

5 & UP

WASH OUT

Things You Can Use

a sprinkling can
two quarts of moist soil

Words You Can Use

pour
run
washed down
gully
erosion

Erosion carves out canyons, erases mountains, creates river channels, and shapes land masses. Although young children cannot comprehend these massive efforts, they can see gullies form on a grassless hillside. A trip to a construction site will clearly show what can happen to unprotected soil. This activity introduces the word erosion. Through a simple demonstration, children become aware of the effects of water.

What To Do

1. Take the children on a walk or drive through a recently constructed housing subdivision.
2. Look for signs of soil erosion.
3. Examine the erosion closely. Discuss how the soil can change and what things can change it, i.e. water, wind, weathering.
4. While at the construction site, gather the children around you and make a pile of dirt on the ground. Let the children imagine that the mound of dirt represents a real hill.
5. Pour water slowly from a sprinkling can over the mound of soil.
6. The children will see how the soil is washed down the hill and how the hill is gradually leveled.
7. Where does the soil go?
8. What makes the gullies?

Want To Do More?

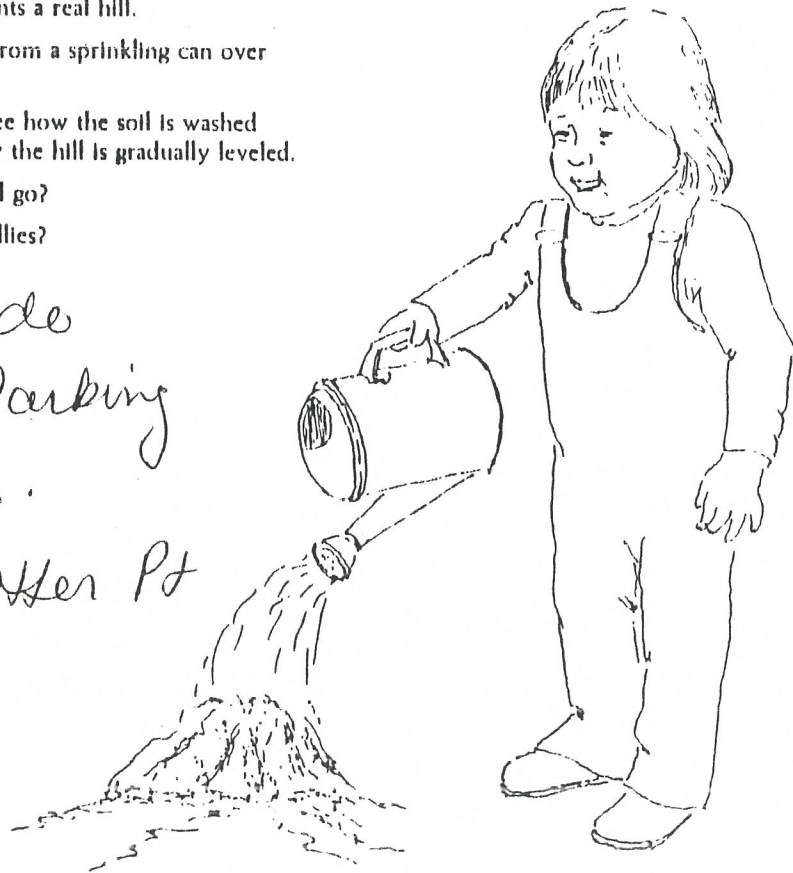
Take a walk in your neighborhood or in the park. Look for signs of erosion.

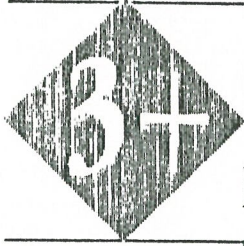
On a rainy day collect a glass of water from a gutter. Take it in the house, examine closely - see the soil in the water. How did it get there?

Discuss what helps stop erosion (i.e. grass, trees, leaf mulch, straw).

Draw a picture of what your neighborhood would be like if lots of soil washed away.

Areas to do
this: Parking
lot gate.
end of after Pt
trail





LEAF HUNT RELAY

Words you can use

leaf
similar
compound
simple
rough
smooth
edge

Things you will need

one pair of leaves per child—you should use at least 3 different kinds of leaves (As children become more skilled, increase the variety.)

Recognizing that leaves can be matched is the first step toward realizing that a tree has leaves of a predictable kind and that they may be the same as or different from the leaves on another tree. The LEAF HUNT RELAY teaches the children to look for key characteristics which will help them find a match more quickly. The relay race adds pizzazz to the matching activity. It's up to the adult to set a pace which creates challenge without frustration. Timing the whole group and then trying to beat that time adds the competitive edge without winners and losers.

What to do

1. Place one set of leaves at one end of the play area and a matching set at the other end.
2. Have the children gather around one set of the leaves. Talk about the characteristics of each leaf, discussing the attributes that make each leaf different. Allow the children time to explore the leaves and make distinctions.
3. Now the group will have a race. The goal is to match a leaf from this set with one from the set at the other end of the room.
4. At the GO signal have a child take a leaf and walk quickly to the other end, find its match and return to the start. In order to give everyone a turn, you may want to have 2 or more children go at the same time.

5. As the child places the matched leaves on the table, the next child goes until all have found a match.

6. If mistakes are made during the relay, discuss these and where the similarities and differences exist in the mismatched leaves.

7. Practice makes perfect. The children will need time to learn how both the matching and the relay work.

Want to do more?

Increase the number and variety of leaves. Have the children remember which leaf they need to match rather than carry their leaf to the second pile. Develop a leaf lotto game.

A CHILDREN'S SEED STARTING PROJECT

1. Buy packets of fairly large and easily grown seeds. Obtain containers - clay, plastic or peat pots; small tin cans; or durable cartons. Be sure there are drainage holes in the bottom.
2. Buy or make a good seed starting soil medium.
3. Have children complete these steps:
 - a. Fill containers level with soil medium; do not pack down.
 - b. Place two or three seeds near center of each container but not touching each other.
 - c. Push each seed gently in with the index finger to the proper depth. The "rule of thumb" is two or three seed diameters deep.
 - d. Cover seeds with a little soil and firm lightly.
4. Demonstrate to children these steps for success in growing the seeds, and then LET THEM DO IT:
 - a. Carefully water soil thoroughly with a fine spray from a clothes sprinkler until soil is saturated. It may be necessary to water again several hours later.
 - b. Place planted containers on trays in a warm place out of drafts.
 - c. Water when necessary; do not let moisture collect in the trays.
 - d. When sprouts appear, move trays to a sunny window.
 - e. Turn containers daily to balance the sunlight on all sides of plants.
5. Show children how to thin the seedlings:
 - a. When seedlings have developed their first set of true leaves, decide which in each container is strongest, healthiest.
 - b. Water the soil thoroughly, and then pull out the extra plants as shown. Pull them sideways from the plant selected to remain.
 - c. Water again to settle soil loosened by thinning.
6. When weather is warm enough, let children transplant the plants outdoors.

Here are some suggestions to help children learn about gardening:

1. Start with age $4\frac{1}{2}$ or even earlier.
2. Begin with easy projects that cannot fail, and progress to more challenging ones.
3. Use every valid opportunity to show interest and praise work well done.
4. Advise well in kinds of gardens chosen and best locations.
5. Demonstrate procedures, but give help only when absolutely needed.
6. Insist that work be done when needed; encourage persistence.
7. Insist on orderliness and neatness.
8. Discuss and show how to combat insects and diseases.
9. Encourage children to keep garden records - weather, and dates of planting, harvesting.
10. Honor the harvest as an important occasion.
11. Arrange for special rewards such as ribbons, certificates, plants, garden books, magazine subscriptions.
12. To keep interest alive in the off season, plan indoor projects such as terrariums.

CONDITIONS FOR GROWTH

MATERIALS:a large tray with 5 bowls, all the same size, with soil dry in them. 5 identical seeds (any hardy kind) 1 black paper cone with a hole at its tip, 2 black cones with no hole at their tips.

- PRESENTATION: . . .
1. Plant the seeds all the same depth, 2 in each bowl.
 2. Do not water one seed, but give it light.
 3. Place a black cone (with no hole) over the 2nd seed. Water this seed. Plant will be pale.
 4. Place a black cone (with the hole) over the 3rd seed. Water this seed. Plant will be tall and thin.
 5. Place a black cone (with no hole) over the 4th seed. Do not water this seed. No growth.
 6. Give the 5th seed both light and water. Normal growth.
 7. Label each container.
 8. Let the seeds grow and let the children observe the differences in growth with the differences in conditions.

Spore Propagation

* Can be done in Fall only

Materials: fern fronds with spores
good soil
shallow clay pot
broken pieces of clay pot
plastic or glass
newspaper
small hand trowel or spoon

Presentation: 1. Lay out newspaper
2. lay fronds on piece of paper to dry for a day
3. fill the clay pot $\frac{3}{4}$ full with soil
4. take pieces of clay pot, put them into earth, half burying them so they are below top rim of pot.
5. water pot well, then sprinkle small amount of earth over broken pieces of clay.
6. hold fern frond - spore side down, and brush over broken clay pieces.
7. Cover pot with glass or clear plastic
8. set on dish in shady window sill

Results: The pieces of clay will turn green and for some time you will see only color not separate plants. Weeks or months may pass before tiny mossy frills appear on clay pieces. These will then grow into individual plants.

Purpose: To show propagation of ferns
give basic information about ferns

Ecology

Ecology (Greek for "study of the home") is the study of the relation of plants to their environment. Plant ecologists study the way that environment both living and nonliving, affects an individual plant, and also investigate the relationships and interaction of all the organisms in a habitat.

Various Terrariums

Terraria - desert - woodland - bog

A successful terrarium must duplicate a specific ecological habitat by providing proper soil, light and temperature for plants.

1. on bottom of container put - layer of coarse sand-gravel or tiny pebbles-mixed with crushed charcoal. fill to $\frac{1}{4}$ of depth
can sterilize before
arrange according to your likes
2. Desert terraria: cover base with 1" of sand or very sandy soil:
wet sand - but do not wet again
requires very sunny location.
temperature of 80° - 90° for best growth. can suspend 60 watt
light over terrarium to achieve this.
if water collects on sides - remove glass cover for 1 day.
Plants to be used: casti, aloes, sedums
can place plants in containers or directly in soil
can put lizards or horned toads in
3. Woodland terrarium:
Soil mixture - 1 part sand - 3 parts good potting soil -Moisten
before adding
mosses, lichen, liverworts ferns, etc. are plants you can use
or can cultivate plants - begonias, croton, small ferns, peperomia - -

North window - temperature of 65° - 75°.
open top completely for several hours every few days.
4. Bog terrarium:
acid soil - 1 part sphagnum and 2 parts potting soil
terrarium should be thoroughly soaked with excess water , being
allowed to remain in ground layer.
bog plants planted directly into soil
Venus fly trap and Pitcher plant planted deeply, but Sundew is
shallow rooted plant.
other insectivorous plants include butterwort and aquatic
bladderwort
light - cool location
temperature of 65° - 72°
water regularly - never let dry out.

newts or turtles can live in bog

BIOLOGY

At home the parents must prepare the environment to foster the child's interest in both plant and animal life. They should help their child realize that other things possess life other than himself. This is the beginning of the concept of Cosmic Education - the totality of life and mutual responsibility or interdependence. The child needs to take part in activities that entail care and there must be an atmosphere of love.

Within these activities the parents should give the language involving plants and animals, using their correct terms, from the general to the specific. Correct names of the tools involved e.g. garden equipment, are used as well. The child should become aware of specific facts and phenomena occurring around him such as the changes in season.

The parents can be encouraged to deal with the above when they meet with the directress for a conference. A basic biology project that they can do with their child is to plant a bulb, read a story about that particular flower, and then watch the flower emerge and blossom.

The directress herself need only know the basics of biology. The interest and awareness of the infinite nature of life and her enthusiasm are her most important qualities.

The outdoor environment of the Montessori class must be accessible to the children so they have the opportunity to work there when they have the urge. Of course this means that the outdoor area must also be safe so the child won't go wandering off.

At least half of the outdoor area should be left in its natural or "wild" state so the children can observe the flora and fauna which occur naturally.

The cultivated area should contain plant specimens which the directress has specifically chosen for what biological phenomena they can teach the children. The idea is to lead the children to classification. The outdoor material is related to card and book material back indoors so the real can be related to they symbolic.

Outdoors there ought to be pathways for the children to use to pass through it. They need to be wide enough to accomodate the child and his implements for working and studying. Any plant beds need to be narrow enough for a child to work on easily. He needs to be able to reach into the center without falling over or stepping on plants on the outer edge. Of course plants' growth chatacteristics need to be considered in the planning also. Many narrow beds will be more practical than one big one.

Maintenance of the outdoor enviornment must be provided for. All the tools and implements have a place. Show the children how to keep the tools clean so they remain in working condition. This The child should be able to witness the whole activity of plant life from the cultivation of the soil, planting seeds and/or bulbs, maintaining the plants as they grow (weeding, watering, trimming off dead parts, harvesting fruits, and again turning over the soil). Some of these plants will be annuals, some perennials.

Maintenance of animal life is also provided for. The yard can contain a bird feeder, bird bath, nuts for squirrells, caged animals, etc.

Plant and animal life is included in the indoor environment as well. Again they are chosen for what they can teach the children and should lead them to classification (different root structures, stem composition, leaves and combinations, flowers, water and light requirements)

Indoor animal life can lead to classification of vertebrates, such as mammals, birds, fish, amphibian and reptiles.

RULES FOR ANIMALS IN CLASS:

- 1) the directress should be able to look after them herself
- 2) in a new class the animals are added in gradually so neither the animal or child is overwhelmed (or teacher!)
- 3) the number of animals depends on what the class, school, etc. can give to them. (idea - rent an animal)

The indoor biology environment should contain a nature table or shelf. Its purpose is to show specimens and experiments to enable the directress to focus the children's attention on a certain specimen or trait. The language is given when the child asks for it. The table is left set up for the children to explore it sensorially at their convenience.

The items on the nature table should be linked up to other areas in the classroom.

When the exhibit is changed teach the children how to arrange things on the table after it is cleared and washed.

Practical life exercises include care of the indoor and outdoor environment. At first the teacher does all the work to show the exact technique and sequence while the children observe. Then the children are able to carry out some of the tasks, but the teacher remains there for guidance. The teacher then can remove herself but is available if needed. Eventually the children can do the activities on their own with the teacher aware but uninvolved.

The purpose of these activities is control of movement, order, sequence, adaptation, independence, and integration.

Such activities to have the children carry out are watering plants, repotting, cleaning garden tools, flower arranging, and care and maintenance of the nature table.

In the sensorial aspect of biology a particular characteristic is isolated and the child is given keys to the environment.

Through the biology cabinet the child can be led to the real plant. The color tablets help the child to know that everything has a color and shading. The tasting and smelling bottles relate to tasting herbs and smelling them and flowers. Sound boxes relate to animal sounds. Geometrical shapes occur everywhere in nature and these are learned from the geometric cabinet. Lightness of touch applies to the handling of both animal and plant life. The progressive exercises help in the classification and distinction of nuts and seeds.

In the language we move from the general to the specific. If the child is interested he will cue you as to what to teach. There are card materials for both readers and non-readers.

Part of the language training is in stories, poems, songs, and pictures on the wall. When doing a story of an animal, have a real or stuffed one there. Show on the map where it is from. Tell the children of its habits and food, integrating as many aspects of the class as you can. Relate the animals limbs to the children's. They want to know the basic needs of the animal.

Handwork is used as an extension of the child's work and exploration of the environment. Flowers can be pressed and then used on cards when laminated. Models can be made of animals. Animal footprints can be made into a mold using plaster of paris. When drawing animals refer to geometrical shapes to simplify their forms.

PROJECT: PLANTING A LIMA BEAN

- 1 - show outer covering and name it
- 2 - peel it into 2 parts and name them; show embryo's root and stem
- 3 - roll up a paper towel and fit it into a jar
- 4 - pour in water 1/3 of the way up and get whole towel wet
- 5 - fit a few seeds near the top between the glass and towel so the children can watch them sprout

- 6- assign the task of watering; record date and draw a picture of the bean's progress
- 7- make a booklet (loose leaf pages - 1 for each day) of the drawings and put them in sequence; make a cover, bind it and title it

ANIMAL ODDBALLS

In each group, circle the one animal that does not belong with the others.

1



Duck



Heron



Eagle



Dragonfly

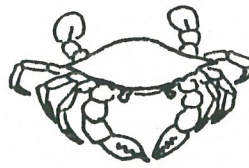
2



Oyster



Snail

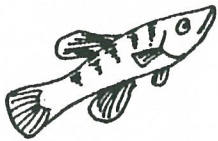


Crab

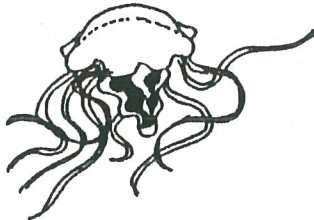


Clam

3



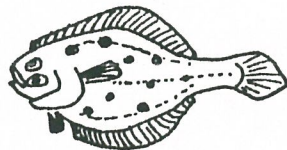
Minnow



Jellyfish



Bass

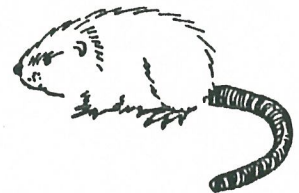


Flounder

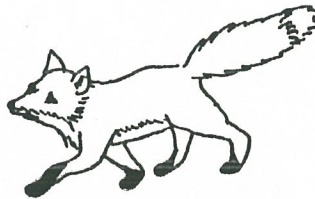
4



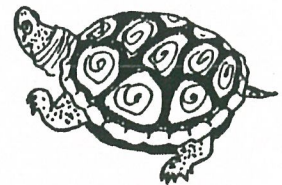
Deer



Muskrat



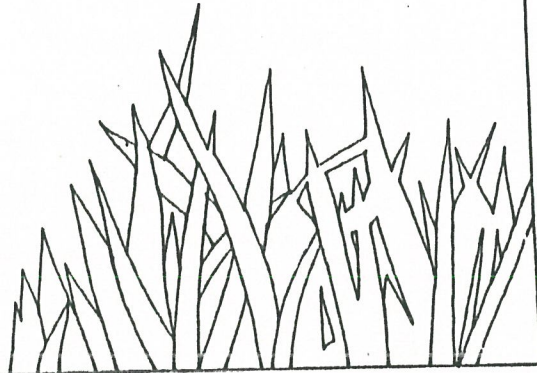
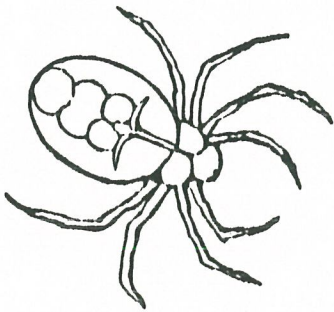
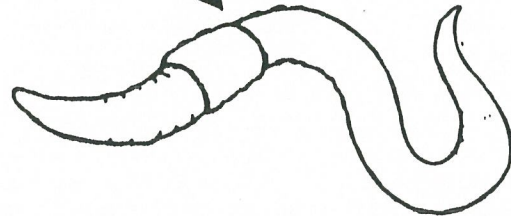
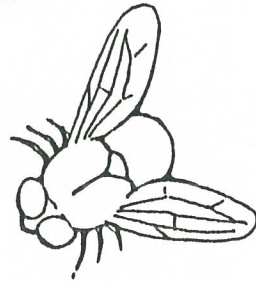
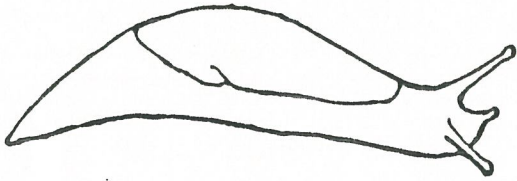
Fox



Terrapin (turtle)

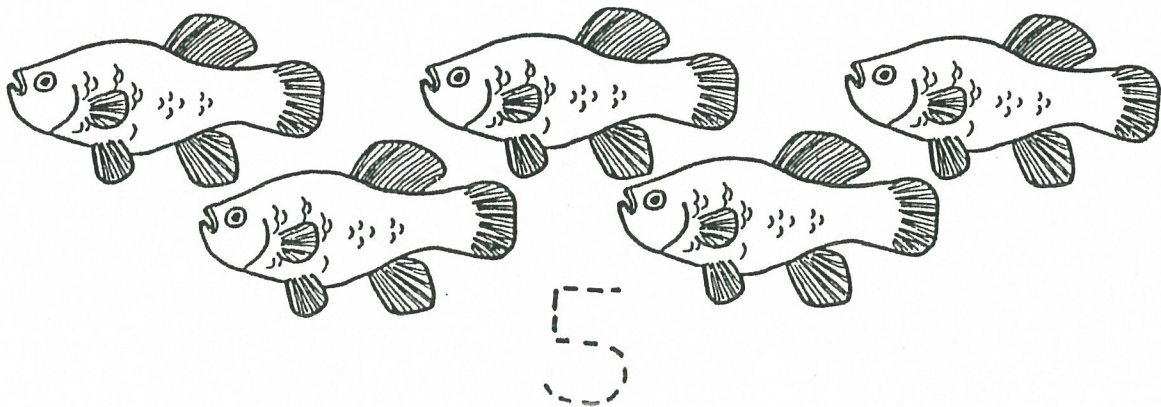
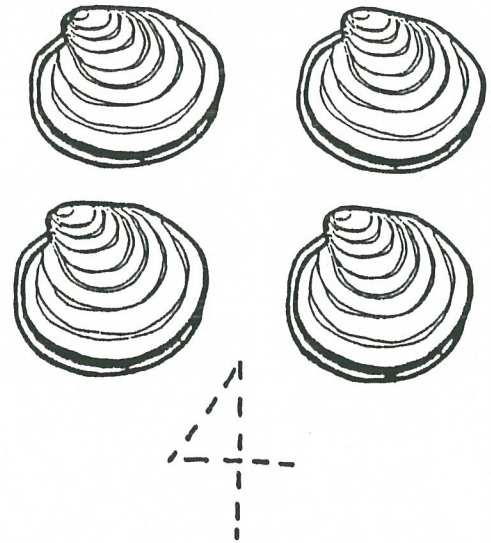
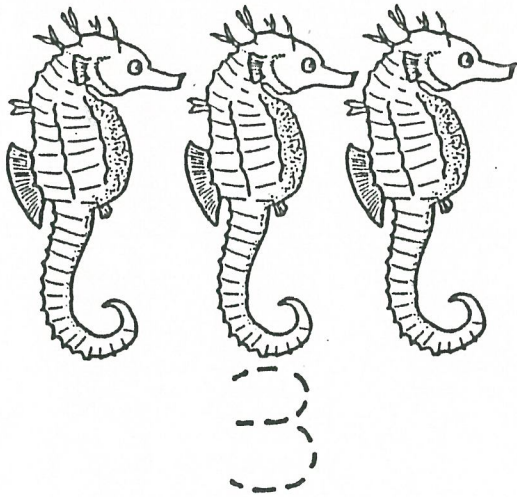
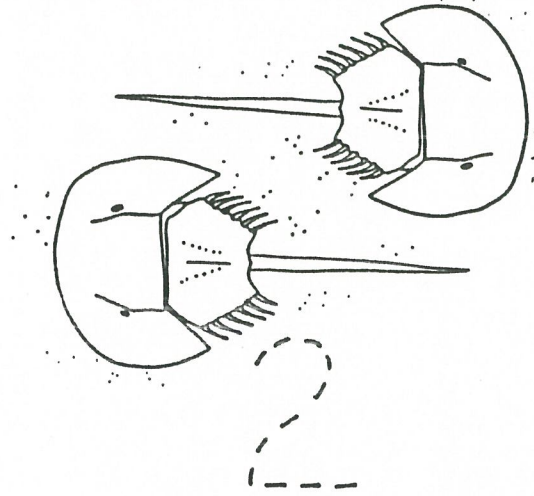
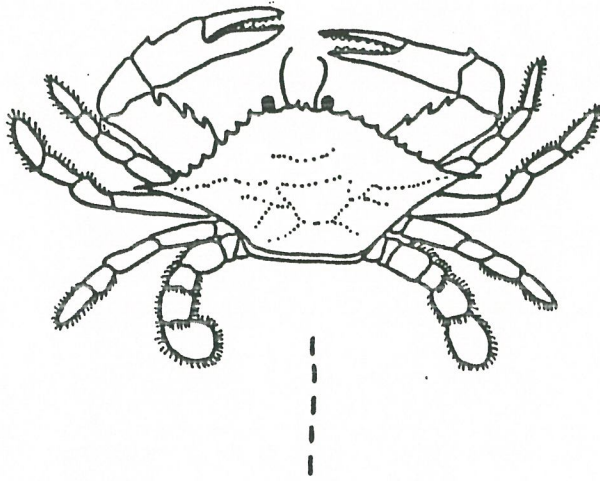
Answers: 1) The dragonfly is the only one that is not a bird; it is an insect. 2) All of these animals have shells, but the crab is the only one with [jointed or bendable] legs. 3) The jellyfish is not really a fish at all! It has none of the features of a fish -- bones, fins, scales, etc. The other three are true fish. 4) The deer, muskrat, and fox are all furry mammals. The terrappin is a reptile.

Join up these animals with their food



Counting Critters

Here are some animals of the Chesapeake Bay. Can you name them? How many animals can you count in each group? Trace the numbers below the animals. Then color the pictures!



This activity was adapted from a booklet of activities developed by Britt Eckhardt Slattery for the National Aquarium in Baltimore.



My Favorite Garden Workers

By
Sharon Lovejoy

Let me introduce you to some of my favorite garden workers. I call them my "Girls." My girls are incredibly strong; they are able to move rocks and twigs 60 times heavier than their own body weight. Can you imagine trying to pick up something that weighs over 3,000 pounds (about the weight of a car)? That is what my garden working girls do. Who are they? They are plump, shiny, red earthworms.

My girls are a little slick or slimy...touch one gently. They are slick because they have great kidneys that pump fluids out through pores located all along their bodies. The fluid or slime they pump out is a great lubricant which helps them slide through soil. Worms crawl by lengthening and contracting their way through earth and using two kinds of muscles, circular and longitudinal. As they do these contractions they open their mouths and virtually swallow everything in front of them. They eat their own body weight in garden debris daily, pass it through their digestive system and poop out great fertilizer (called castings).

As worms work their way through the soil they also loosen it and provide aeration. Loose soil makes it easier for young plants to root and loose, light soil hold lots more water.

Look closely at a worm's sleek body. See all of the rings...these are called annuli. Now, use a magnifying glass and look at all of the setae (bristles) along the worm. These bristles keep the worms from slipping and sliding as they work their way through the soil.

When you look at a worm, you are looking at a pair of tubes...one inside the other. The inner tube is where all of the worm's digestion takes place. The outer tube is simply the worm's skin. Worms breathe through their skin...that is why you cannot get worms too wet. They will drown!

Look for eyes and ears...can you find any? No, but did you notice how they responded and reacted to light, touch or sound. They are very sensitive to the vibrations that sound produces.

Do worms have brains? Yes, but they are tiny and useless. Actually, the worms would still go on being worms even if they didn't have their brains.

Do earthworms have hearts? Yes, they have 5 hearts!

Can you cut a worm into pieces and make it grow new worms? Worms can grow a new tail, but cut off tails will not grow a new head.

FRIENDLY GARDENING

By

Sharon Lovejoy

If the word gardening conjures up images of endless days of weeding, spraying for aphids, poisoning pests, baiting for slugs and battling nature it is time for you to change that image. If that is how YOU feel about gardens you will transfer that to your children and the children in your classroom. Think of gardening as the most earth friendly and positive thing you can do for the world. Think of gardening as the classroom of life, the teacher of the whole process of life and death, the teacher of respect for life and the the teacher of responsibility and consequences. Think of your garden as a haven for you, for the children and for all of the critters that fly or walk in for a visit.

In order to provide a haven for birds, butterflies, bugs, bats and bees you will need shelter from the wind (provided by walls, fences, hedgerows, trees), a variety of habitats, ground covers to mid-range shrubs, vines(these are very important for nesting birds, caterpillars and bats),trees, water, (dripping fountains attract myriads of wildlife), birdbaths and a pond...even a tiny one is magical.

Plants for the critters:

Hummingbirds and butterflies love all of the salvias. Plant Mexican or leucantha, Greggii, elegans (commonly known as pineapple and important because in mild climates it flowers from October to April, a time when hummers need nectar) spathaceas (called hummingbird sage), abutilon, buddleia, cape honeysuckle, zauschneria (California native fuchsia), Fuchsia sp., Bee balm (monarda), native columbine, heuchera (coral bells), hound's tongue, pink flowering currant (*Ribes sanguineum glutinosum*), Grevillea, single hollyhocks, varieties of sunflowers such as Autumn Beauty or Velvet Queen, Penstemon, bottlebrush, butterfly weed (*Asclepias*), Joe-Pye weed, coreopsis, lupines, phlox, sedums, verbenas, Lantana, Veronicas and more. The list is endless, just observe what the hummers and butterflies visit.

Plant berry bearing plants to provide food for thrushes, robins, cedar waxwings, quail and numerous others. I suggest, elderberries, shadblow, serviceberry, Juneberry, black cherry, chokecherry, huckleberries, buckthorns (such as our California coffeeberry), dogwoods, (not the *Cornus kousa*), wild roses, blackberry, cotoneaster, blueberry, crabapples, holly, hawthorn, snowberry and viburnums.

Many plants provide valuable seeds for the birds. When you're thinking of seed sunflowers are probably the first thing to pop into your mind. Yes, sunflower seeds are loved by the birds, but there are many others that are important to smaller species of birds such as goldfinches. Here are some wonderful plants to provide seeds for your visiting friends: Alyssum, amaranth, aster, bachelor's buttons, black-eyed Susan, coreopsis, cosmos, dill, flax, forget-me-nots, impatiens, marigolds (old fashioned

BUILD A BAY BULLETIN BOARD



Students color and cut out "3-D" figures to add life to a Bay backdrop. Grades K-3

Objectives

- visualize some of the components of the Bay ecosystem
- distinguish between some aquatic and land-dwelling plants and animals
- discuss relationships between humans and natural resources.

Materials

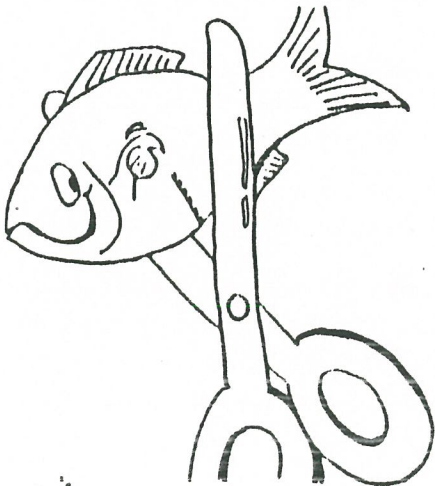
- copies of pages 17-18
- scissors
- glue, paste or clear tape
- crayons
- (rolls of) colored construction paper for bulletin boards.

Subjects

Science, social studies, art.

Skills

Discussion, drawing/crafts, identification, matching.

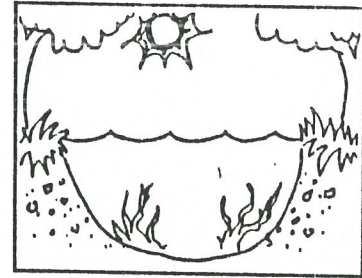


Procedure

1) Prepare a background scene to represent an aquatic setting (the Bay) — see diagram. Include a large area of water with land on both sides or shores. Add some trees to edges of bulletin board, to help students remember that land and water are connected. Be sure to give the Bay a bottom surface, and include some underwater grasses to provide food and cover for the animals.

2) Discuss with students the relationship between land and water.

- How is water different from land?
- Where on land do we find water? Do we ever find land in (on) the water?
- Does water ever make changes in the land (hint: rain)?
- Imagine a land without any water at all. What would it be like? Would plants live there? Would animals live there? Would people live there?
- Make a short list of some kinds of plants and animals that would be found on land near the water; make another list for those found in or on the water (hint: see page 19).



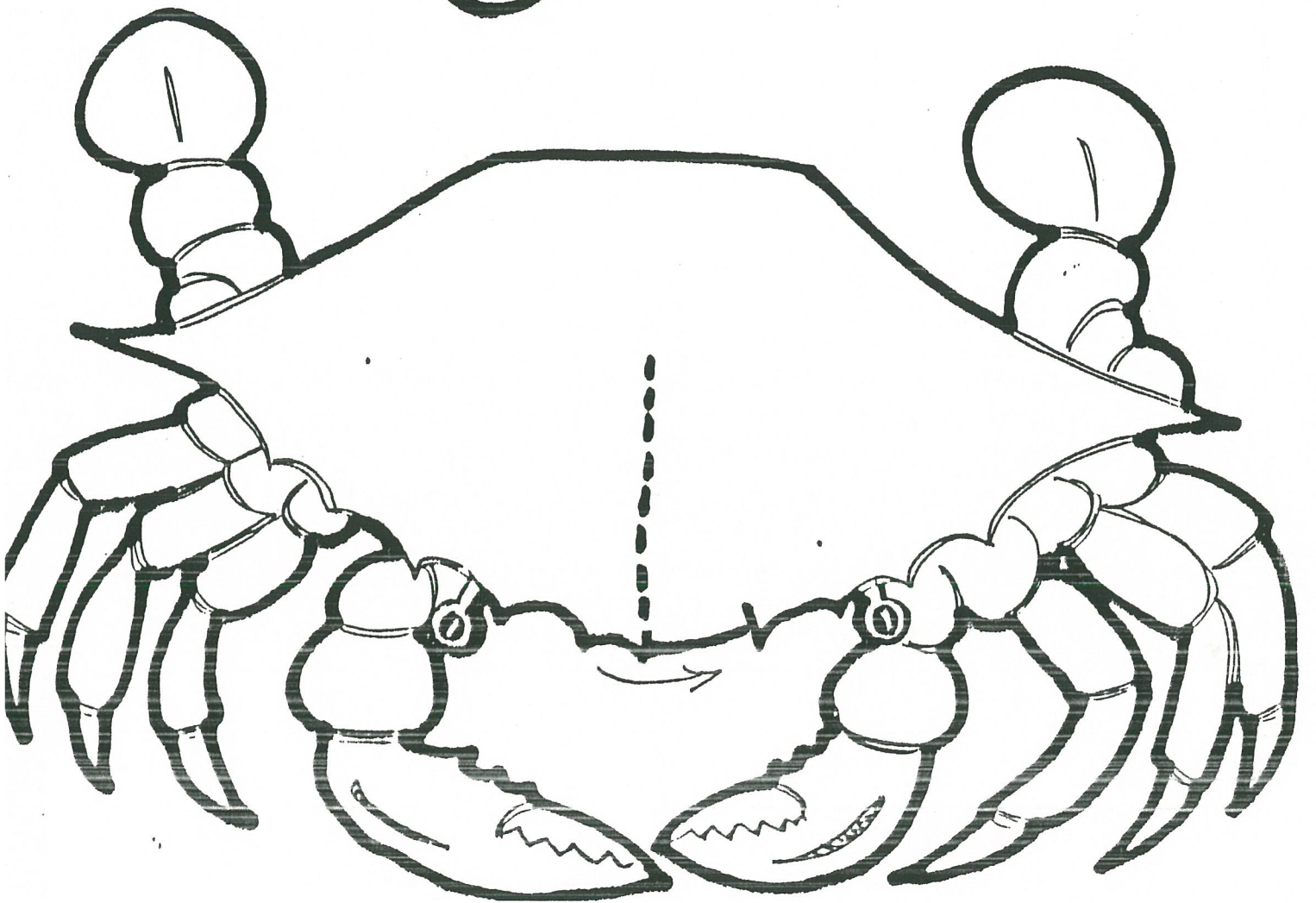
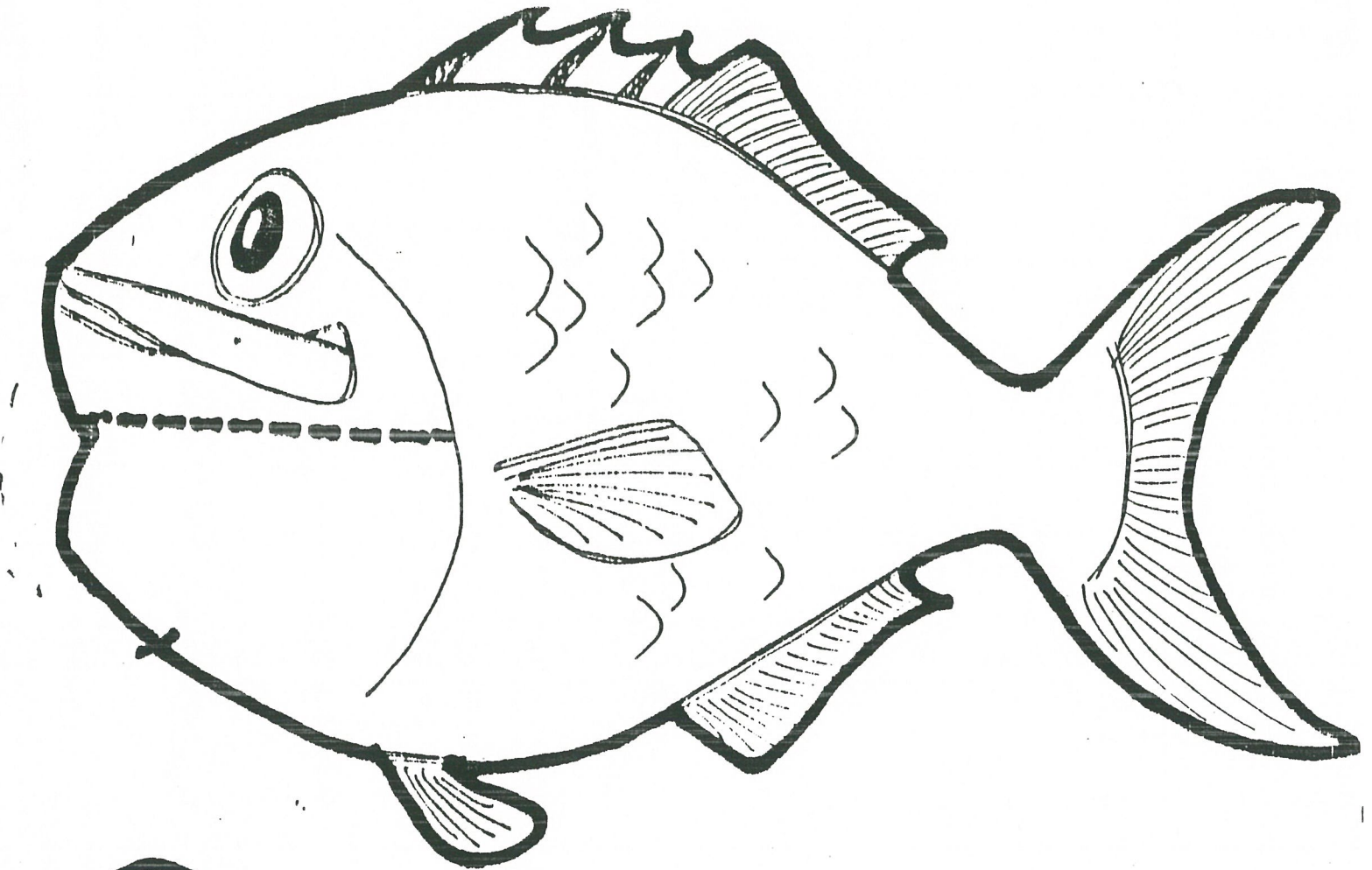
3) Pass out copies of the cutouts provided (one or two per student). Have the students color the figures, then cut them out along the heavy outline. To make the figure stand out, cut a slit along the dotted line and lap the edges over in the direction of the arrow — match the edge of the top piece to the mark on the bottom piece. Fasten in place. When the figures are complete, have the students find spots for them to be attached to the backdrop.

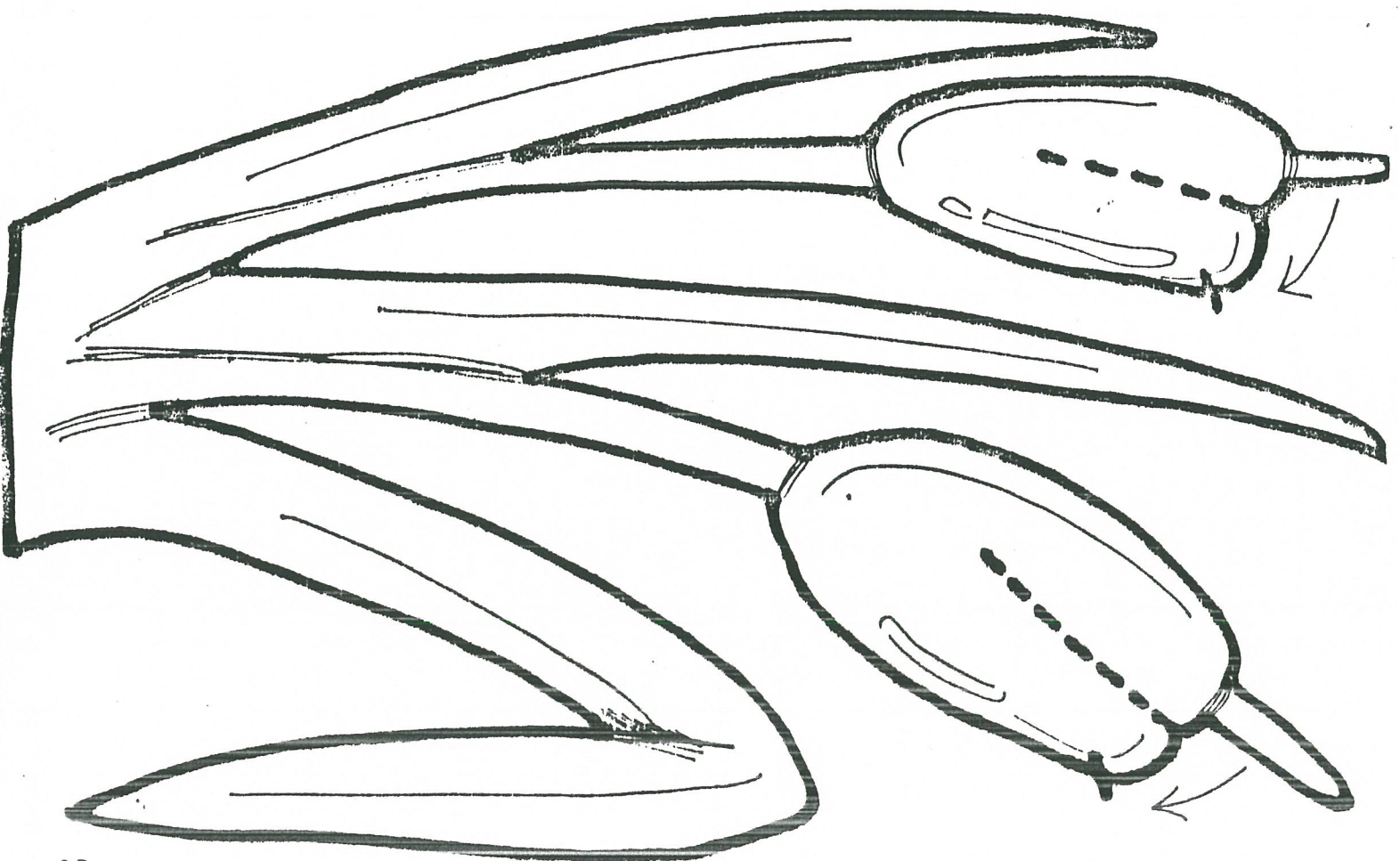
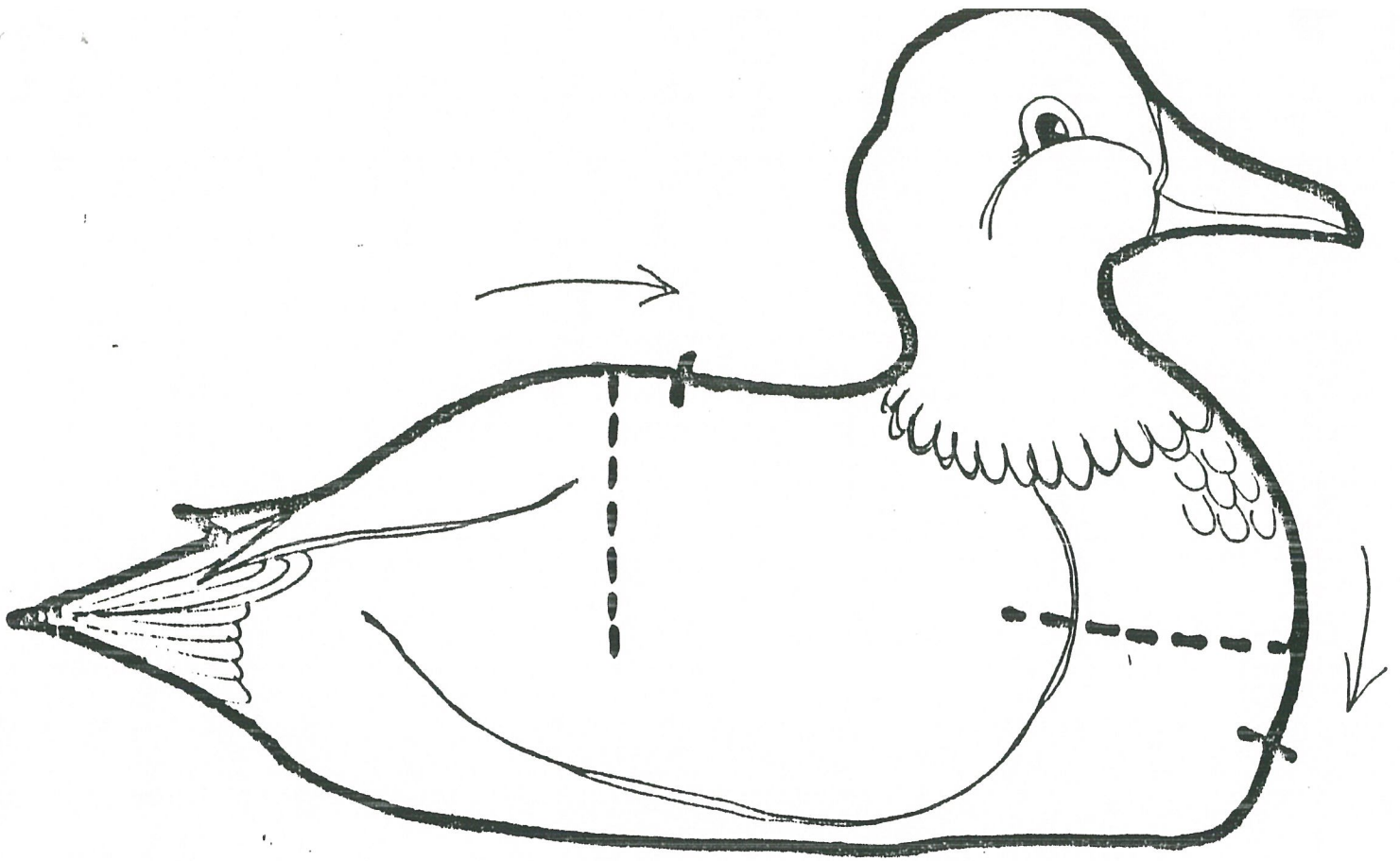
- Where would people fit into this scene? Draw yourself using water (fishing; swimming, boating, drinking, washing, etc.), and label your drawing. Add these drawings to the board.

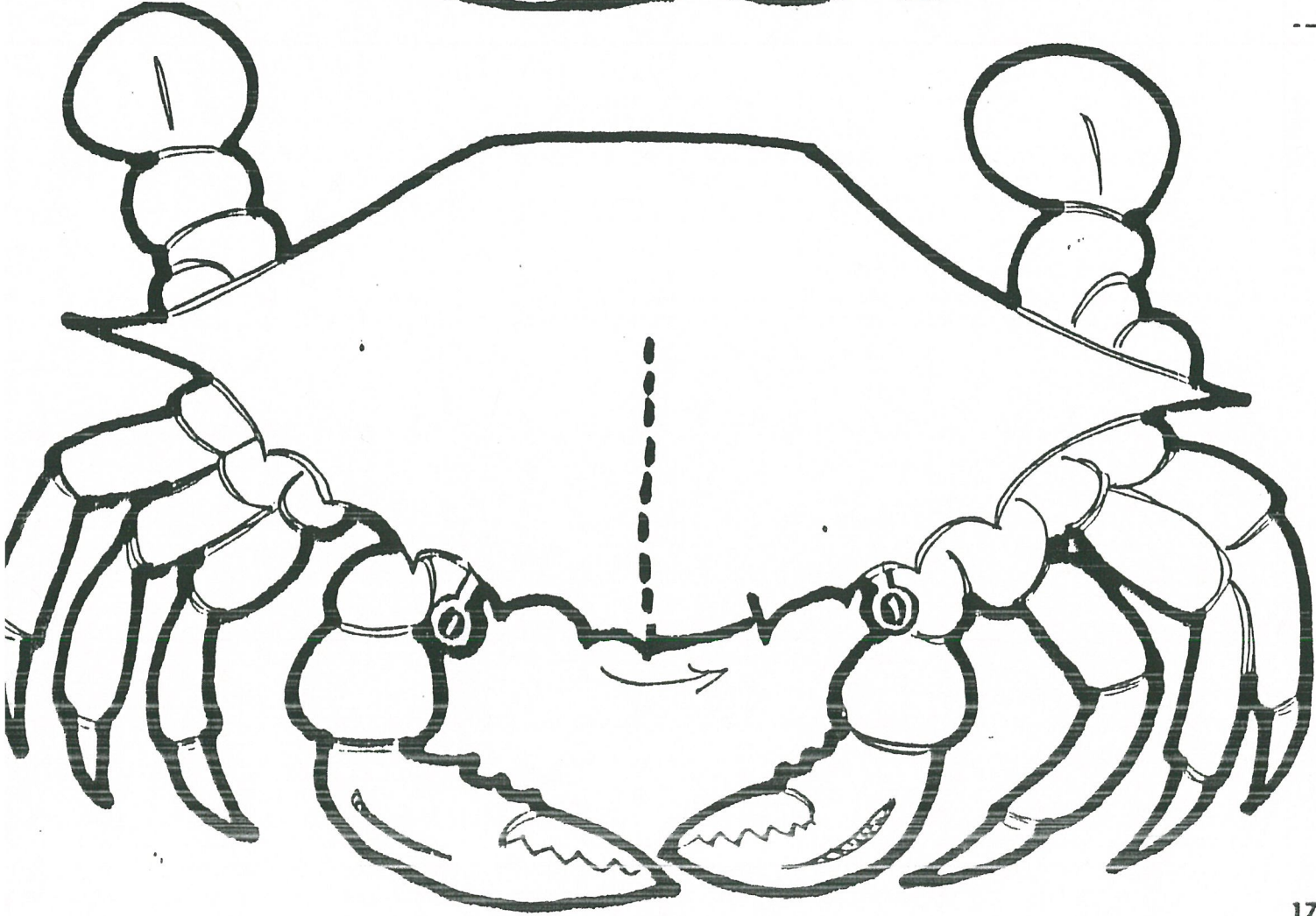
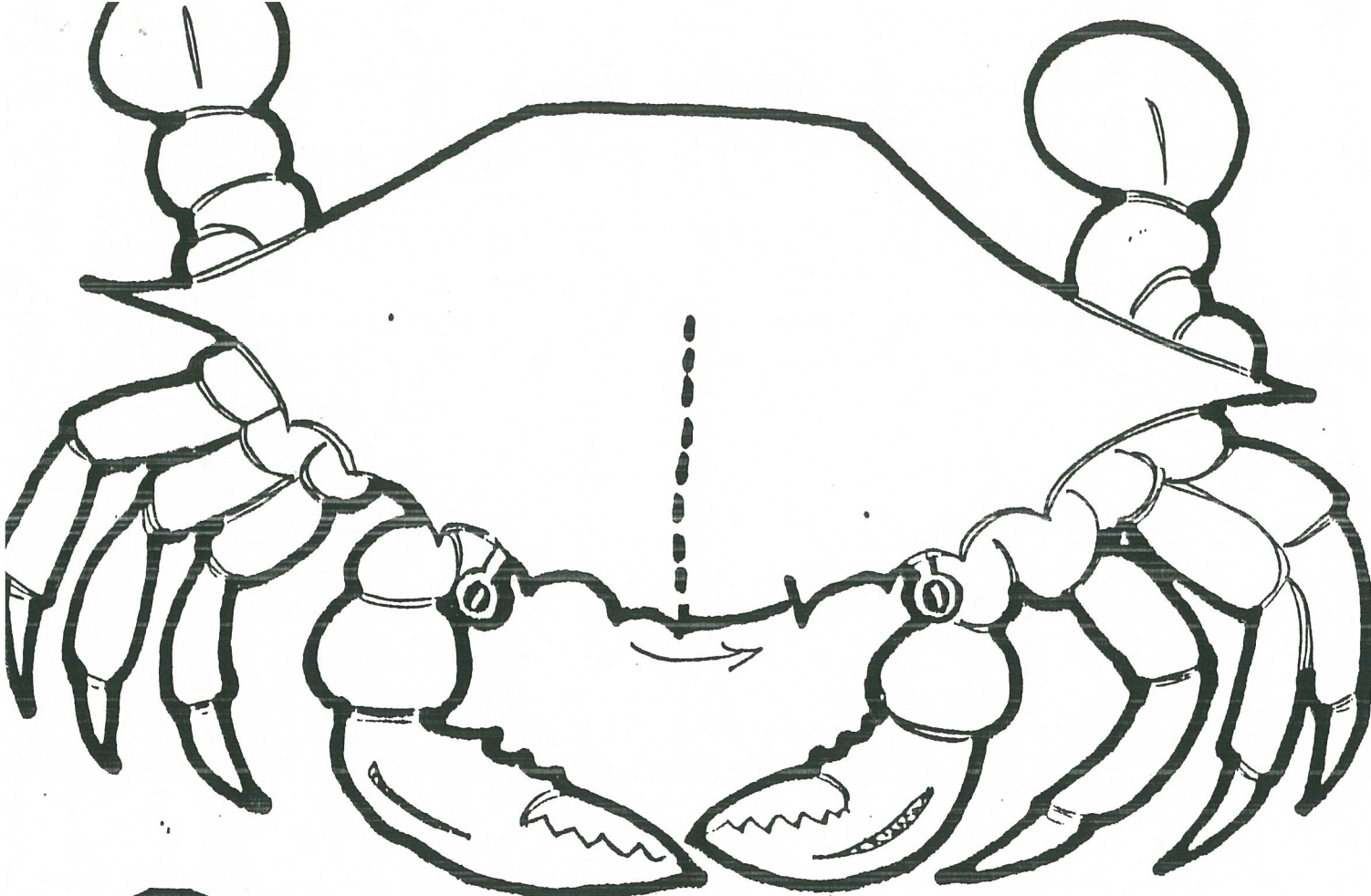
Questions for (advanced) discussion:

• What changes do people often make to land (clear trees to build houses, leave trash, etc.)? Have the class decide which changes are "good" and "bad."

• How might these changes affect animals that live there? — How about plants? Do you think these changes could affect the water? How?







Marsh

wetland

what is in a marsh?

mud

plants

animals

1. how is water different from land?

Do we ever find land on water?
water on land?

2. Does water make changes in the land?

3. What is a land with little or no water?

4. list water animals

list near-the-water animals

5. Ecosystem, trophic levels
Food chain