

Vocabulary

1. bogs: swamps
2. amphibian: an animal that lives both on land and in the water

CONCLUSION

You have read about 12 endangered species. They are protected by the law. Many other animals are in danger. They are not protected by the law.

Many people are working to protect these animals. These animals can survive. Everyone must help. Strict laws must be made against pollution. We must plan carefully. Water and land must be shared with these animals. If we do not, they will disappear. How nice would the environment be for us then?

QUESTIONS

1. What are the main ways in which man threatens many species of animals in Florida?
2. What can be done to protect these species?

Adapted from - "Florida's Endangered Dozen," by David LaHart, Florida Wildlife, Feb., 1973, pp. 15-22.

GLOSSARY

A

abandon: leave (53-12)
absorb: soak in (50-5)
adaptation: something that helps a plant or animal fit into a changed environment (26,29,36, 46,47)
adapted: suited for (26,29-1,40)
adjust: get used to (53-19)
amphibian: animal that lives both on land and in water (48,53-23)
antennae: feelers on an insect (27-3,31-10)
ancestors: relatives who came before us, like grandparents (29-1,29-5)
attract: to pull towards (14-2,29-5)

B

behavior: the way animals act (30-1)
beliefs: ideas, feelings (46-4)
blends: mixes (50-5)
bogs: wet, marshy areas (53-23)
bounties: rewards (46-1)
breed: reproduce (53-11)
burrows: digs(verb), or animal homes in the ground (noun)(50-4)

C

canals: small streams made by someone (25-2)
carnivorous: meat-eating (53-8)

chemical: a special substance (14-1)
cinquain: a special poem (12)
circle: a round shape (5)
claim: say (47-1)
clan: a small group (14-2)
climate: weather (37-2)
colony: group like a family, tribe (14-1)
compost: a mixture of materials which is decaying (22)
compost pile: a pile of decaying matter (23-4)
conserves: saves (23-2)
consumer: one who uses up something (42, 44-5)
continue: keep on (25-5)
creature: animal (47-1)
cycle: circle (24,24-1,27,33,48)

D

damp: a little wet (50-2)
decay: break down (22)
decomposer: one which breaks things into smaller parts (42)
decreases: gets less, or smaller (53-12)
deposit: money left for safe return of something (23-3)
destroyed: wiped out (46-3)
digest: change food to something the body can use (50-3)
disease: sickness (27-4,30-1,30-4)
disturb: to bother something (27-3,53-12)

dredging: digging on the bottom of a lake or river (49-2,53-16)
drought: a dry spell (53-12)

E

eaves: part of roof that hangs over (29-1,29-3)
emblem: symbol (53-14)
endangered: in danger of dying out (53-1)
enforce: make someone obey a law (33-2)
engineer: someone who builds roads, buildings, missiles (25-2)
environment: the things around you (1,30-1,37-2,50-5,53-1)
estuaries: a place where fresh water meets salt water (49,49-1,53-19)
evaporate: change from water to water vapor; disappear (24)
experience: knowing what you are doing (38-3)
exo-skeleton: a "skeleton" outside an animal, like a shell (37)

F

fertilizer: a substance which makes plants grow better (23-4)
fierce: mean (37-2)
flocks: large groups (29-1)
fossils: signs of plants or animal that are no longer living (37,37-2)

G

germs: tiny things that cause sickness (27-4,30-4)
grazing: eating grass (46-2)

H

habitat: place where something lives (53-11)
herds: large groups of animals (46-2)
homesites: place where a home is built (53-3)
humus: dark, rich soil (26)

I

illegal: against the law (33-2)
indicator: shows something (29-4)
intelligent: smart (46-2)
interact: to act with others (13)
interdependent: depending on each other (13)
inter-related: tied together (53-1)

L

litter: trash left on the ground (21)
loyal: faithful (46-2)

M

marshes: wet, grassy area (53-1,53-3)
mates: partners (14-2)
moisture: water (50-1)

N

natural: having to do with nature (30-1)
natural environment: anything in nature around you (30-1)
natural resources: things found in nature (23-2)
nibble: small bite (25-3)
neighborhood: area where you live (1)
nocturnal: hunting and living at night (47-2)
non-deposit bottles: bottles that are thrown away (23-3)
non-renewable: cannot be used again (23-2)
non-returnable: cannot be brought back (23-3)

O

opinion: belief (30-2)
organic: coming from living things (23-4)

P

parasites: small animals that live on other animals or plants (30-4)
permanently: for keeps (46-3)
permitted: allowed (53-5)
pesticides: chemicals to kill pests (51)
poachers: people who kill animals that are protected (53-19)

pollution: unclean or unhealthy (29-4)
prairies: grassy plains (46-1)
predators: animals that kill other animals for food (25-2,33-1,43, 46-2,47,47-1,50-5)
preserve: save (53-8)
prevent: stop (25-2, 30-4)
prey: animal which is hunted by others (46,46-2,47-2)
producer: one who makes something (42)
protect: keep safe (18-3,33-2, 46-2,49-1)
pupae: young of insects (50-4)

R

rarely: not very often (53-5)
raw materials: basic things used to make other things, like coal, iron, ore, etc. (23-2)
rectangle: a four-sided shape (5)
recycle: to use over again (23, 23-2)
recycling centers: special place that co lects things to be used over again (23-3)
reduces: makes less (23-3)
relationship: way people or animals get along (46-2)
reuse: use again (23-1)

S

saber: a very sharp kind of knife (37-2)
sanctuary: a safe place (53-3)
scavenger: one who eats dead things (29-4,43,50-2,53-14)
search: look for (50-4)
shed: lose, as to shed fur (30-2)
shelter: place to stay (25-2)
signal: special kind of sound or movement (14-1)
slender: thin (53-16)
smuggled: moved out in a hidden place (53-5)
species: kinds of animals or plants (53-1)
spoil: make bad (27-4)
stalked: hunted (46-1)
survive: stay alive (27-3,29-2, 36,37-3,47-2)

T

territory: something that belongs to someone, like a special piece of ground or a mate (14-2,52)
texture: the way a surface feels or looks (6)
threatened: in danger (53-5)
trespassing: walking on other people's land without asking (38-3)
triangle: a three-sided shape (5)
trowel: small shovel (38-4)

twigs: small tree branches (25-2)

U

undersize: small (49-2)

V

vacant: empty (50-1)
vegetarian: someone who eats only vegetables (25)
veterinarians: animal doctors (30-4)
vicious: mean (53-19)
villian: the "bad guy" (46-1)