

# IT'S TOO SALTY!

K-2

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## OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Discuss the shortage of water in parts of the world and locate them on a map;
2. Demonstrate, orally or in writing, the sequence of changing salt water to fresh water using a shoebox TV;
3. List, orally or in writing, reasons why water is important and ways to conserve water; and
4. Give an oral or written definition of the new terms: brackish, desalinization, desert, fresh water, salinity, and salt water.

## BACKGROUND INFORMATION

There are two main types of water on Earth, salt water and fresh water. Salt water contains a high level of dissolved salts (oceans, seas). Fresh water is usually found in the ground and in rivers and lakes. Fresh water does not have a lot of salt and is easily turned into drinking water. Most of the water on Earth is salty. Salt water is 3.5% salt. The salts in the sea are mainly composed of table salt. Sea water also contains magnesium, sulfur, calcium, and smaller amounts of all the elements contained in the Earth's crust. The oceans become salty because rivers flow down the mountainsides and over land, tearing loose tons and tons of minerals. Most of these minerals are different kinds of salts. The rivers carry these salts to the sea. There is usually not enough salt in a river to make the river water taste salty. It is very expensive to turn salt water into fresh water that is good to drink, but it can be done.

### SUBJECTS:

Science, Social Studies,  
Language Arts

### TIME:

1 hour

### MATERIALS:

world map  
chart paper  
salt  
cucumber seeds  
other types of seeds  
pan  
electric skillet or hot plate  
jelly roll pan  
kitchen mitts  
shoe boxes  
straws  
adding machine tape  
eggs  
resource book  
11" x 14" shallow pan  
aluminum foil  
modeling clay  
rock salt  
water

The salinity (saltiness) of sea water is affected by:

1. The rate of evaporation.
2. The amount of rainfall falling into the ocean.
3. The amount of fresh water added by streams and rivers.
4. The amount of salt in solutions in rivers and streams emptying into the ocean.
5. The amount of salt added by underwater volcanoes and vents.
6. The temperature of the ocean water.

With a shortage of fresh water in many areas of the world, such as the Middle East, desalinization has been identified as a solution, but the process is extremely costly.

### Terms

**brackish:** water that is a mixture of fresh and salt water.

**desalinization:** the purification of salt or brackish water by removing the salt.

**desert:** an arid region lacking enough moisture to support vegetation.

**fresh water:** inland water that has a low concentration of minerals, salts, and dissolved solids found as surface water or ground water.

**salinity:** amount of salt dissolved in water.

**salt water:** water that has a high level of dissolved salts (oceans, seas).

## **ADVANCE PREPARATION**

- A. Gather supplies on materials list.
- B. Make a chart with terms.

## **PROCEDURE**

- I. Setting the stage
  - A. Display a map of the world.
    1. Discuss the availability of water.
      - a. Have you ever run out of water?
      - b. Are there places in the world that could run out of water?
      - c. Look at all this water (point to oceans.) Can we drink it?

- d. Can ocean water be changed to make it drinkable?
  2. Show the Middle East on a map. Explain that this region is desert and water is scarce.
- B. Write these words on a chart and discuss briefly:

salinity  
desalinization  
brackish  
desert  
irrigation

- C. Explain that places like Israel depend on desalinization to irrigate crops.

## II. Activities

- A. Cucumbers and salt = ?

1. Plant an equal number of seeds in two small cups of soil. Place the cups in the sun. Water each cup with the same amount of water—one with fresh tap water, the other with salt water (one part salt to 25 parts water). Using a journal, record the results through the week. What did you find out? Use other types of seeds. What happens?

- B. Making Salt Water Fresh

1. Mix 1 part salt to 25 parts water. Is it salty? Taste the water. Put the water in a pan. Heat the water in an electric skillet or over a hot plate. Heat to boiling. Put ice cubes on a jelly roll pan. Using kitchen mitts, hold the pan above the steam, so that the steam condenses on the underside of the pan. Collect the condensed drops in a bowl. Taste the collected water. Is it salty? This process is done commercially in many countries that have an inadequate supply of fresh water. This collected water is called distilled water.

- C. Make a shoebox TV to retell the sequence of changing salt water into fresh water. Create panels on adding machine tape. The first panel is the title. The other panels illustrate the steps of desalinization. (Have the students brainstorm the steps before making the panels.)

## III. Follow-Up

- A. Have students review vocabulary.
- B. Make a list of ways to conserve water.
- C. Make a list of ways water is used at home.
- D. Crack two eggs. Float one egg in fresh tap water and the other in salt water (use a large amount of salt). Record in a journal what happens to the eggs.

#### IV. Extension

- A. Ask the question, “How did the ocean become so salty?” Explain the process using background information. Demonstrate this process with the following experiment.
  1. Form a mountain with aluminum foil in one side of an 11” x 14” shallow pan. (Use clay to cover mountain to give ‘earthy’ effect.) Make a crater in the top of the mountain and a trench down the mountain. Place rock salt (represents minerals and elements found in the Earth in the trench). Pour water slowly into the crater and down the mountain. As water gathers at the bottom of the mountain (ocean) dip it up and pour down the mountain. Students should be able to see how the water (river) melts or dissolves minerals and rocks and passes these salty elements on to the ocean.
- B. Freeze salt water to see what happens.
- C. Research other countries that desalinate their water and determine what methods they use.

## RESOURCES

Allen, Maureen, All About Water, developed in cooperation with Department of Water Resources, California, 1992.

Postel, Sandra, Last Oasis: Facing Water Scarcity, W.W. Norton and Company, New York, 1992.

Vesilind, Priit J., Middle East Water - Critical Resource, National Geographic, Vol. 183, No. 5, May, 1993.

Water Matters: Every Day, Everywhere, Every way, National Geographic Society, 1993.

# SALTY OR FRESH

K-2

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## OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Identify, orally or in writing, fresh water and salt water;
2. Locate fresh and salt water sources on a globe;
3. Name, orally or in writing, common fresh water sources: ponds, lakes, rivers, and springs; and
4. Give an oral or written definition of the new terms: fresh water, groundwater, salt water, and surface water.

### SUBJECT:

Science

### TIME:

45 minutes

### MATERIALS:

blackline masters  
salt  
plastic cups  
toothpicks  
maps  
globe

## BACKGROUND INFORMATION

The majority of the Earth's surface is covered with water. About 97% of this water is salt water. Polar ice caps, glaciers, icebergs, groundwater, and surface water sources provide the remaining 3% of fresh water.

### Terms

**fresh water:** inland water that has a low concentration of minerals, salts, and dissolved solids found as surface water or groundwater.

**groundwater:** water that infiltrates the Earth and is stored in usable amounts in the soil and rock below the Earth's surface; water within the zone of saturation.

**salt water:** water that has a high level of dissolved salts (oceans, seas).

**surface water:** precipitation that does not soak into the ground or return to the atmosphere by evaporation or transpiration, and is stored in streams, lakes, wetlands, reservoirs, and oceans.

## ADVANCE PREPARATION

- A. Copy blackline masters.

- B. Display or duplicate local and state maps.
- C. Collect salt, cups, and toothpicks for the experiment.
- D. Prepare and label solutions for each classroom group.

Cup A - Fill with fresh water

Cup B - Fill with fresh water + three tablespoons of salt

## PROCEDURE

### I. Setting the stage

- A. Have the students examine a map or globe looking for bodies of water.
- B. Make a word web listing different types of water sources they find. See if the students can add any other water sources they could not see on the map or globe.
- C. Explain that some of these water sources are salt water and some are fresh water. Help students further divide the web to identify which sources are fresh and which are salty.
- D. Discuss which sources would be used for drinking water and why.

### II. Activities

- A. Divide the students into small groups. Give each group a set of water solution cups and toothpicks for taste testing.
- B. Have the students use their senses to make observations about what is in each cup.
- C. Have students label the evaluation sheet indicating which cup contains fresh and which contains salt water (blackline master).

### III. Follow-Up

- A. Worksheet - See blackline master. Have students label the type of water found in the illustrations.
- B. Sing the song:

#### **Water Sources**

(Tune: Go Tell Aunt Rhody)

What are water sources  
What are water sources  
What are water sources  
Where can water be found?

Streams and rivers  
Streams and rivers  
Streams and rivers  
Flow within our state.

Water flows underground  
Water flows underground  
Water flows underground  
And bubbles up as a spring.

Bays and oceans  
Bays and oceans  
Bays and oceans  
Are salty as can be.

Small ponds and big lakes  
Small ponds and big lakes  
Small ponds and big lakes  
Act as reservoirs.

These are water sources  
These are water sources  
These are water sources  
And where they can be found.

#### IV. Extensions

- A. Investigate a local water source and have students identify what kind of water it contains.
- B. Have the students examine a globe comparing the amount of land and water.
- C. Have students further examine the fresh and salt water sources. Have students list the names of as many salt and fresh water sources as possible. This is a good timed activity for students. (Approximately 5-10 minutes.)
- D. Read Getting the Water We Need to extend the students understanding of our need for water and how we use our water sources.

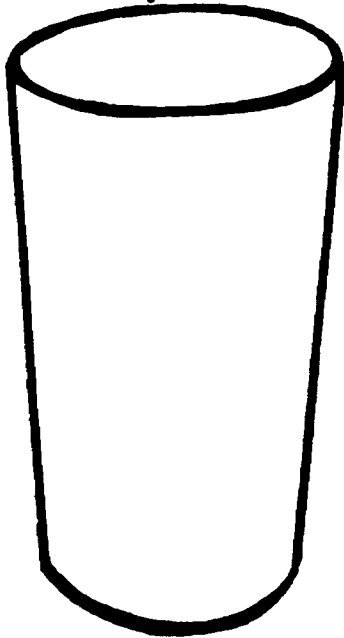
## RESOURCES

Biddulph, Fred and Biddulph, Jeanne, Getting the Water We Need, The Wright Group, 1995.

Official Water Watcher Resource Manual, Southwest Florida Water Management District, 2379 Broad Street, Brooksville, FL, 34609-6899. 352/796-7211.

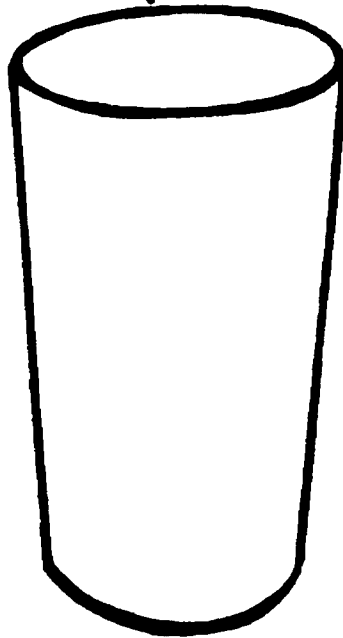
# Fresh or Salty

Cup A



Cup A contains  
\_\_\_\_\_ water

Cup B

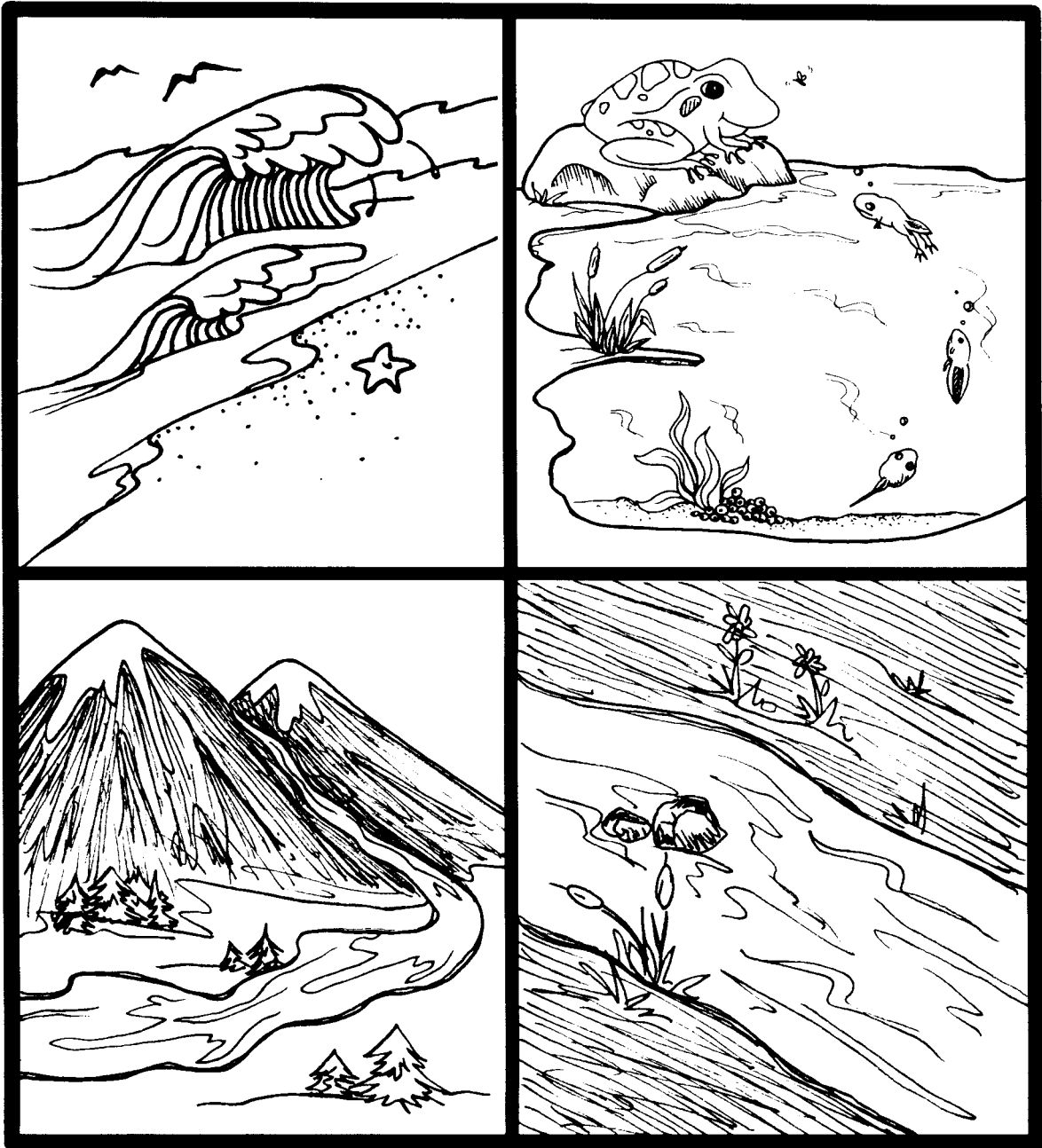


Cup B contains  
\_\_\_\_\_ water



Directions: Label the type of water found in each of the pictures below.

Word Bank: fresh water  
salty water





# WHAT IS A WETLAND?

K-2

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## OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Describe, orally or in writing, the characteristics of wetlands.
2. Identify, orally or in writing, some plants and animals that live in a wetland area; and
3. Give an oral or written definition of the new terms: brackish, habitat, tide, and wetland.

## BACKGROUND INFORMATION

Wetlands are transitional areas where land and water connect. There are different types of wetlands. Some are full of salt water from the oceans. In some coastal areas, the water is fed by fresh and salt water. This makes the water brackish. Most coastal waters are affected by tides. Inland, the wetlands are fed by fresh waters. The plants and animals that live in a particular wetland are suited to a particular habitat. An important factor for survival is dependent on how much water is available during the seasons of the year.

### Terms

**brackish:** water that is a mixture of fresh and salt water.

**habitat:** the place or type of site where a plant or animal naturally or normally lives and grows.

**tides:** the alternate rising and falling of the ocean's surface which occurs twice in each lunar day (24 hours).

**wetland:** areas that periodically have waterlogged soils or are covered with a shallow layer of water resulting in reduced soil conditions; wetland areas typically support plant life that are adapted to life in wet environments.

### **SUBJECT:**

Science

### **TIME:**

1 hour or 2 30-minute sessions

### **MATERIALS:**

pictures of wetlands  
books for reference  
aluminum pan  
clay  
florist foam  
cotton swabs  
pine needles  
twigs  
pebbles  
drawing paper  
toothpicks  
crayons  
glue

## ADVANCE PREPARATION

- A. Gather pictures depicting various wetlands.
- B. Copy the word search puzzle.
- C. Make a model of a wetland to display for students to base their models on.

## PROCEDURE

### I. Setting the stage

- A. Explain what a wetland is and describe some of the different types of wetlands.
- B. Show pictures of several different types of wetlands and make a list of names.
- C. Explain that one of the most common types is the fresh water marsh.
- D. Have students think of plants and animals that might live there.
- E. Go on a scavenger hunt to gather pine needles, twigs, pebbles, moss, and weeds.

### II. Activities

- A. Make a model of a fresh water wetland.
  - 1. Put clay sloping into an aluminum pan.
  - 2. Use florist foam as the buffer.
  - 3. Add water.
  - 4. Have students illustrate animals of the fresh water wetlands; color, cut out, glue to toothpicks, and place in the marsh model. Use cotton swabs as cattails, pine needles to represent reeds, twigs for trees, and scatter pebbles around the model.
- B. Provide students with the word search puzzle.

### III. Follow-Up

- A. Review the definition of a wetland and its characteristics.
- B. Display models in the classroom.

#### IV. Extension

- A. Provide reference books and have students make other models based on other types of wetlands, such as salt water marsh, fresh water swamp, mangrove swamp, or a bog.

### RESOURCES

Wading into Wetlands, Nature Scope, Vol 2, No. 5, National Wildlife Federation, Washington, D.C., 1986.

Young Scientist's Introduction to Wetlands, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

# Word Search:

## What is a Wetland?

### Word List:

marsh	lake
swamp	pond
bog	tide
river	coastal
stream	wetland

W T S W A M P A C B  
E D I T D E O G F O  
V H I V R W N U C G  
W K X J S E D L O T  
R F M Y R T A U A X  
E P T L Q L R M S Q  
V W I A Z A X A T E  
I Q G K H N D R A Y  
R T Z E Y D R S L B  
T S Z N O A P H C Z

# EXPLORING WETLANDS

K-2

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## OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Tell what they observed after visiting a wetland site;
2. Identify, orally or in writing, insects, animals, and plants observed at the wetland site;
3. Record, orally or in writing, information obtained through the observation of a wetland site;
4. Give an oral or written definition of wetland.

## BACKGROUND INFORMATION

Wetlands are transitional areas where land and water connect. Wetlands, for many years, were filled, drained, polluted, and channeled until their importance was recognized. They are a valuable habitat for waterfowl, various kinds of wildlife, fish, and shellfish. Wetlands are also used for recreation, erosion control, and water quality control. There are numerous places to look for wetlands:

- edges of ponds and streams
- low spots in a field or woods that hold water for a week or more
- drainage ditches that are frequently filled with water
- places with wetland plants such as cattails or the feathery-looking reeds called “phragmites”

### Term

**wetland:** areas that periodically have waterlogged soils or are covered with a shallow layer of water resulting in reduced soil conditions; wetland areas typically support plant life that are adapted to life in wet environments.

### **SUBJECTS:**

Science, Language Arts

### **TIME:**

varies according to the time teacher would like to spend

### **MATERIALS:**

assorted books related to wetlands  
reference books for identification of plants, animals, and insects  
jar or small fish tank  
rocks and gravel  
pond weeds  
milk carton  
plastic wrap  
rubber band  
small fish net

## ADVANCE PREPARATION

- A. Gather materials to make a “pond in a jar” and an underwater viewer.
- B. Locate books to place in the classroom for information and research.

## PROCEDURE

### I. Setting the stage

#### A. Ask the students the following questions:

1. What is a wetland?
2. How many of you have ever been to a wetland?
3. What did you see there? Make a list on the board or chart.
4. We are going to explore a wetland. Give the students a list of the things they will need to bring. Make an underwater viewer to take. Bring a net to collect samples. (See activities section.)

\*When exploring a wetland area, dress in old clothes and shoes/boots. Use an insect repellent. Never go alone.

- B. At the wetland, scoop up a handful of mud. What does it feel like? How does it smell? Look for signs of animals, like tracks, nests, and resting places. With a viewer look for fish, aquatic insects, eggs, and living things on the bottom.

### II. Activities

#### A. Pond in a Jar

1. Put rocks, gravel, and pond weeds in a jar or fish tank.
2. Fill it with pond water and let it sit for a day.
3. Add collected animals and plants and keep the container in a bright, but not sunny, window. Small fish, fiddler crabs, aquatic insects, or grass shrimp are the hardiest of specimens, but remember to return collected water to where it was found in a few days.
4. Watch animals to see how they behave. Look for little specks moving around the surface of the water. Use an insect book for identification.

#### B. Underwater Viewer

1. Cut out the top and bottom of a milk carton or coffee can.



2. Stretch clear plastic over the bottom and use a rubber band to hold the wrap.
3. The viewer will allow you to look into the water without getting your face wet.

### III. Follow-Up

- A. Make a bulletin board to show Pond in a Jar life.
- B. Write a big book about their day exploring a wetland.

### IV. Extensions

- A. Share journal entries.
- B. Make posters showing what animals or insects were observed and information found about them.

## RESOURCE

Assignment EARTH...What is a Wetland, Outdoor Delaware, Mississippi-Alabama Sea Grant Consortium, Ocean Springs, MI.



# SPONGY WETLANDS

K-2

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## OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Sort things that absorb and things that do not absorb;
2. Predict, orally or in writing, what will happen to houses with or without wetlands;
3. Build a wetland area in a meat tray to show how wetlands absorb water; and
4. Give an oral or written definition of flood plain and wetlands.

### SUBJECTS:

Science, Math, Language Arts

### TIME:

30 minutes

### MATERIALS:

11"x15" tray or lid  
2 cups of water  
blue construction paper  
Monopoly game houses  
10 sponges  
meat trays for each student  
glue and tape  
markers  
scissors

## BACKGROUND INFORMATION

Wetlands are vital in flood control and water storage, and they help to recharge the water table. Wetland areas spread out water over large sections of land, slowing its flow. The heavy, spongy vegetation absorbs water to help control any overflow providing a place for storage of excess water. Some of the water seeps far beneath the Earth's surface to become vital groundwater.

This lesson will show what happens when people build their homes in wetland areas or close to rivers and how the wetlands, like sponges, help to absorb water and control flooding.

### Term

**flood plain:** relatively flat area on either side of a river or stream that may be under water during a flood.

## ADVANCE PREPARATION

- A. Cut two 4" x 15" strips of blue construction paper. Prepare 11" x 15" tray with a strip of blue construction paper in the middle and Monopoly game houses along the sides. Place 2 cups of same amount of water near the tray.
- B. Collect enough meat trays from the grocer for each student.

- C. Cut enough sponges in small strips for the students to place in their wetland meat trays. Have materials ready for the wetland meat trays.

## PROCEDURE

### I. Setting the stage

- A. Spill a small amount of water on a table. Discuss suggestions on how to clean up the spill using paper towels, sponges, and clothes. Discuss why we use these items to clean up spills. Discuss the word absorb. Look around the room for things that absorb and things that do not. Place things that absorb in a tub and things that do not in a different tub. Ask the students to compare the items and decide why some things absorb the spill and others do not.

### II. Activities

- A. Using a plastic rectangular tray or lid about 11" x 15", display some houses from the Monopoly game along the 15" sides of the tray. Cut a 4" x 15" strip of blue construction paper and place it in the middle of the tray. Ask the students what they think will happen to the houses if water is poured on the blue paper. Slowly pour one cup of water on the blue construction paper and discuss how the homes get wet because the water has no place to go. Take everything out of the tray and dry it off. (See attached illustration.)
- B. Place a dry piece of blue paper in the center and the same houses along the sides. Now place small sponges along the sides of the blue paper. Ask the students from what they already know what they think will happen now when the water is poured on the blue paper. Pour slowly another cup of water on the blue paper. Discuss the results. Relate this experiment to the wetlands. The wetland areas near rivers, streams, and oceans also absorb the water because of their sponge vegetation. If we remove the wetland areas to build homes, farms, or hotels, the excess water has no other place to go causing floods in these areas.

### III. Follow-Up

- A. Have students build their own wetland areas using meat trays from the grocer. Provide meat trays, sponges, construction paper, glue, tape, and markers. Encourage the students to place in their wetlands animals and plants that live there. They can make houses, farms, or hotels by drawing them, then cutting them out leaving a strip at the bottom to tape or glue to the meat tray. If they are folded they will stand up and make a 3-D effect. Display the wetlands on a table and have the students to dictate a short description of how wetlands help us.

### IV. Extension

- A. Let students experiment with growing different types of grass on a sponge. Place the wet sponge on a tray. Sprinkle small amounts of grass seed on top of the sponge and leave it in or near a window. Everyday the students will have to make sure the sponge is kept wet. The students may observe as the seeds begin to sprout and grow. Students may record

the growth of their grass and compare growth with other types of seed. Explain that the sponge must stay wet or the grass will not grow. (The grass will not continue to grow because it cannot obtain the proper nutrients from the sponge to continue its growth cycle.) Explain that plants in wetland areas are plants that need the extra moisture in order to survive.

## **RESOURCES**

Cortesi, Wendy W., Explore a Spooky Swamp, National Geographic Society, Washington, D.C., 1978.

Dobrin, Arnold, Marshes and Marsh Life, Coward-McCann, New York, 1969.

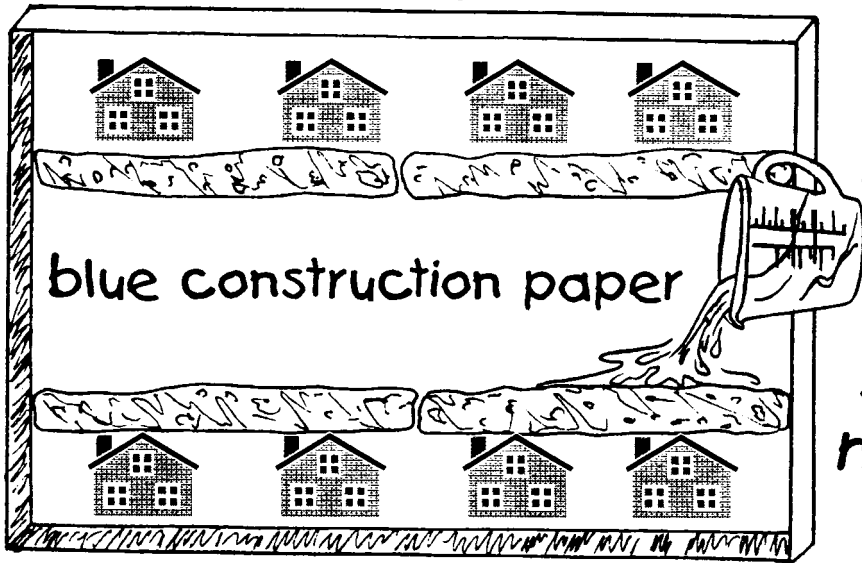
Facklam, Margery, And Then There Was One, The Mysteries of Extinction, Sierra Club Books/Little, Brown and Company, San Francisco, 1990.

Greenway, Shirley, Animal Homes, Water, Newington Press, Connecticut, 1990.

Hoff, Mary and Rodgers, Mary M., Our Endangered Planet Rivers and Lakes, Lerner Publications Company, Minneapolis, 1991.

Liptak, Karen, Saving Our Wetlands and Their Wildlife, Franklin Watts, New York, 1991.

# Tray



sponges  
cup of  
water  
sponges  
monopoly  
game  
houses

# WHO NEEDS WETLANDS?

K-2

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## OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Name, orally or in writing, reasons to protect and save the wetlands;
2. Demonstrate, orally or in writing, a public awareness of the problems associated with the wetlands; and
3. Give an oral or written definition of the new terms: ecosystem and reclamation.

## BACKGROUND INFORMATION

Scientists are busy working to find out about the function and value of the wetlands. They have found that wetlands help control flooding, filter pollutants, and lessen the erosion of soil. Wetlands are breeding grounds for many birds and water animals, some of which are endangered species. The wetlands also provide a quiet area for recreation such as fishing, boating, hunting, bird watching, and exploring.

At one time, the wet, soggy lands were considered useless. They became dumping grounds. In the name of progress, land conversion was begun by draining, filling, dredging for farmland use, and building highways and shipping channels.

We now know that the wetlands are a complex ecosystem where the existence of water, animals, and plants are interdependent.

### Terms

**ecosystem:** the relationship between all the parts (living and non-living) within an environmental community.

**reclamation:** bringing land that has been disturbed by some process back to its original condition.

### **SUBJECTS:**

Science, Social Studies, Language Arts, Art, Math

### **TIME:**

1 hour

### **MATERIALS:**

books on wetlands  
paper bags (large, plain)  
crayons  
student letter  
chartboard  
envelope  
Counting Cranes

## ADVANCE PREPARATION

- A. Make a vocabulary chart using a wetland scene as a background on which to write terms.
- B. Obtain pictures showing the destruction of the wetlands.
- C. Obtain book Counting Cranes.
- D. Obtain plain grocery bags.

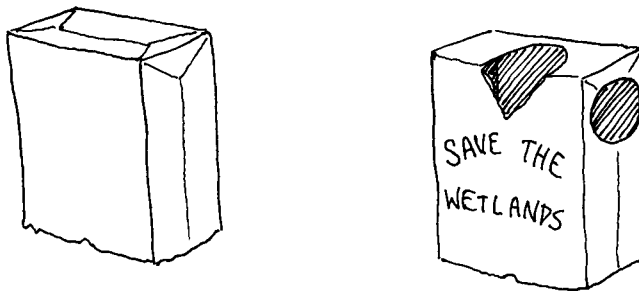
## PROCEDURE

### I. Setting the stage

- A. Give students background information discussing what the wetlands are, why they are important, and why we need to save them.
- B. Read and discuss the book Counting Cranes.
- C. Discuss the destruction of the wetlands and brainstorm why it is important to save them. List these on a chart.

### II. Activities

- A. Give each student a large, plain paper bag to make a vest that promotes saving and preserving of the wetlands.



- B. Write a letter to a government official (the President, a Congressman, etc.) concerning the importance of the wetlands.

### III. Follow-Up

- A. Wear vests during the study of the wetlands.
- B. Have students visit other classes while they wear their vests. Have them explain to other students the importance of the wetlands and reasons why it is necessary to save and preserve them as part of the ecosystem.



- C. Collect letters and mail them to the appropriate government officials.

#### IV. Extensions

- A. Have students research animals that are endangered in the wetland; such as whooping cranes, American crocodiles, or the manatee.
- B. Read the book Paper Crane. Locate Japan on a map. Make an origami crane. For Christmas, Tree of Cranes could be read.
- C. Vocabulary could be used to work on dictionary skills or create a word search.
- D. Map migration of the cranes.

## RESOURCES

Bang, Molly, The Paper Crane, Greenwillow Books, New York, 1985.

Mendoza, George, Were You a Wild Duck Where Would You Go?, Stewart, Tabori, and Chang, New York, 1990.

Nakano, Dakvohtei, Easy Origami, Viking Kestrel, London, 1985.

Owens, Mary Beth, Counting Cranes, Little, Brown and Company, Boston, 1993.

Say, Allen, Tree of Cranes, Houghton, New York, 1991.



# CRANBERRY BOGS

K-2

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## OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Identify, orally or in writing, the characteristics of a bog;
2. Locate bogs on a map;
3. Identify, orally or in writing, foods which can be obtained from bogs;
4. Identify, orally or in writing, various animals that live in bogs;
5. State, orally or in writing, the important values of a bog; and
6. Give an oral or written definition of the new terms: acid, bogs, and peat.

### **SUBJECT:**

Science

### **TIME:**

45 minutes

### **MATERIALS:**

Cranberry Thanksgiving by  
Wende and Harry Devlin  
vinegar  
chicken bones  
aquarium  
gravel  
soil  
peat moss  
venus fly trap and other plants  
sphagnum moss  
insects  
cranberries  
journal

## BACKGROUND INFORMATION

Bogs are fresh water wetlands. Peat, acid, and water are the characteristics of a bog. Rainfall is the primary source of water. The bogs were formed in kettle-holes, depressions left by receding glaciers. Bogs are usually found in colder parts of the world, but they do exist in temperate areas. They form in wet areas where there is little water flowing in or out of the wetland. Bogs look very much like swamps, but a strong thick web of plants grow over the bogs. These plants are called peat and feel very spongy to walk on. Peat forms as plants die and their leaves, stems, roots, and other parts fall into the acid water of the bogs. Over time, this acid-rich material is compressed, forming layers of peat. Because of the slow rate of decay, plants, and animals that fall into bogs can stay preserved for thousands of years. The bogs are very acidic, making it difficult for plants to grow in warm climates. Some plants have adapted like bladderworts, pitcher plants, sundews (which traps and digest insects), and cranberries. Moose, deer, bears, and other large mammals visit the bogs at various times of the year to find food, shelter, and water.

### Terms

**acid:** a substance with a quantity of positively charged hydrogen ions.

**bog:** fresh water marsh with build-up of peat and high acidity, that typically supports mosses adapted to acidic soil conditions (particularly sphagnum); many are located in colder regions.

**fresh water:** inland water that has a low concentration of minerals, salts, and dissolved solids found as surface water or groundwater.

**peat:** rich organic material that is made up mostly of partially decayed plant material.

## ADVANCE PREPARATION

- A. Place clean chicken bones in vinegar (acid) two weeks before lesson begins.
- B. Gather materials needed to make the bog terrarium.
- C. Locate the book Cranberry Thanksgiving.

## PROCEDURE

- I. Setting the stage
  - A. Explain the definition of bog, peat, and acid. Show examples of peat. Let the students examine the texture. Let the students describe the chicken bone that was in the vinegar (acid). How is it different from a chicken bone that was not soaked in an acid? Explain how prehistoric animal parts have been found preserved in bogs. Scientists have learned much about our past by studying remains found in bogs around the world. Read Cranberry Thanksgiving to set the stage for making a bog terrarium. Discuss how cranberries must have a bog in order to grow and produce fruit.
- II. Activities
  - A. Construct a bog by using an aquarium. Have the students help assemble it.
    1. Place gravel on the bottom.
    2. Mix two parts garden soil and one part peat moss.
    3. Plant a variety of plants, one being a venus fly trap.
    4. Add a layer of sphagnum moss to the top of the soil and around the plants.
    5. Water the soil well.
    6. Cover the terrarium.
    7. Place near a window, but not in direct light.

(Will need insects for venus fly trap).

B. Keep a journal to describe what happens in this habitat.

### III. Follow-Up

A. Make a recipe for “Grandmother’s Famous Cranberry Bread” found in the book Cranberry Thanksgiving.

B. List other uses for cranberries.

### IV. Extensions

A. Research other plants that eat insects. Draw a picture and write three facts about the plant.

B. Draw a monster plant and tell what it eats.

## RESOURCES

Devlin, Wende and Devlin, Harry, Cranberry Thanksgiving, Simon and Schuster, New York, 1971.

MacDonald, The Earth’s Habitats, Fearon Teacher Aids, Simon and Schuster, New York, 1993.

Wading into Wetlands, NatureScope, National Wildlife Federation, Washington, D.C., 1989.



# DOWN BY THE SEA

K-2

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## OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Identify, orally or in writing, the effects of urban and industrial development on coastal wetlands;
2. Discuss, orally or in writing, wetland conservation techniques;
3. Demonstrate, orally or in writing, an appreciation for the beauty of the coastal wetlands; and
4. Give an oral or written definition of the new terms: aquifer, barrier island, estuaries, and wetlands.

## BACKGROUND INFORMATION

Along both coastlines of the continental United States are areas that are well protected from the direct onslaught of waves. Within these protected areas may be found areas called coastal wetlands. These areas could also include coastal lagoons, estuaries, and sloughs. In these quiet waters, soft sediments and organic matter are deposited by rivers and tidal flows resulting in the development of a soft mud bottom. This area serves as food, nursery, and refuge for fish, shellfish, birds, and other wildlife. The wetlands and barrier islands are important to 75% of the migratory waterfowl. The commercial fish and shellfish rely on the estuaries for at least part of their life cycle. The salt marsh also serves a vital role in linking the land with the sea by providing a buffer against flooding, and holding water so that it can percolate back into natural aquifers.

The demand for coastal land development has significantly increased in recent years and wetlands are being lost to urban, residential, and industrial development. In some areas, oyster harvesting has become prohibited because of poor water quality.

There are many things we can do to slow down the destruction of the wetlands and barrier islands. Sites for a development project could be located upland instead of destroying a wetland site. Not draining or filling wetlands is vital to protecting one of the most productive habitats in the world. Donating funds to private and public conservation agencies and purchasing federal duck stamps are other ways to support and encourage conservation of wetlands.

### **SUBJECTS:**

Science, Social Studies, Math, Language Arts

### **TIME:**

50 minutes

### **MATERIALS:**

coastal wetland mural for bulletin board  
pastel chalk (optional)  
drawing paper  
pictures of animals (land and sea)  
straight pins  
chart paper  
Counting Cranes by Mary Beth Owens

All around the salt marsh the sounds of shorebirds and migrating ducks and geese may be heard. The protection of coastal wetlands is vital for the survival of many shellfish and commercial fish. Becoming aware of the effects of urban and industrial development to coastal wetlands is important to saving this valuable area.

Terms

**aquifer:** porous, water-bearing layer of sand, gravel, and rock below the Earth’s surface; reservoir for ground water.

**barrier island:** a body of land that is completely surrounded by water; it is roughly parallel to the shore and separated from the shore by a lagoon; barrier islands protect the shore from the direct onslaught of waves.

**estuary:** a marine ecosystem where freshwater enters the ocean; the term usually describes regions near the mouth of rivers, and includes bays, lagoons, and marshes.

**wetlands:** areas that periodically have waterlogged soils or are covered with a shallow layer of water resulting in reduced soil conditions; wetlands areas typically support plant life that are adapted to life in wet environments.

**ADVANCE PREPARATION**

- A. Enlarge coastal wetland picture onto bulletin board paper. Add color and laminate for durability.
- B. Enlarge and copy marine-animal pictures included in this lesson. Add color. Label with animal’s name (grass shrimp, striped bass, blue crab, flounder, oyster, clam, mussel, pelican, flamingo, common loon, and great blue heron).
- C. Draw two Marine Animals graphs.

Grass Shrimp	Blue Crab	Flounder	Clam	Flamingo

- D. Locate a copy of Counting Cranes by Mary Beth Owens.



## PROCEDURE

### I. Setting the stage

- A. Show the students the bulletin board mural of a coastal wetland. Tell the students this is called a coastal wetland which is an area near the ocean that is covered with a thin layer of water most of the time. It is the home of many different kinds of animals and plants.
- B. Play the game “Who Lives Here?”
  1. Have the students sit in a circle. Display the pictures of the different animals. Have the students arrange them into groups by asking, “Which of these animals live in a coastal wetland?” Pin pictures of animals onto the mural. Discuss why they selected these animals.
- C. Have students select three of the marine animals to draw, color, and cut out. Place these animals on the wetland mural.

### II. Activities

- A. In a whole group discussion, graph the number of each kind of marine animal found on the coastal wetland mural. Tell the students that the coastal wetlands provide important habitats for many types of sea animals and birds. It is also a home or habitat for waterfowl that fly south (migrate) when the weather gets too cold in the north.
- B. Tell the students that since this is such a beautiful place, we’re going to build a town here. Discuss and name some things a town needs in order for people to live, work, and grow (houses, hotels, grocery stores, malls, gas station, restaurant, factories, farm, park, fire station, hospital). Name the town. Write it on a piece of paper and post on the mural.
  1. Put the students into pairs. Give each pair a name of one of the things needed to support the town people and a piece of drawing paper. Have each pair draw, color and cut out their building or park.
  2. After the students have cut out the buildings, discuss the importance of each building to the town. Have each pair come up, select a site to put their building, and staple it to the mural. Continue this until all the buildings are in place.
  3. You could extend this further by placing streets on the board to connect the buildings. (Roads could be cut from adding machine paper. Select the width and length to cut the paper from the dimension of the mural.)
- C. Ask the students to name the animals they can still see after the town has been built. Graph the number of animals again on a separate graph. Compare the two graphs. Ask the students:
  1. What happened to the animals? (They died or moved away. The loss of the wetland habitat resulted in the loss of the animals.)

2. Why did they go away? (The town drained and filled the wetland site and/or polluted the water, and moved in taking over the different marine animals' homes.)
3. What could we have done differently to have our town and save the coastal wetland habitat? (Locate upland from the wetland area, do not fill or drain the wetland, designate the wetland as a national protected wildlife area, and purchase federal duck stamps from your local post office to support the purchase of wetlands.)

D. After the discussion, relocate the town upland from the coastal wetland site.

### III. Follow-Up

- A. Have the students demonstrate their knowledge of effects of urban and industrial development on the wetlands and ways to protect the wetland by performing the following tasks:
  1. Name the effects of building a town on a wetland site.
  2. Name three things we could do to protect a coastal wetland.

### IV. Extensions

- A. Research the different types of marine animals listed. Write a report about the facts discovered and illustrate the animal as realistically as possible. Display reports and illustrations.
- B. Look at old and new maps of your area or state. Are there any areas where there used to be wetlands that are no longer there? If yes, what happened to these wetlands?
- C. Read the book Counting Cranes by Mary Beth Owens. Discuss what the cranes would do if the wetlands were destroyed.

## RESOURCES

Gulf Facts: Habitat Degradation, The Gulf of Mexico Program Office, John G. Stennis Space Center, Building 1103, Room 202, Stennis Space Center, MS 39529-6000.

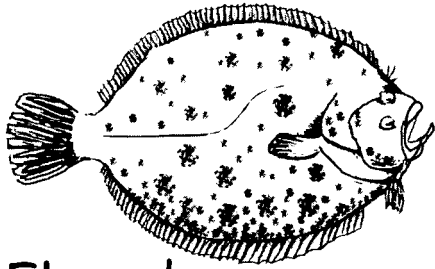
Dragonfly Pond, Aquatic Project Wild, Western Regional Environmental Education Council, Boulder, CO, 1987.

Niesen, Thomas M., The Marine Biology Coloring Book, Harper Collins Publishers, New York, 1982.

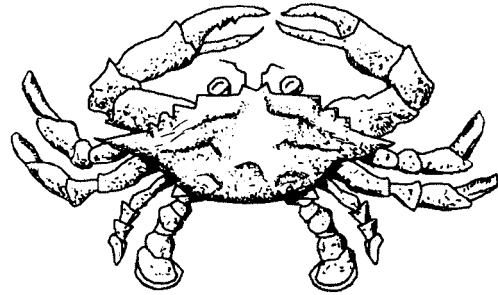
Owens, Mary Beth, Counting Cranes, Boston, Little, Brown and Company.

W.O.W.: The Wonders of Wetlands, Slattery, B.E., Environmental Concern Inc., P. O. Box P, St. Michaels, MD 21663.

A limited supply of the "Wetlands" poster can be obtained at no cost from the U.S. Geological Survey, Box 25286, Denver Federal Center, Denver, CO 80225.



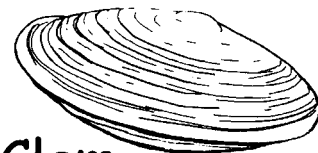
Flounder



Blue Crab



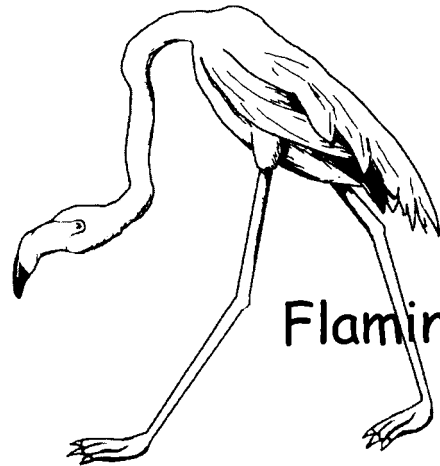
Pelican



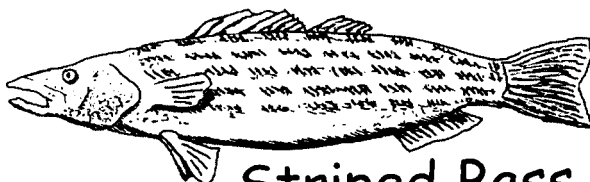
Clam



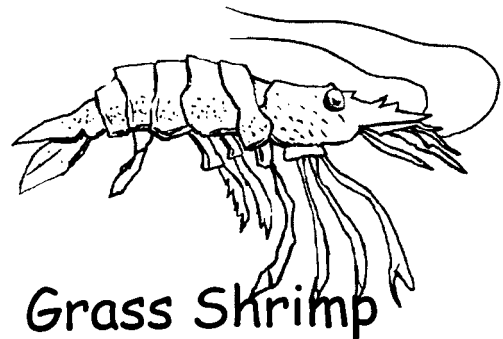
Oyster



Flamingo

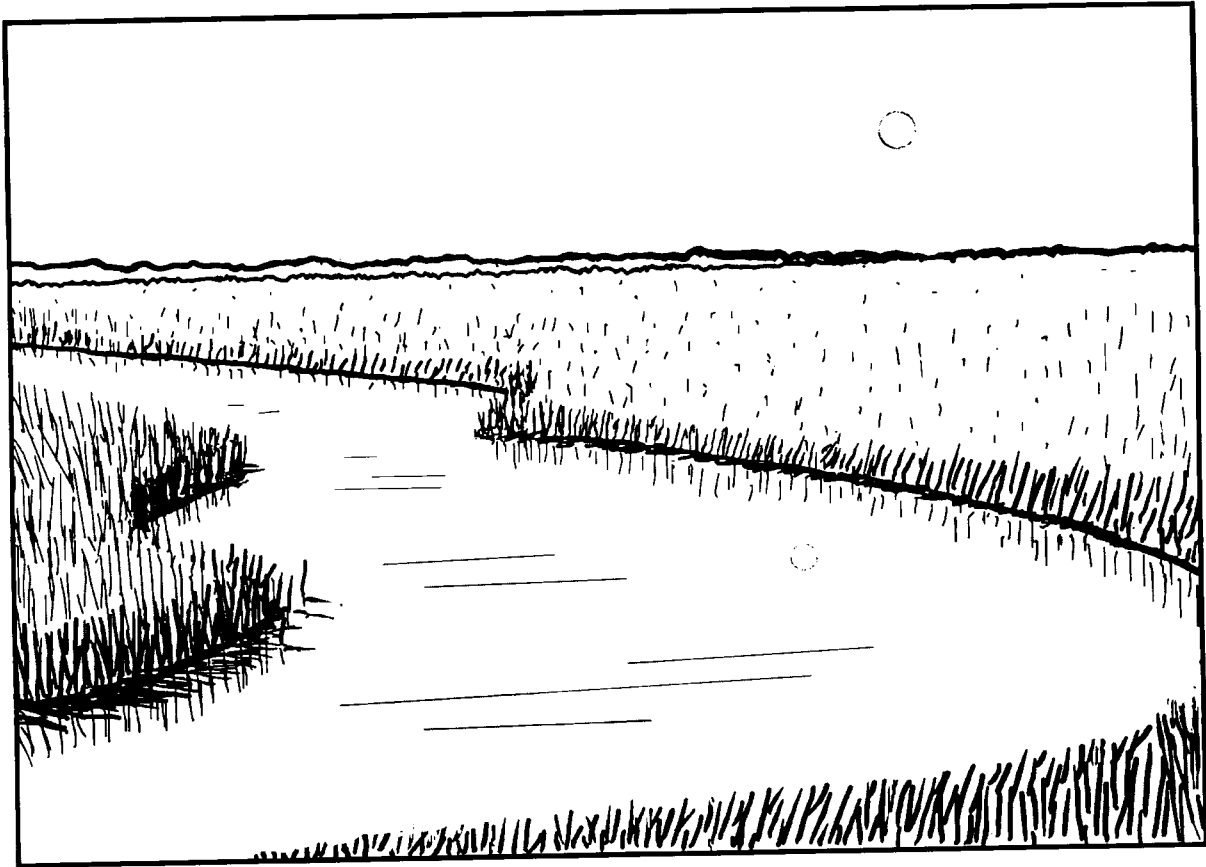


Striped Bass



Grass Shrimp

# Mural Design for Coastal Wetland



# WETLANDS, SWEET, WETLANDS

K-2

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## OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Describe, orally or in writing, and illustrate animals and plants found in wetlands;
2. Provide oral or written suggestions about how to create a bulletin board of the wetlands;
3. With help, design their own wetlands book; and
4. Give an oral or written definition of the new terms: food chain, fresh water, habitat, surface waters, and wetlands.

### SUBJECTS:

Science, Social Studies, Language Arts, Writing, Art

### TIME:

45 minutes

### MATERIALS:

copies of teacher book  
copies of student report sheets  
white bulletin board paper  
paper and crayons  
scissors  
yarn or string  
copies of student book

## BACKGROUND INFORMATION

People once thought of wetlands as ugly, useless eyesores with slimy, crud-covered creatures crawling around. The fact is that wetlands are useful and our planet needs them. These soggy areas lie between dry land and fresh surface waters. Wetlands support plants and animals that otherwise could not live in wetter or drier environments. They act as kidneys to our planet and filter out harmful wastes that flow over land before they ever reach fresh water helping to prevent water pollution in our rivers, streams, and lakes. Studies have shown that submerged plant roots that wetlands provide act to increase the available dissolved oxygen for downstream uses. In addition to supporting fish, the increased oxygen makes the water more resistant to pollutants downstream since most pollutants act to decrease oxygen levels killing fish. Wetlands also stop floods by slowing or absorbing the runoff from big storms.

People have relied on wetlands for a long time. In Ireland, they use peat (decayed vegetation that has become packed down in swamps and bogs) as a low-cost fuel. Farmers in Asia plant their rice in wetland areas because the increased amount of water helps nourish the grain during its growing season. The wetlands in Iraq where the Tigris and Euphrates rivers join is the main source of fishing for Arabs. Many people enjoy exploring swamps, like the Okefenokee Swamp in Georgia in boats pushed through the water with long poles.

Wetlands are gaining a better reputation now that governments and conservation groups around the world are recognizing them as special habitats and valuable pollution fighters. Because we lost many of our wetland areas to farmland, research on constructed artificial wetlands is ongoing at many sites around the world. We need our wetlands. Let's instill a positive appreciation for wetlands in our children.

Wetlands are one of the most important ecosystems in the world. They provide habitat for many plants and animals, some of which could not survive anywhere else. Some of the plants found in wetland areas are cattails, saw grasses, rushes, orchids, spider lilies, and lily pads as well as cypress trees and mangrove trees. They provide food, shelter, and nesting areas for the animals. Many amphibians such as frogs and salamanders, reptiles such as snakes and alligators, and mammals such as rabbits and muskrats depend on the wetlands for survival. Many birds such as ducks, geese, and swans use them for breeding grounds and migrating stops. Herons, egrets, and wood storks could not survive without the multitude of insects, clams, snails, and crabs the wetlands provide. All the habitats of the wetland areas are vital to the balance of nature and the Earth.

### Terms

**food chain:** the chain of living things in an ecosystem in which each link in the chain feeds on a link below it and is fed upon by the one above it.

**fresh water:** inland water that has a low concentration of minerals, salts, and dissolved solids found as surface or ground water.

**habitat:** the place or type of site where a plant or animal naturally or normally lives and grows.

**surface waters:** precipitation that does not soak into the ground or return to the atmosphere by evaporation or transpiration; it is stored in streams, lakes, rivers, ponds, wetlands, oceans, and reservoirs.

**wetlands:** areas that periodically have waterlogged soils or are covered with a shallow layer of water resulting in reduced soil conditions; wetlands areas typically support plant life that are adapted to life in wet environments.

## ADVANCE PREPARATION

- A. Reproduce the teacher's copy of the story In the Wetlands on tag board or construction paper and color the illustrations. Bind one end with staples, tape, or metal rings to complete the book.
- B. Locate many different nonfiction books about the wetlands (see resources).
- C. Reproduce "Student Report Sheet" for the number of students participating in activity.
- D. Cut out a large shape of a house on white bulletin board paper to fit a bulletin board.

## PROCEDURE

- I. Setting the stage
  - A. After reproducing the story In The Wetlands, read it to the students pointing to each word. Discuss the different plants and animals that are found in wetlands and why they use the

wetlands as their habitat. Discuss the food chain of the frog and bird. Provide other books on the wetlands (see Resources).

## II. Activities

- A. After a discussion on different wetland plants and animals, have students to select one and make a report (see Student Report Sheet).
- B. Each student will draw a picture of his/her plant or animal on the report sheet and write or dictate to someone important facts they remember. Have students discuss what they have drawn in front of the class, then display the reports.

## III. Follow-Up

- A. As students complete their reports, have them create their own wetland on a bulletin board. Cut out a large shape of a house on white paper to fit a bulletin board. Students draw sky, water, and trees on the house shape. The students then draw, cut out, and place their plants or animals on the house in cut-out windows and doors. Display their reports around the bulletin board attaching yarn or string from the report to the plant or animal. Have the class name and label their wetland.

## IV. Extensions

- A. Students may make their own In The Wetlands book. Reproduce the students' pages and cut in half. Students may illustrate to match the words on each page. Then bind the book for the students to read and reread. Students may take home their copy and read it to their parents.
- B. Reread the story In The Wetlands. Have the students find words they recognize. Make a list of these words for each student to read. Then, have the students read the book pointing to each word.

## RESOURCES

Cortesi, Wendy W., Explore a Spooky Swamp, National Geographic Society, Washington, D.C., 1978.

Dobrin, Arnold, Marshes and Marsh Life, Coward-McCann, New York, 1969.

Facklam, Margery, And Then There Was One, The Mysteries of Extinction, Sierra Club Books/Little, Brown and Company, San Francisco, 1990.

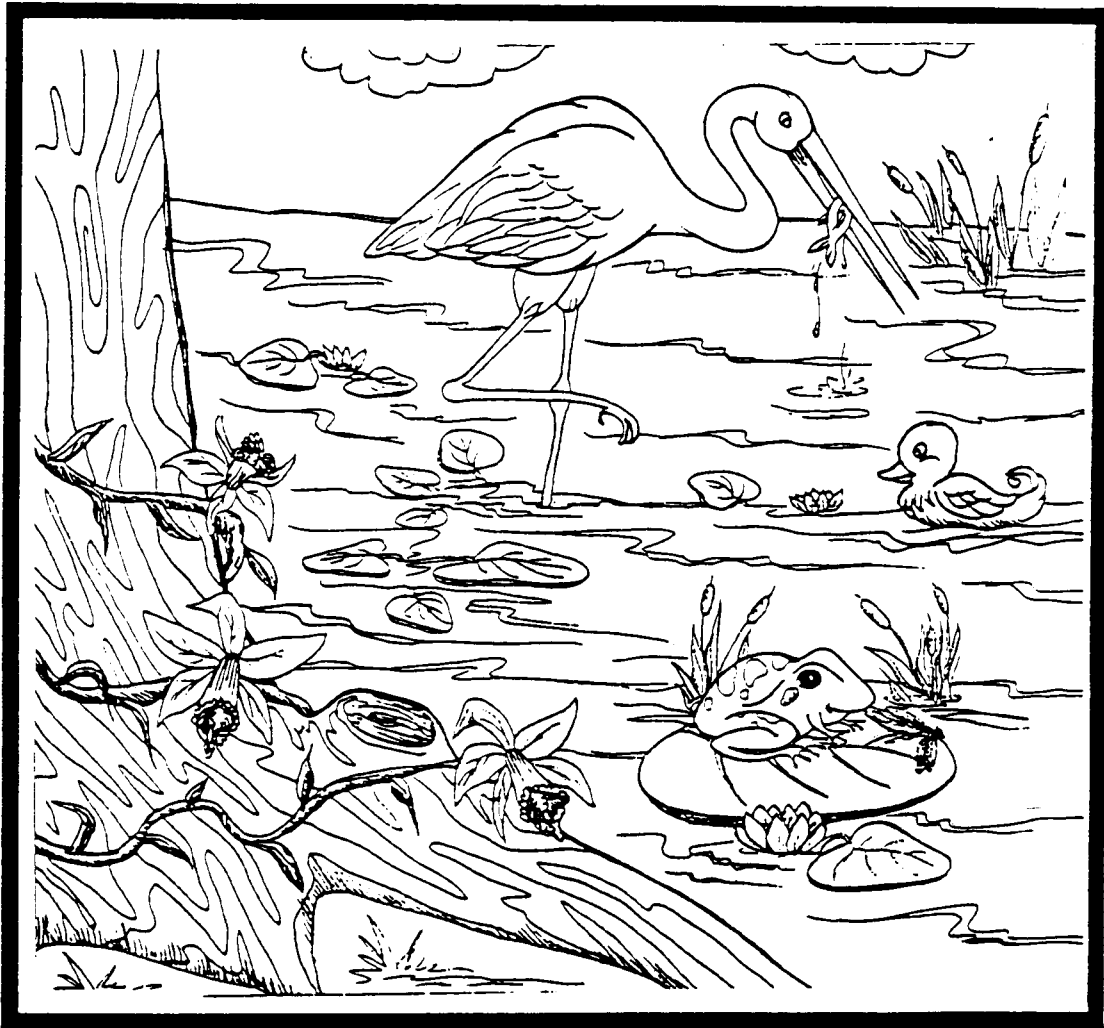
Geraghty, Paul, Over the Steamy Swamp, Harcourt Brace and Company, Orlando, 1988.

Greenway, Shirley, Animal Homes, Water, Newington Press, Connecticut, 1990.

Hoff, Mary and Rodgers, Mary M., Our Endangered Planet Rivers and Lakes, Lerner Publications Company, Minneapolis, 1991.

Liptak, Karen, Saving Our Wetlands and Their Wildlife, Franklin Watts, New York, 1991.

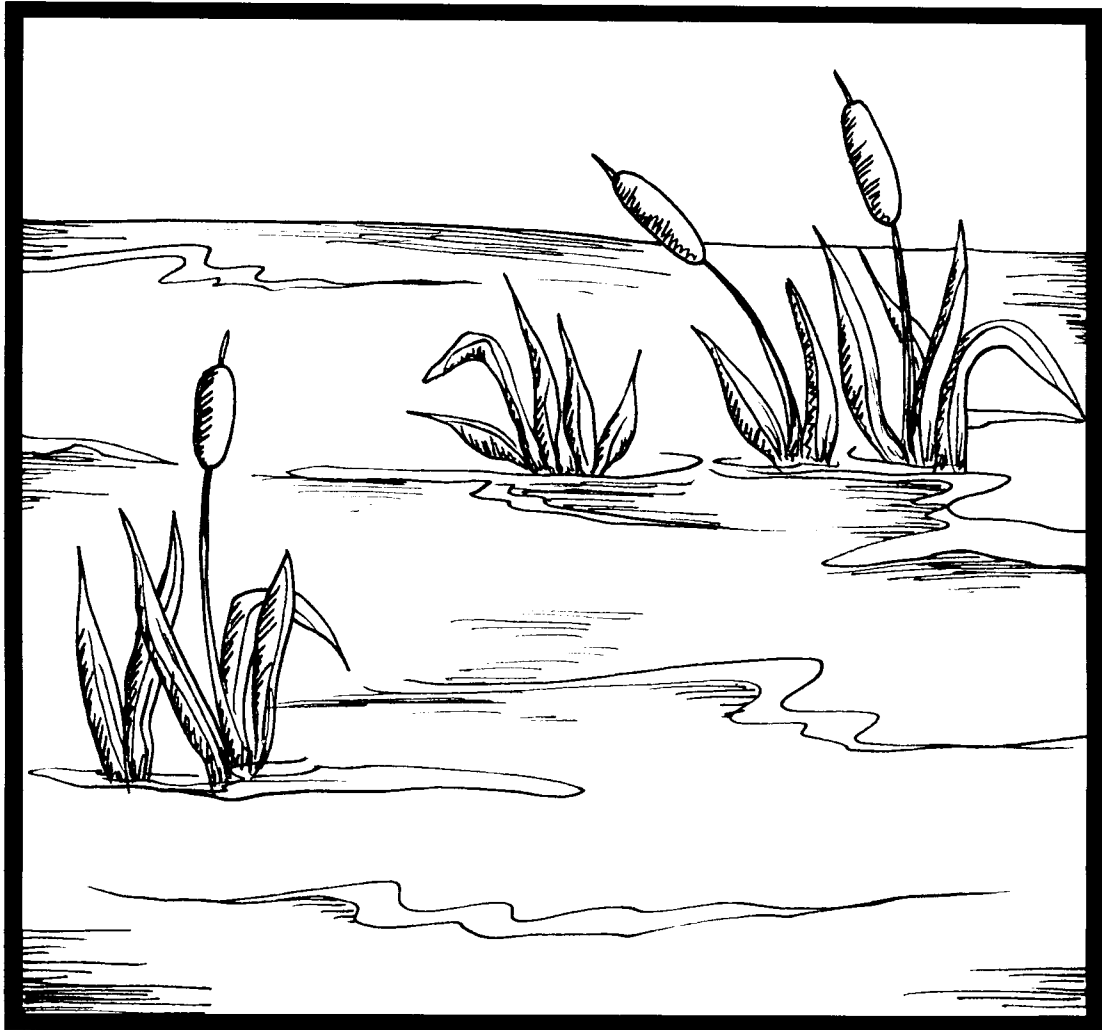
# IN THE WETLANDS



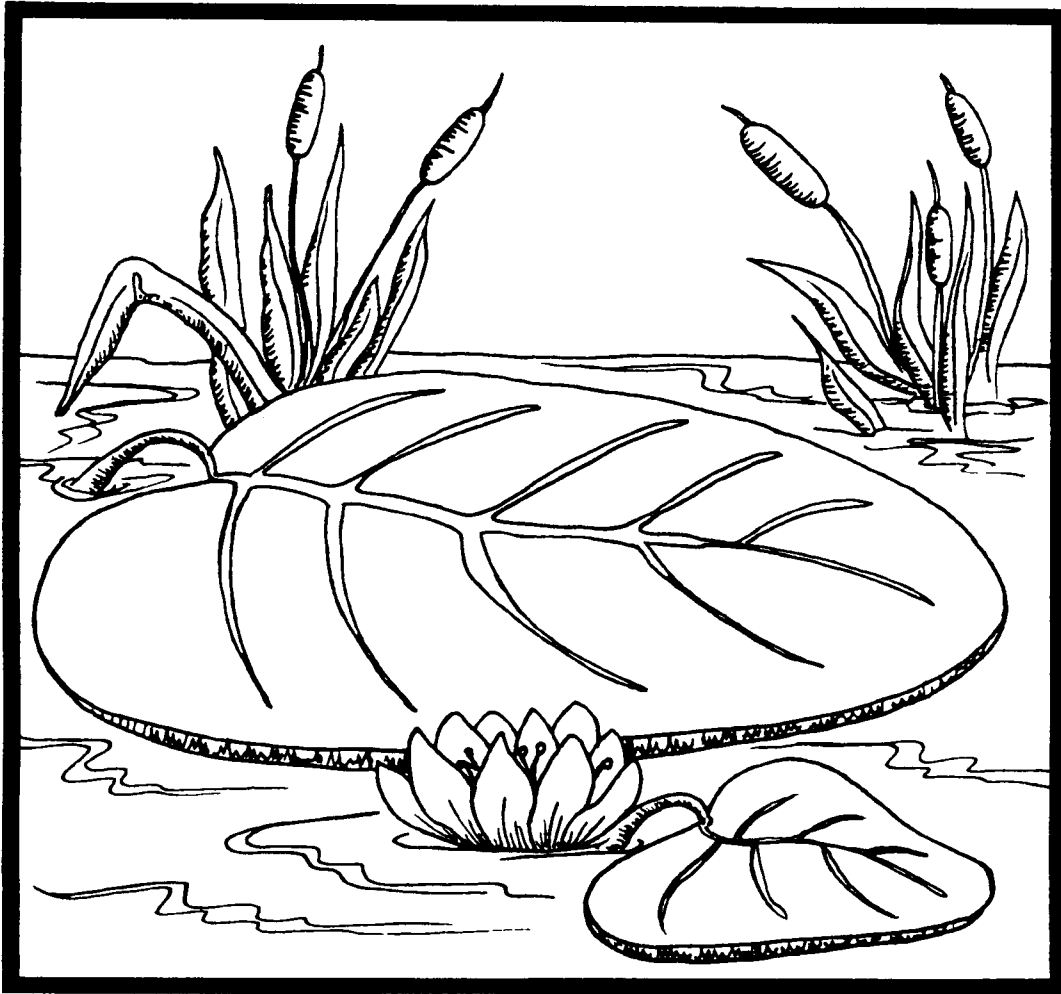
Words by Donna Morgan  
Illustrated by \_\_\_\_\_



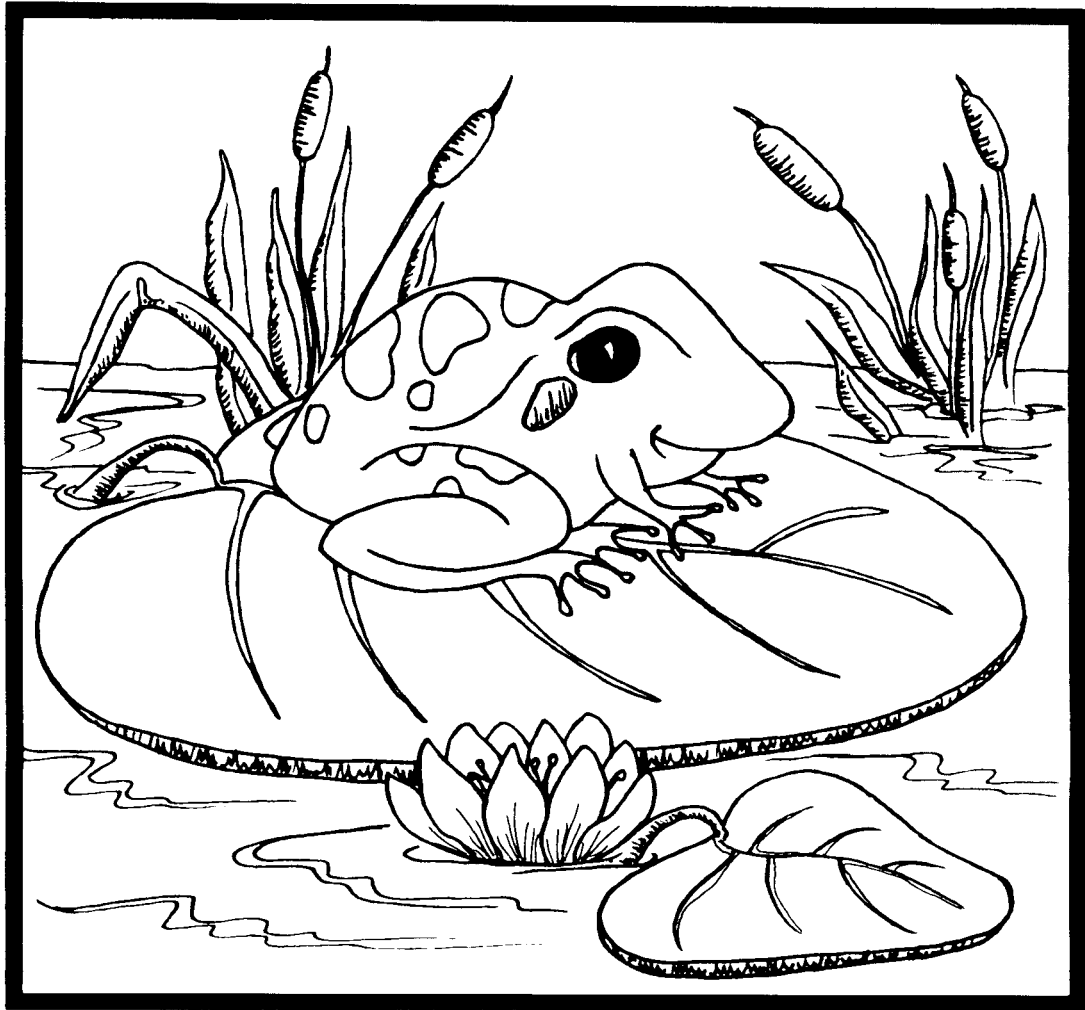
In the wetlands we  
see water.



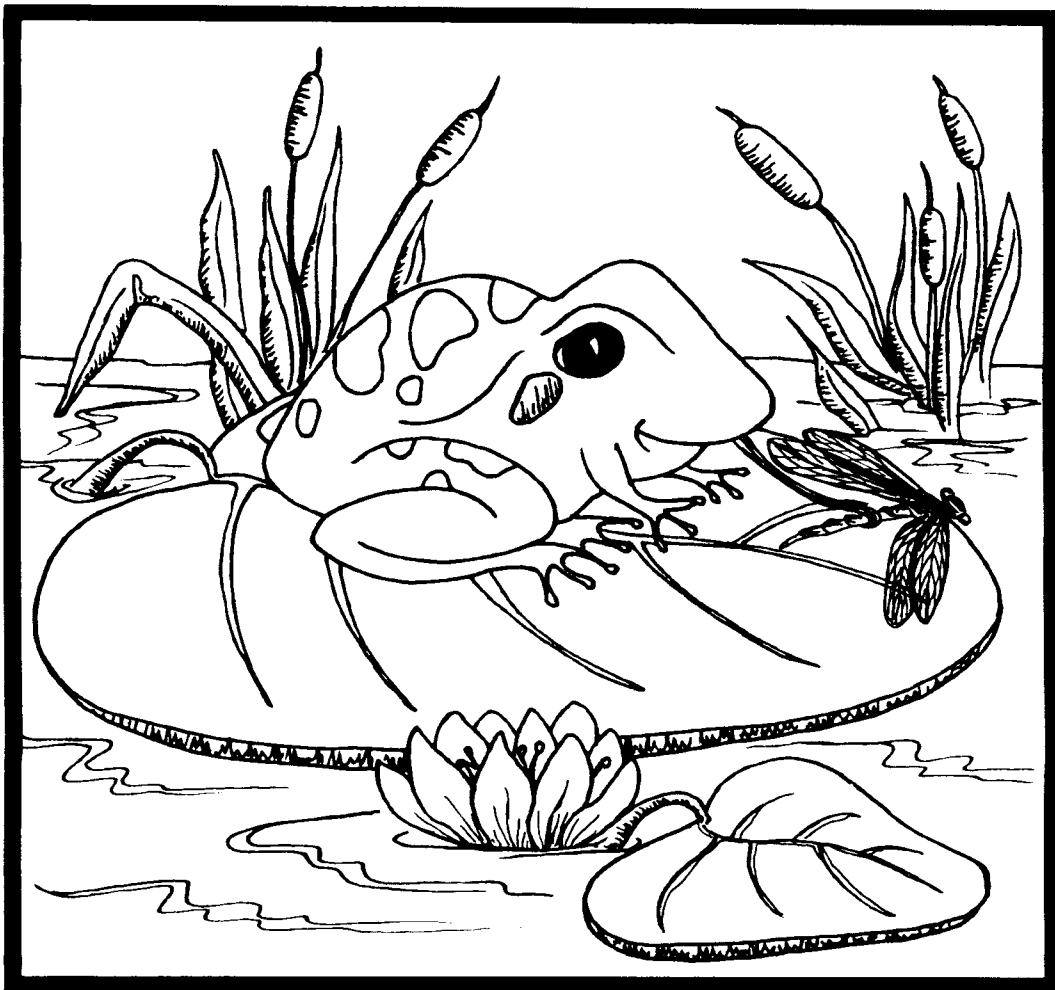
On the water we  
see lily pads.



On the lily pads we  
see green frogs.



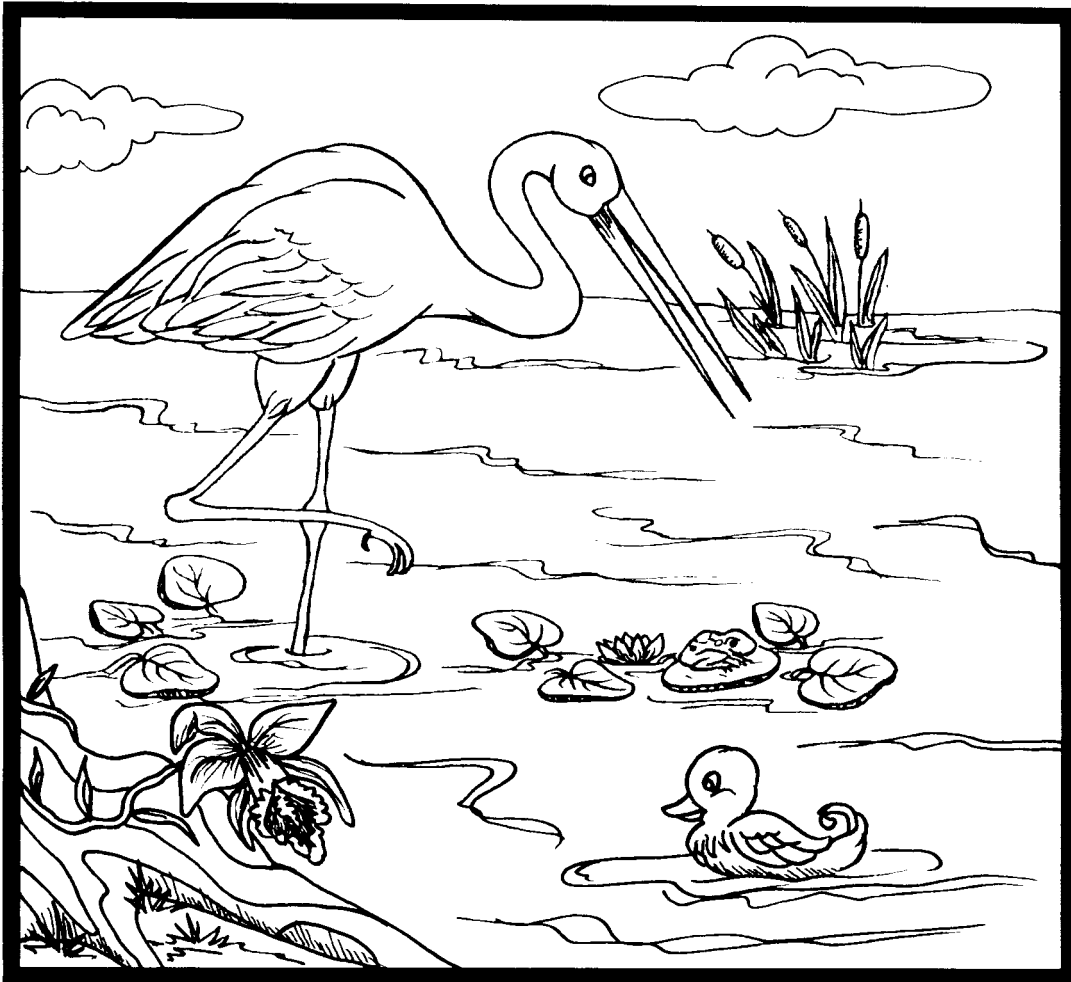
By the frogs we  
see dragonflies.



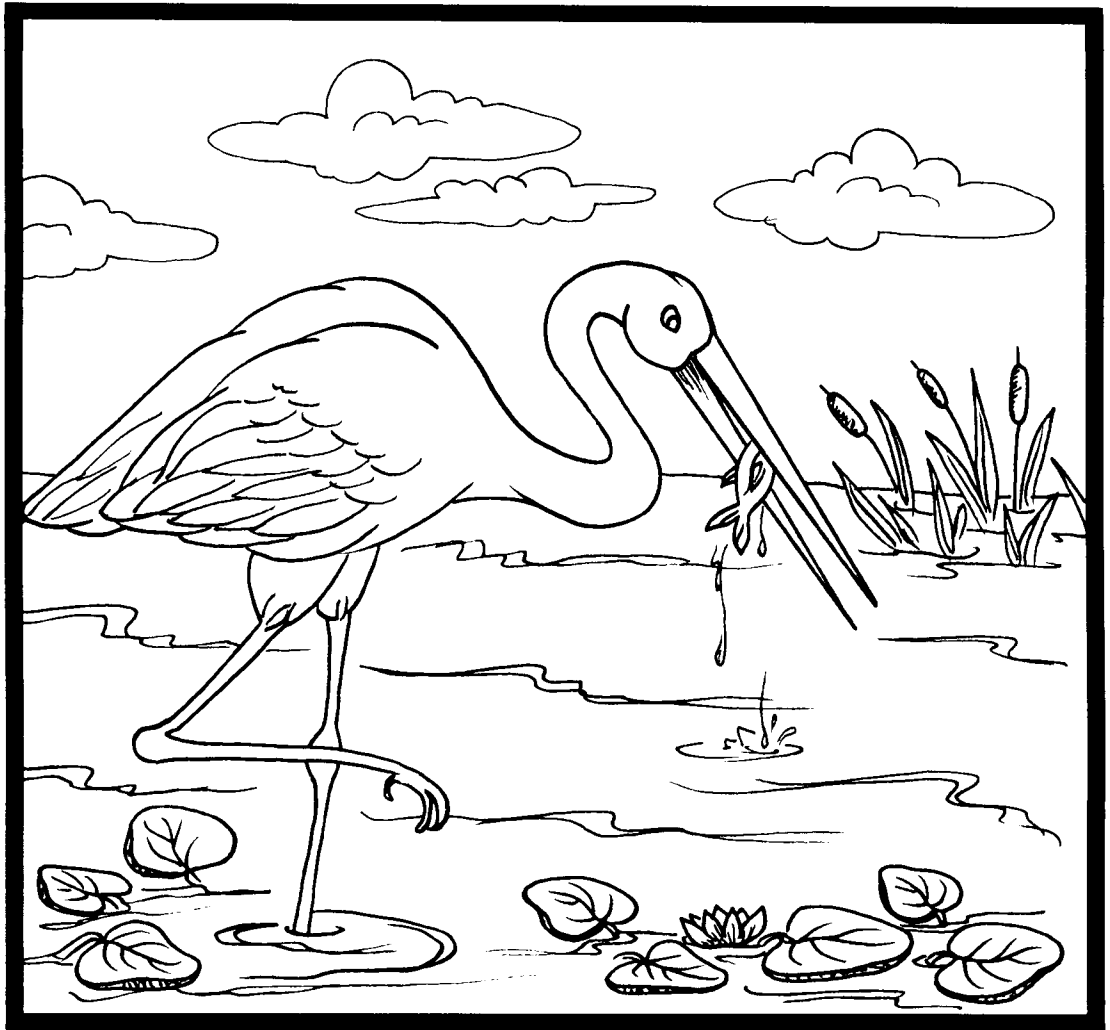
In the wetlands  
we see orchids.



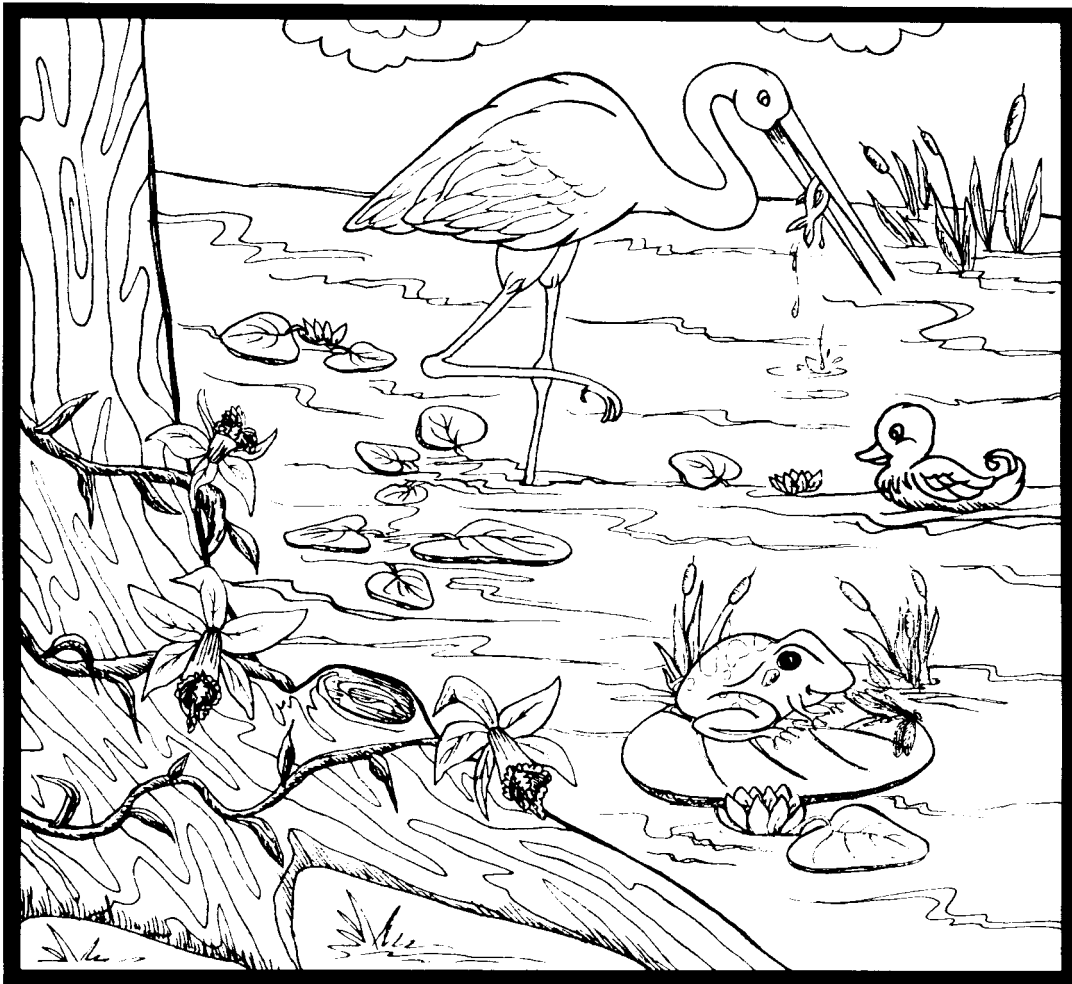
By the orchids  
we see birds.



By the birds we  
see small fish.

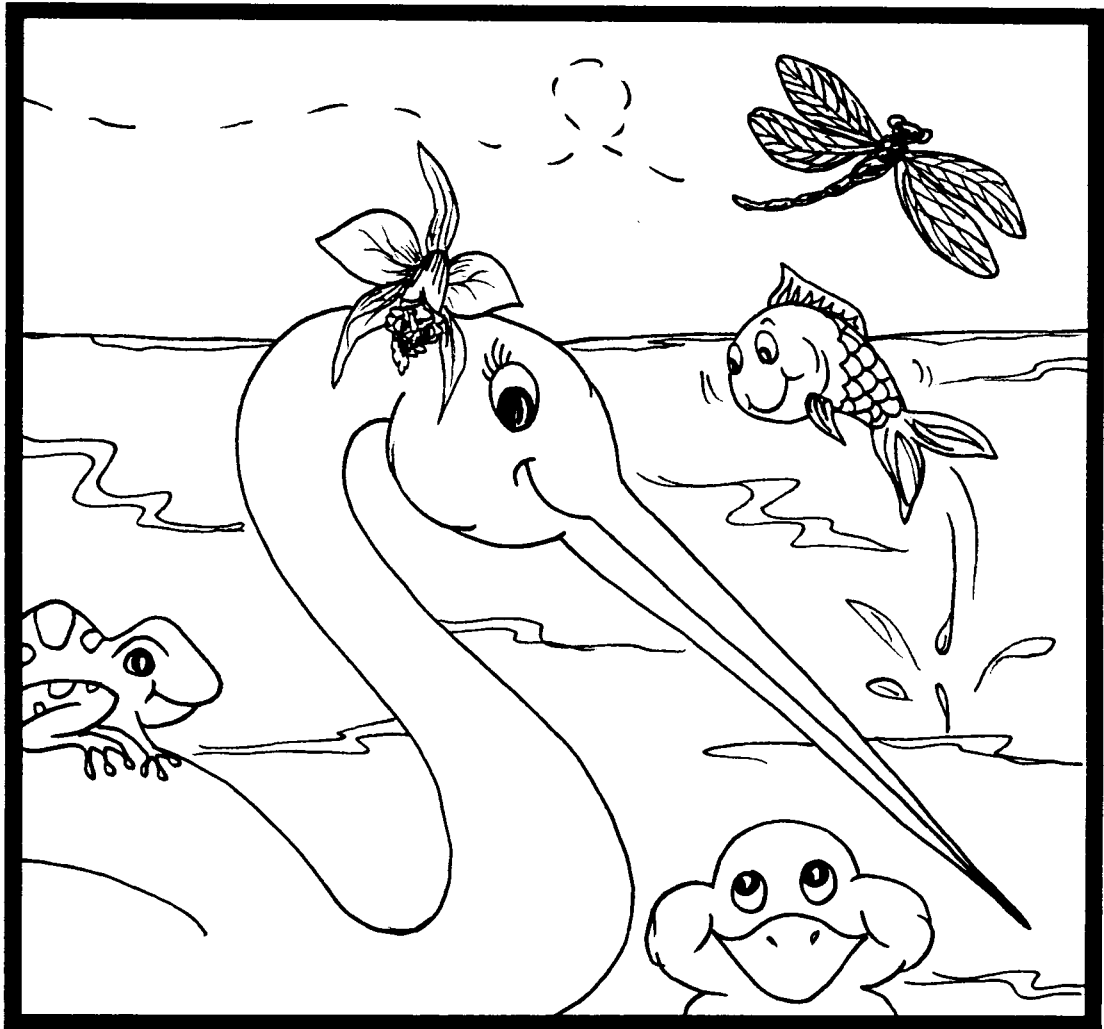


In the wetlands we see many plants and animals.





Wetlands  
are their  
home.

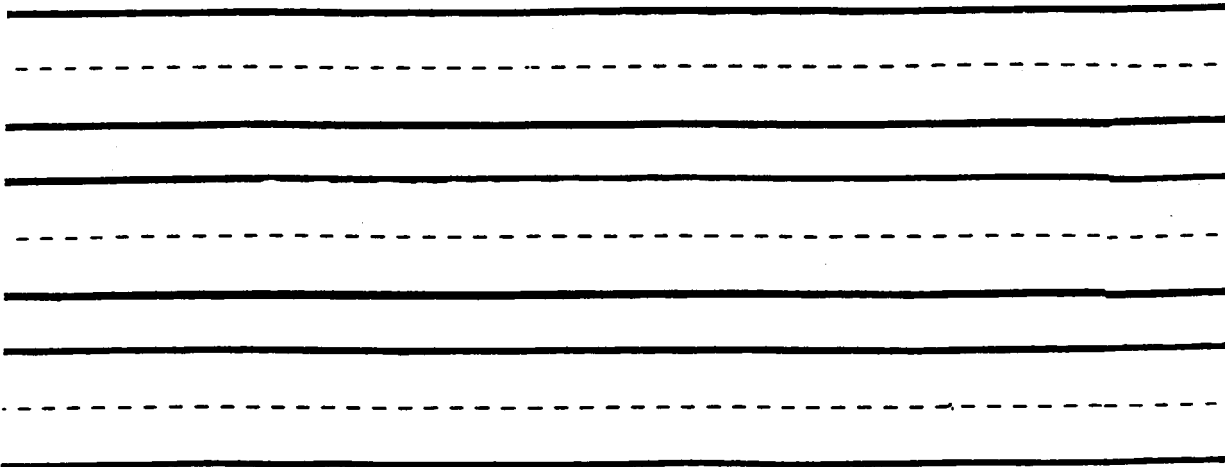
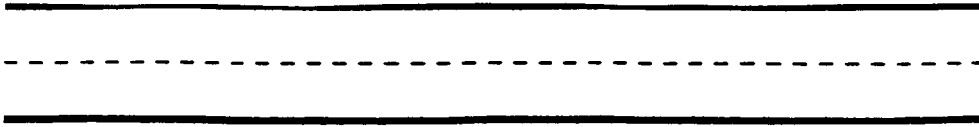
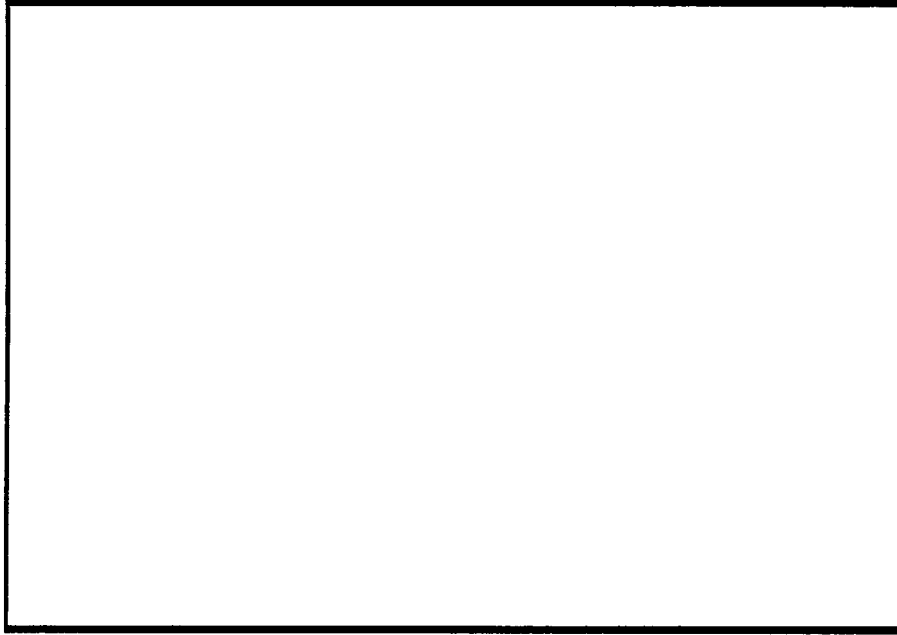


By \_\_\_\_\_

Student Report Sheet

# The Wetlands

## Plants and Animals



# A B C's OF THE WETLANDS

K-2

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## OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Tell or write the importance of the wetlands;
2. Identify, orally or in writing, the different types of wetlands;
3. Identify, orally or in writing, foods of the wetlands;
4. Identify, orally or in writing, animals found in the different wetlands; and
5. Give an oral or written definition of wetlands.

## BACKGROUND INFORMATION

Wetlands are known as the “kidneys of the landscape.” They function as removers of wastes from both natural and human sources. Wetlands are the homes to a variety of plants and animals. Wetlands are nurseries for many species of coastal fish. Wetlands are areas that periodically have waterlogged soils or are covered with a shallow layer of water resulting in reduced soil conditions. The characteristics of the wetlands and how they function is determined by what is happening in the area surrounding the wetlands. Wetlands are found in all parts of the world and are classified into types. There are fresh water and salt water wetlands. Some examples of fresh water wetlands are swamps, marshes, bogs, pasture ponds, and prairie holes. Salt water wetlands are mangroves and salt water marshes. Wetland areas typically support plant life that are adapted to life in wet environments.

We now know that from an economic and ecological standpoint, wetlands are extremely valuable, fertile areas. The misguided notion that wetlands were a wasteland led to its destruction. Between the 1950s and the 1970s the U.S. nearly lost 460,000 acres per year. The major loss resulted from drainage for agricultural development as well as construction of housing, highways, and commercial buildings.

### **SUBJECTS:**

Science, Language Arts, Social Studies

### **TIME:**

1 week, 30 minutes a day

### **MATERIALS:**

books on the wetlands  
encyclopedia sets  
dictionaries  
pictures of different kinds of wetlands  
writing paper  
construction paper  
pencils  
crayons  
materials to make student books  
ABC books  
Geography From A to Z: A Picture Glossary by Jack Knowlton

## ADVANCE PREPARATION

- A. Obtain ABC books.
- B. Gather pictures of wetlands.
- C. Gather materials to make student books.

## PROCEDURE

- I. Setting the stage
  - A. Discuss with the students the term wetlands and share some information using pictures and books.
  - B. Share an ABC book with the students, then explain that they will be writing their own ABC book on the topic: WETLANDS. Begin brainstorming words that begin with the letter a, then the letter b, and so on. Show the students books on the wetlands that can be sources for them.
- II. Activities
  - A. Have the students list the alphabet on paper.
  - B. Have the students find words pertaining to the wetlands for each letter.
  - C. Have the students write the definitions or use the word in a sentence.
  - D. Edit the work.
  - E. Put the “ABC’s” of the wetlands in book form.
- III. Follow-Up
  - A. Have students share their books.
  - B. Place them in the library for other students to read.
- IV. Extension
  - A. Have the students produce a crossword puzzle using the terms and definitions from the ABC book.

## RESOURCES

Challand, Helen J., Disappearing Wetlands, Childrens Press, Chicago, 1992.

Knowlton, Jack, Geography From A to Z: A Picture Glossary, Thomas Crowell, New York, 1988.

Wading into the Wetlands, NatureScope, Vol. 2 No. 5, National Wildlife Federation, Washington, D.C., 1986.



# “BAY” WATCH: (BY THE BAY)

K-2

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## OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Identify, orally or in writing, a bay as a source of water in the world around them;
2. Compare and contrast, orally or in writing, a bay to a lake or ocean;
3. Name, orally or in writing, an animal found by the bay;
4. Write two facts about the named animal; and
5. Give an oral or written definition the new terms: bay, gulf, and estuary.

## BACKGROUND INFORMATION

A bay is a body of water partly enclosed by land but with a wide outlet to the sea. Bays are similar to gulfs, only smaller. Mobile Bay, Alabama is an example. Estuaries are influenced by the ocean tides resulting in a mixture of salt water and fresh water.

Bays are homes to many diverse and unique animals, both large and small. Bays and their beaches are also used for numerous recreational activities and water travel.

### Terms

**bay:** a body of water partly enclosed by land but with a wide outlet to the sea.

**gulf:** a large body of sea or ocean water partly enclosed by land.

**estuary:** a marine ecosystem where freshwater enters the ocean; the term usually describes regions near the mouth of rivers, and includes bays, lagoons, and marshes.

### **SUBJECTS:**

Science, Music, Social Studies, Language Arts, Art, Computer, Dramatic Play

### **TIME:**

1 week, 30 minutes per day

### **MATERIALS:**

Down by the Bay (book and song) by Raffi  
local map  
map of United States and/or world map  
assorted pictures of bays from assorted resources  
Word Web  
transparency  
assorted pictures of animals that live by the bay from assorted resources  
"Tripping with Terwilliger--Bay Tidelands" (video or comparable video)

## ADVANCE PREPARATION

- A. Assemble resource pictures/books/videos to show pictures of bays. You may use old magazines (travel, sports, nature), geography texts, library books, National Geographic magazines, and assorted videos.
- B. Assemble resource pictures/books to show animals that live by bays. You may use old magazines (travel, sports, nature), science and geography texts, library books, National Geographic magazines, Ranger Rick magazines, Your Big Backyard magazines, Zoobook magazines, and assorted videos.
- C. Make transparency of Word Web.
- D. Set up centers in room (optional).
- E. Assemble materials associated with the environment “by the bay.” Bays have historically been heavily utilized as centers of civilization due to the protected waters easing navigation.
- F. Write vocabulary words on flash cards.

## PROCEDURE

- I. Setting the stage
  - A. Build background by inviting the students to go with you on an imaginary “walk” along the bay. Name the sounds they hear on the walk. Describe the animals they see along the bay. Describe the smells. Provide additional information about the environment and animals as necessary from the assorted resource books.
  - B. Encourage the students to describe places with water they have seen. Record the description (that suggests the characteristics of different bodies of water) on the Word Web transparency.
  - C. Define the term “bay” and show the worksheet “Bodies of Water.” Emphasize the bay and its characteristics. Distinguish bays from oceans and lakes.
  - D. Use the United States or world map to name some known bays.
- II. Activities
  - A. Introduce vocabulary words associated with the theme: bay, wave, sand, deep, shallow, shore, lake, ocean, island, and sea.
  - B. Read Down by the Bay by Raffi (emphasize the setting of the book). Sing the song if time permits. Discuss the animals named in the book. Decide if they do/do not live by the bay. List these in the appropriate column on the board or the worksheet.



- C. Use a local/state map to show the bay closest to the school. If there are no nearby bays, discuss other bodies of water that may be familiar to them.
- D. Name some activities the students can do “down by the bay” (wading, collecting shells, sunning, walking on the beach, having a picnic, and fishing).
- E. View video, “Tripping with Terwilliger.” List animals named in the video (mussels, clams, spiders, beetles, barnacles, crabs, periwinkle snails, and shore birds).
- F. Divide the class into pairs. Have each pair choose an animal (or assign an animal) from the above list. Allow the student pairs to use the resource books and encyclopedias to find and record two or more facts about their animal. Pairs should share their facts with the class.
- G. Allow the students to go to various centers as time allows.

### III. Follow-Up

- A. Have the students demonstrate their knowledge of bays by labeling the correct bodies of water on the worksheet, “Bodies of Water.”
- B. Have the students draw a picture of an animal found by the bay and label their picture. Write two facts about the animal drawn. Assemble into a class Big Book. Vote on a title.
- C. Sing the “Water Sources” song with students.
- D. Read Morning Beach by Leslie Baker. Allow the students to examine the paintings in the book. Invite them to use watercolors to create “down by the bay” pictures.
- E. Have the students write in their journals about experiences they have had with families or friends by the water.
- F. Read Beach Ball by Peter Sis.
- G. Create a “pretend” beach in the classroom. Let students create a name for the beach. Make a sign for the “beach” area.
- H. Suggest items needed for a beach party (beach towels, bathing suits, beach balls, pails and shovels, and picnic food in a basket). List suggestions on a chart. Read to review.
- I. Read At the Beach by Anne and Harlow Rockwell or Hurry Up, Jessie! By Harriet Ziefert and Mavis Smith.
- J. Brainstorm, write, and display rules that are followed to keep people safe at the beach, such as swimming near a lifeguard, swimming with a friend, wearing a life jacket (if necessary), and staying close to the shore when swimming. Have each student choose a rule. Have each student draw themselves following the rule he/she chose. Share with the class.

#### IV. Extensions

- A. Invite a naturalist to visit the classroom to discuss the importance of bays and the encroachment of man upon nature's wildlife environment.
- B. Read A House for Hermit Crab by Eric Carle. Compare man's need for houses to those of animals and how they need them for the same purposes (for protection, meeting individual needs, sleeping, eating, and taking care of their young). Discuss how houses differ with location, sociological development, and materials available to use.

#### Centers to Set Up In Classroom

##### A. MUSIC

- \* During water play, listen to music.
- \* Make musical instruments to accompany themselves while singing "Down by the Bay." Use cereal boxes, jars with lids, milk jugs, paper towel tubes, shoe boxes, or coffee cans. Fill them with pasta, nuts, rice, sand, paper clips, rocks, or dried beans.
- \* Provide the tape of the song "Down by the Bay" at the listening center.

##### B. ART

- \* Have a supply of watercolor sets to create pictures.
- \* Provide art supplies for students to draw a map of an imaginary bay. Name the bays they have drawn.
- \* Provide sand to create a sand picture (after listening to the book For Sand Castles or Seashells by Gail Hartman).

##### C. SOCIAL STUDIES

- \* Globe
- \* Maps
- \* Resource pictures of bays

##### D. WATER AND SAND TABLES

- \* Provide cups, spoons, funnels, sifters, bottles, pails, and shovels for sandcasting and exploration.
- \* Place shells or stones in the sand and allow the students to have a shell treasure hunt.

##### E. SCIENCE

- \* Provide shells, sand, and rocks for hands-on experiences.
- \* Have a supply of books related to the theme (see resources).

##### F. COMPUTER

- \* Provide the CD "Beachy Keen!" by Carole Marsh.

#### G. DRAMATIC PLAY

- \* Have available clothes, materials, and props for a day at the beach, wading in the tidepool, or picnicking at the beach.

#### H. MATH

- \* Provide an assortment of seashells. Use these to sort according to attributes. Graph the results on a graphing mat.
- \* Provide tangram blocks. Have students create fish shapes using the tangrams.

#### I. LANGUAGE ARTS

- \* Read “The Left/Right Beach Story” by Pam Leiker and do the corresponding activity with the students.

## RESOURCES

A House for Hermit Crab, (video) Reading Rainbow.

Amos, William H., Exploring the Seashore, National Geographic Society.

Asch, Frank, Sand Cake, New York, Parent’s Magazine Press, 1978.

Baker, Leslie, Morning Beach, Little Brown, Boston, 1990.

Bowden, Joan, Why the Tides Ebb and Flow, Houghton Mifflin, 1979.

Burnington, John, Come Away From the Water, Shirley, Crowell, New York, 1977.

Carle, Eric, A House for Hermit Crab, Scholastic.

Crews, Donald, Harbor, Greenwillow, New York, 1982.

Day, Alexandra, River Parade, Viking, New York, 1990.

Dodd, Lynley, The Smallest Turtle, Gareth Stevens, Inc.

Feeney, Stephanie and Fielding, Ann, Sand to Sea, University of Hawaii Press.

Florian, Douglas, A Beach Day, Greenwillow, New York, 1990.

Gunzi, Christiane, Tide Pool, Doring Kindersley, 1992.

Hartman, Gail, For Sand Castles of Seashells, Bradbury, New York, 1990.

Heyduck-Huth, Hilde, The Starfish, Macmillan.

Hopkins, Lee Bennett, The Sea is Calling Me, Harcourt Brace Jovanovich.

Jenkin-Pearce, Susie, The Seashell Song, Lothrop, Lee & Shepard.

Johnson, Sylvia, Hermit Crabs, Lerner Publications, Co.

Lund, Doris Herold, The Paint-Box Sea, McGraw-Hill Book Company.

Marsh, Carole, Beachy Keen! (Computer CD), Gallopade Publishing, Marietta, GA 30067, (404) 577-5085.

McDonald, Megan, Is This a House for Hermit Crab?, Orchard Books.

McMillan, Bruce, One Sun-A book of Terse Verse, Holiday House, New York, 1990.

Raffi, Down by the Bay.

Rockwell, Anne and Rockwell, Harlow, At the Beach, Macmillan, New York, 1987.

Rylant, Cynthia, Henry and Mudge and the Forever Sea, Bradbury, New York, 1989.

Samton, Shelia White, Beside the Bay, Philomel Books, New York, 1987.

Silver, Donald, One Small Square Seashore, W.H. Freeman and Company, 1993.

Sis Peter, Beach Ball, Greenwillow, New York, 1990.

Stock, Catherine, Sophie's Bucket, Lothrop, Lee & Shepard.

Taylor, Barbara, Shoreline, Dorling Kindersley, 1993.

Tripping with Terwilliger, Bay Tidelands (video), Terwilliger Nature Education Center, P O Box 722, Tiburon, CA 949920-0722.

Yamashita, Haruo, Mice at the Beach, Morrow, New York, 1987.

Ziefert, Harriett and Mavis Smith, Hurry Up, Jessie!, Harper Collins, New York, 1991.

Zion, Gene, Harry By the Sea, Harper, New York, 1965.

The Left/Right Beach Story, June/July—Creative Teaching Press.

# WATER SOURCES

(Tune: Go Tell Aunt Rhody)

What are water sources  
What are water sources  
What are water sources  
Where can water be found?

Streams and rivers  
Streams and rivers  
Streams and rivers  
Flow within our state.

Water flows underground  
Water flows underground  
Water flows underground  
And bubbles up as a spring.

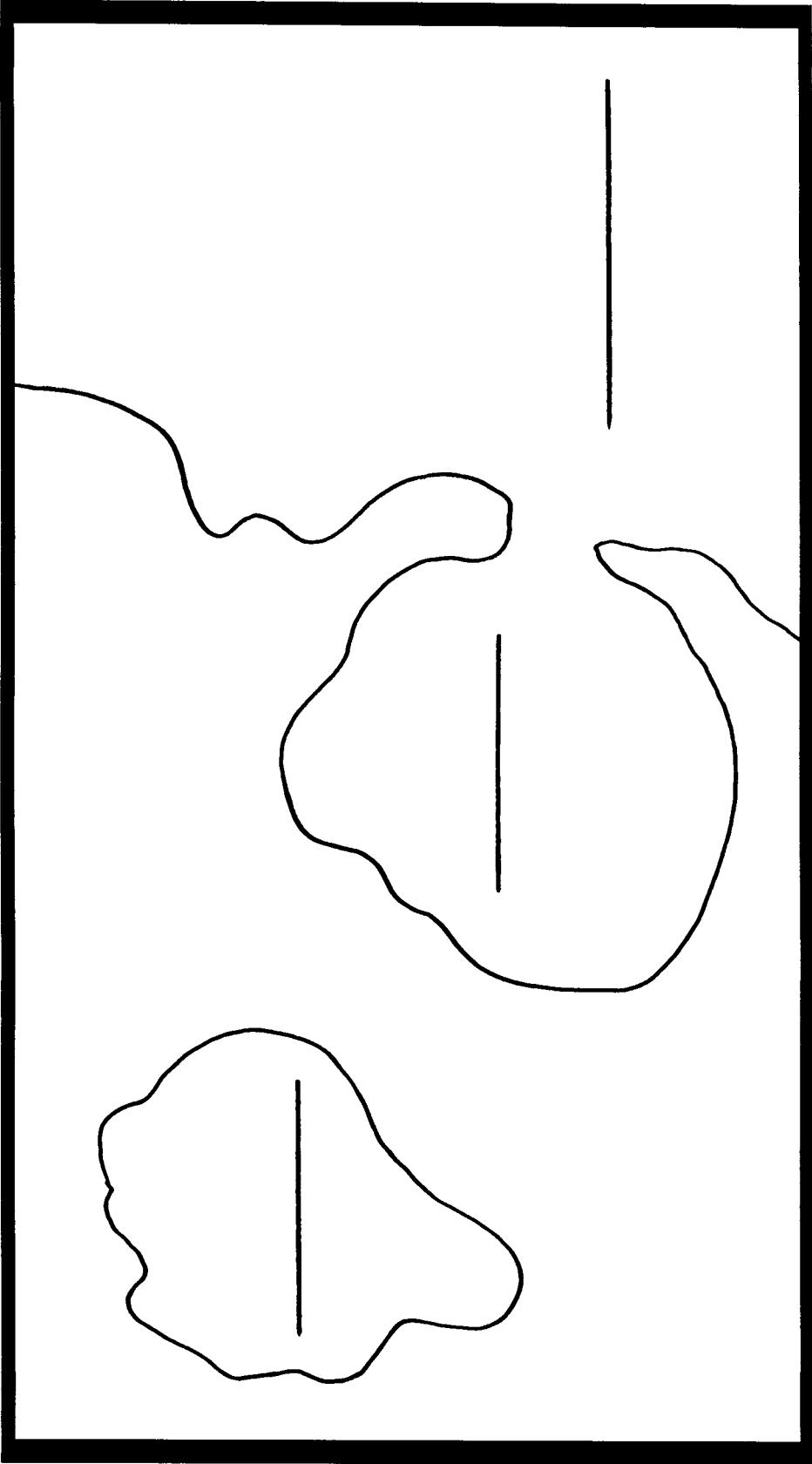
Bays and oceans  
Bays and oceans  
Bays and oceans  
Are salty as can be.

Small ponds and big lakes  
Small ponds and big lakes  
Small ponds and big lakes  
Act as reservoirs.

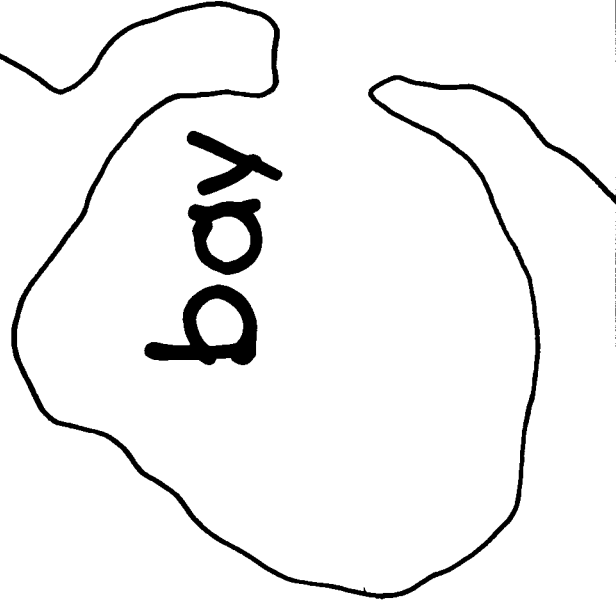
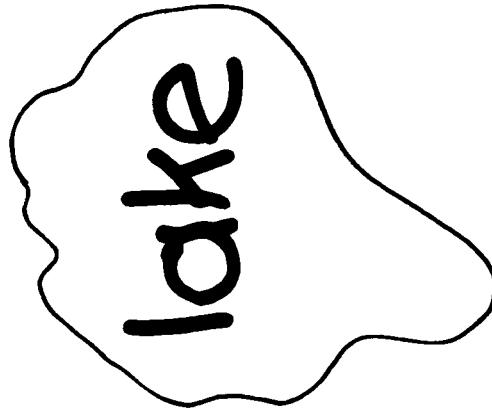
These are water sources  
These are water sources  
These are water sources  
And where they can be found.

Name \_\_\_\_\_  
Label each body of water.

bay ocean lake



# Bodies of Water (setting the stage: C)



ocean





# MARIE DEBRIS

K-2

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## OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Tell at least two things they can do to reduce litter or protect marine animals; and
2. Give an oral or written definition of the new terms: debris and marine animals.

## BACKGROUND INFORMATION

Trash discarded in oceans and on beaches threatens the health and safety of people, birds, fish, and marine animals. An estimated 14 billion pounds of trash is dumped in the world's oceans each year. Many sea birds and marine animals die each year from entanglement in marine debris or from eating plastic. Boats are often damaged by trash in the water.

### Terms

**debris:** the remains of something broken down or destroyed.

**marine animals:** animals that live in the sea or in a tidal pool.

## ADVANCE PREPARATION

- A. Use a garbage bag (head) and garbage (facial features) to make the character "Marie Debris." Stuff the bag with crumpled newspaper. (See attached illustration).
- B. Write information about marine debris on cash register tape (thin roll of paper). Place the roll of paper inside the bag and feed the end out through "Marie's" mouth. See marine debris fact sheet for needed information.

### **SUBJECTS:**

Science, Art

### **TIME:**

1 hour

### **MATERIALS:**

1 large plastic garbage bag  
1 small garbage bag for each student  
miscellaneous garbage items  
cash register tape  
5 pounds sugar  
drawing paper  
glue

## PROCEDURE

### I. Setting the stage

- A. Introduce “Marie Debris.” Ask students “What is debris?” Write the word “debris” on the chalkboard (the remains of something broken down or destroyed). Is debris harmful? Good? How?
- B. Slowly pull the tape out through the character’s mouth and read the information.

### II. Activities

- A. Let each child create their own trash character using small garbage bags and garbage. Help them think of trash related names like:

Ricardo Discardo  
Ashley Trashley

1. Have students draw a picture of the effect debris has on sea animals on an 8 1/2” x 5 1/2” piece of drawing paper. May need to review marine debris facts.
2. Glue picture on back of Marie Debris.
3. Display trash characters by hanging them from the ceiling in order to display both sides.

### III. Follow-Up

- A. Walk around the school grounds and pick up trash.
- B. There are things you can do to help. List the following things on chart paper and read them aloud:
  1. Don’t throw trash in the water or on the beach.
  2. If you see trash, pick it up and put it in a garbage can.
  3. Don’t throw anything out of your car.
  4. Don’t use helium balloons, sometimes they fall in water and are eaten by marine mammals.
  5. Reduce the amount of waste you generate by recycling.

### IV. Extensions

- A. Write “14,000,000,000 pounds” on the chalkboard. Ask the children what that number is. Tell them, 14 billion.
- B. Pass around a five pound bag of sugar (let each student hold it). Write “five

pounds” on the board. Say, “This bag of sugar weights five pounds. Is it heavy? Every year people put 14 billion pounds of trash in the oceans or on the beaches of the world.

- C. Is that a lot of garbage? Use a calculator to show how many five pounds of sugar make 14 billion pounds.

## **RESOURCE**

Gulf of Mexico Program Gulf Facts, Stennis Space Center, Mississippi.

# MARINE DEBRIS FACT SHEET

An estimated 14 billion pounds of trash, much of it plastic, have been dumped in the world's oceans every year.

Over 1 million pounds of trash and debris were picked up on Gulf beaches during the 1988 beach cleanup.

Over 68% of the trash picked up during the 1988 cleanup was plastic.

The worldwide fishing industry dumps an estimated 150,000 tons of plastic each year, including packaging, plastic nets, lines, and buoys.

Plastics are lightweight and durable. Beverage 6-pack yokes may persist 450 years in the marine environment.

Within the U.S., an estimated 2 million seabirds and 100,000 marine mammals die each year from entanglement in marine debris or ingestion of plastics mistaken for food.

Waterborne debris fouls boat propellers and water intake structures, disabling engines, necessitating costly repairs, and creating a safety hazard for boat operators.

Debris such as plastic sheeting becomes entangled in fishing nets. Trawling nets are often snagged and torn on oil drums and other heavy objects at sea.

As much as 1 ton per mile of litter is picked up along Gulf Coast beaches each year during volunteer cleanups.

## Marie Debris

Make a large character using a garbage bag.



Write background information on cash register tape.



# OCEANS AND PONDS

K-2

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## OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Identify, orally or in writing, some animals that have an aquatic habitat;
2. Classify, orally or in writing, animals according to the type of aquatic habitat; and
3. Give an oral or written definition of the new terms: aquatic and habitat.

### **SUBJECTS:**

Science, Art

### **TIME:**

2 one hour sessions

### **MATERIALS:**

index cards  
chart paper  
tape  
blackline master,  
Water-Fresh-Salt  
blackline master, Water Habitats

## BACKGROUND INFORMATION

Animals must have a home that provides all their needs: the right amount of water, the right kind of food, and the right temperature. A home that provides all these things is called a habitat.

There are many different habitats on Earth. Ponds and oceans are examples of aquatic habitats. An ocean is a salt water habitat. A pond is a fresh water habitat.

### Terms

**aquatic:** living or growing in or on water.

**habitat:** the place or type of site where a plant or animal naturally or normally lives and grows.

## ADVANCE PREPARATION

- A. Make two charts with the following titles:

Water Animals  
Fresh Water/Salt Water (make 2 columns)

B. Copy the blackline masters:

Water-Fresh-Salt  
Water Habitats

C. Prepare mural background.

D. Cut two large pieces of blue bulletin board paper. Cut one piece in the shape of a pond and the other wavy like the ocean. Label: Ocean - Salt Water, Pond - Fresh Water.

## PROCEDURE

I. Setting the stage

A. Ask each student to name an animal that lives in water.

B. Write the name of the animal on an index card and give it to the student. Have each student to tape his/her card on the Water Animals chart.

II. Activities

A. Pass out the Water-Fresh-Salt worksheet (blackline master included).

1. Go over the Water Animals Chart having the students classify each animal's aquatic habitat as fresh water or salt water by writing the name of the animal in the appropriate column.

B. Display the ocean and pond murals. Ask each student to draw a picture of the animal he/she chose. Then cut out the picture and glue it to the pond or ocean mural.

III. Follow-Up

A. Pass out the Water Habitats worksheet (blackline master included). Have students cut out the animal pictures and glue each one in its proper aquatic habitat.

B. Make a whale as an example of a salt water mammal. Share why the whale is a mammal and not a fish (instructions included).

IV. Extensions

A. Have each student choose one animal and write and illustrate a story about how/where the animal gets water.

B. Make a book titled Animals and Water by stapling the students' stories together and making a cover. Place the book in your classroom library.

C. Explore other types of animal habitats and create a diorama display of them.



## RESOURCE

DeBruin, Jerry, Creative, Hands-On Science Experiences, Good Apple, Inc., Carthage, Illinois, 1980.

## SACK WHALE PATTERN

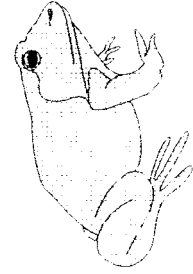
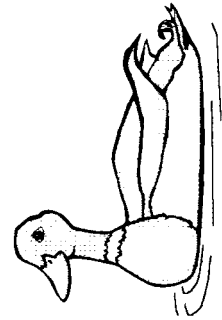
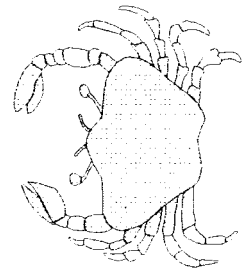
1. Spread flat, large paper sack.
2. Trace fluke pattern at top of bag and paint sack.
3. Cut an X in the bag for the blow hole.
4. For the waterspout, roll a piece of 9" x 12" blue construction paper into a cylinder shape. Tape it so it won't unroll.
5. Let the students cut on the fluke pattern lines.
6. Have the students open bag and stuff with crumpled paper from the recycling bin.
7. Staple fluke closed.
8. Using markers, let the students make the whale's mouth and eyes.
9. Let the students cut the blue construction paper cylinders halfway down all the way around. Cut the fringed strips to represent the waterspout. Insert into X shaped hole.
10. Cut two fins from construction paper and glue to the whale's side.



Salt-water Habitat      Fresh-water Habitat

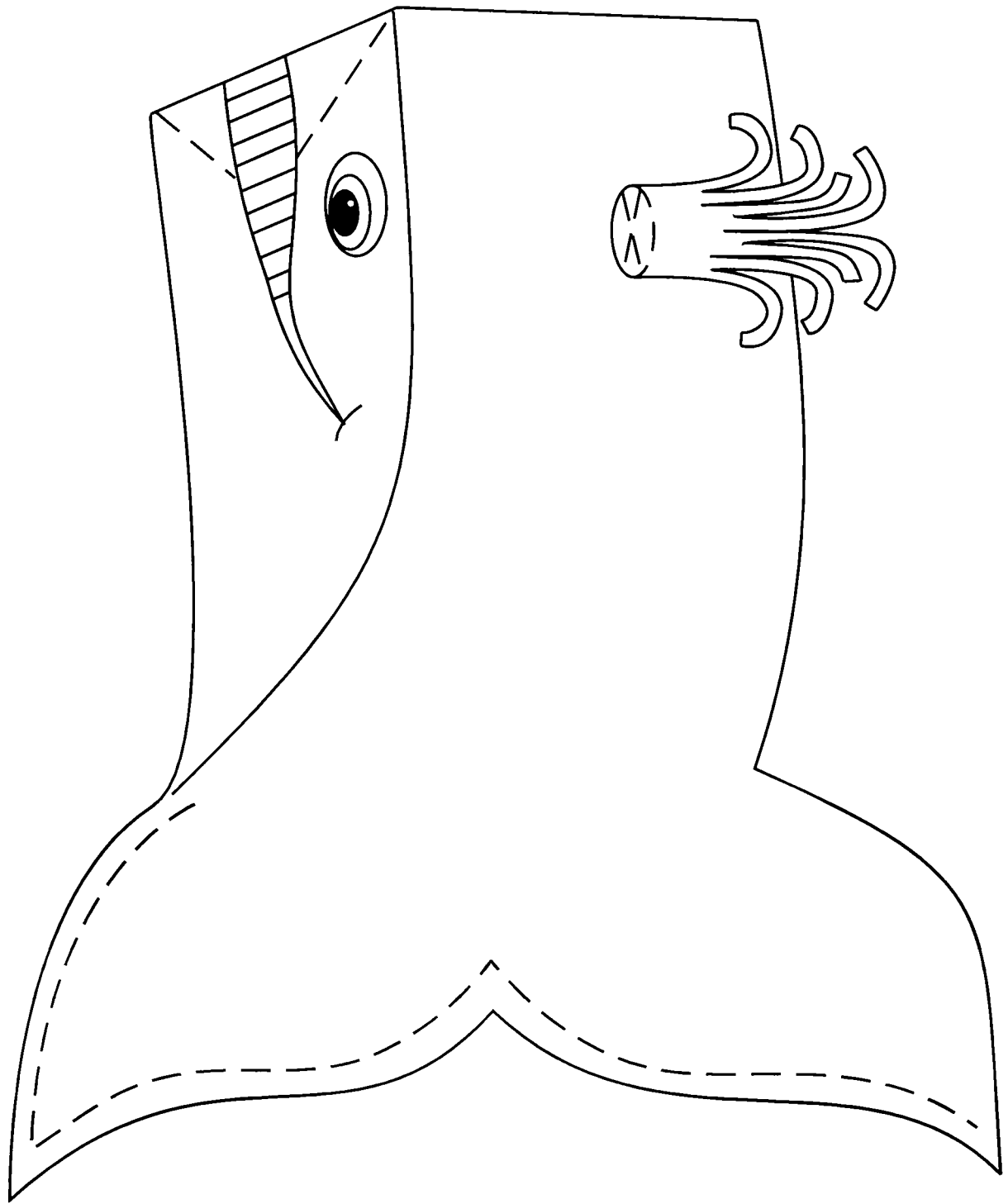
Ocean

Pond

Cut out the pictures and paste each one in its natural habitat. Color the picture.



Fresh-Water 	Salt-Water 





# HOW DRY I AM, HOW WET I'LL BE!

K-2

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## OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Make a model of the ocean tide to create a tidal pool;
2. Write or tell what plants and animals were found in a tidal pool;
3. Demonstrate, orally or in writing, the role of suction in the survival of tidal pool creatures; and
4. Give an oral or written definition of ocean tides.

## BACKGROUND INFORMATION

Many different areas of our world are covered with water. In each type of water, different types of plants and animals flourish. Survival of these plants and animals are determined by different water temperatures, water pressure, food supply, chemical balance, and other water characteristics. The physical characteristics of marine life and their adaptability determine their habitat. Coastal marine life must be able to adapt to tidal changes.

### Term

**ocean tides:** the natural rise and fall of the ocean caused by the moon's gravitational pull.

## ADVANCE PREPARATION

- A. Prepare gelatin, but remove from refrigerator before it is completely set.

## PROCEDURE

- I. Setting the stage
  - A. Share stories about trips to the beach. Describe the waves and tides.

### **SUBJECTS:**

Science, Language Arts, Art

### **TIME:**

1 hour

### **MATERIALS:**

cake pan  
blue or green gelatin  
suction-cup hooks  
sand  
paper cup  
water  
small paper plate  
crayons  
scissors

## II. Activities

### A. Demonstration of high and low tides.

1. Pour a layer of gelatin into one half of a cake pan and pour a layer of sand in the other half. Embed part of a paper cup in the sand. This will be a tidal pool.
2. Slowly tilt the pan so that the gelatin starts moving toward shore. Tilt the pan slowly forward and back, going forward more each time. This represents the tide moving in.
3. If the beach is rocky, water from high tide collects around rocks forming tidal pools. Some gelatin will remain in the cup as the tide goes back out to sea.

### B. Demonstration

1. Use “My Home is a Tidal Pool” to show various creatures found in this habitat.
2. Explain that these animals must attach themselves to rocks or be swept out to sea. Explain suction by pressing a suction cup on the table or by using a vacuum cleaner hose and a paper plate. The animals secure their food as the water passes food over and around them. They open their mouths, never losing their hold on the rocks, and secure their nourishment.

## III. Follow-Up

- A. Write a dialogue between tidal pool inhabitants.
- B. Research a particular tidal pool creature and report to the class.
- C. Make a paper plate hermit crab. See “Hermy the Hermit Crab.”

## IV. Extensions

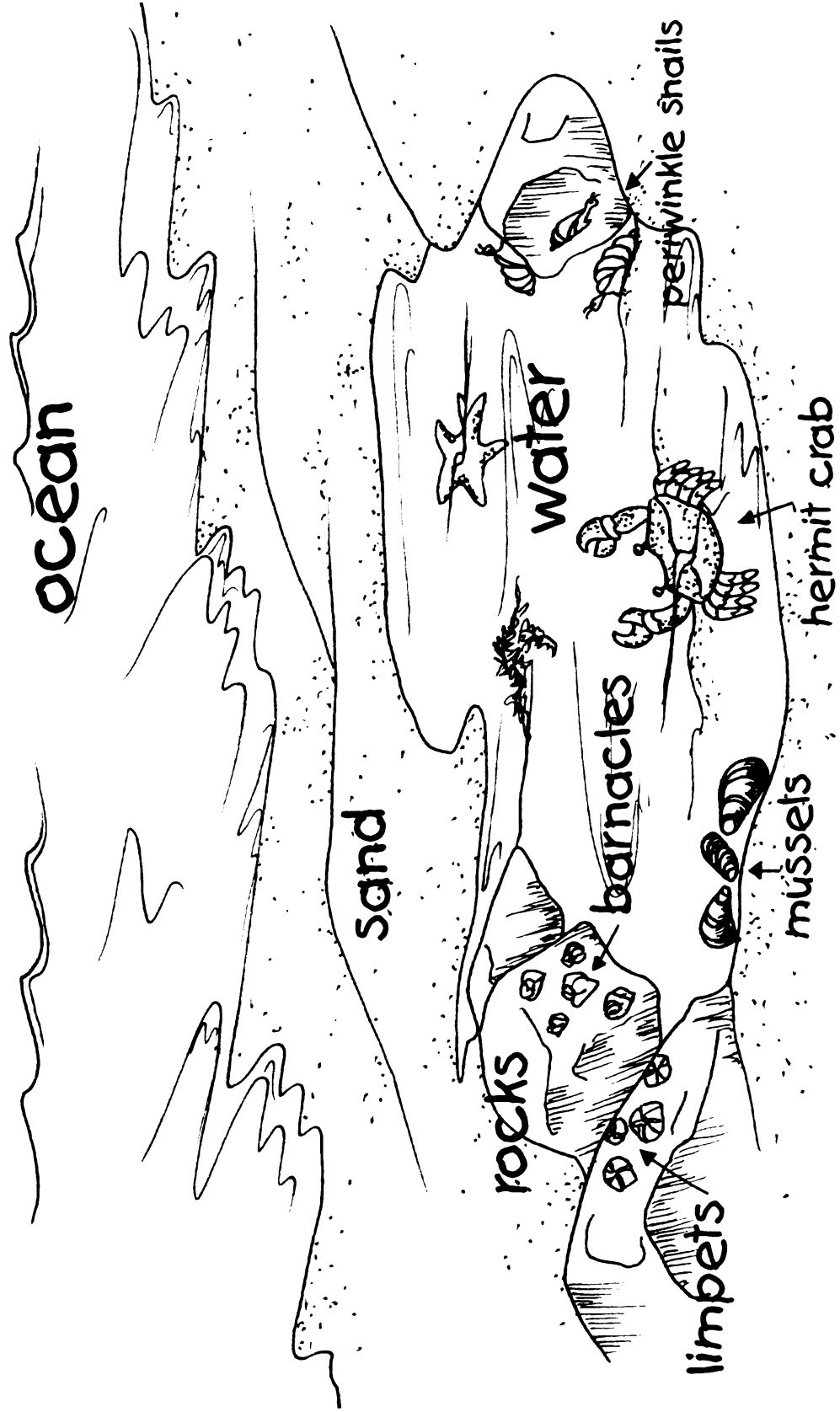
- A. Discuss how the native Americans used these animals for food and ornamentation.
- B. Write a story about a visit to a tidal pool.

## RESOURCE

Schaffer, Frank, School Days, Sept/Oct, 1995.

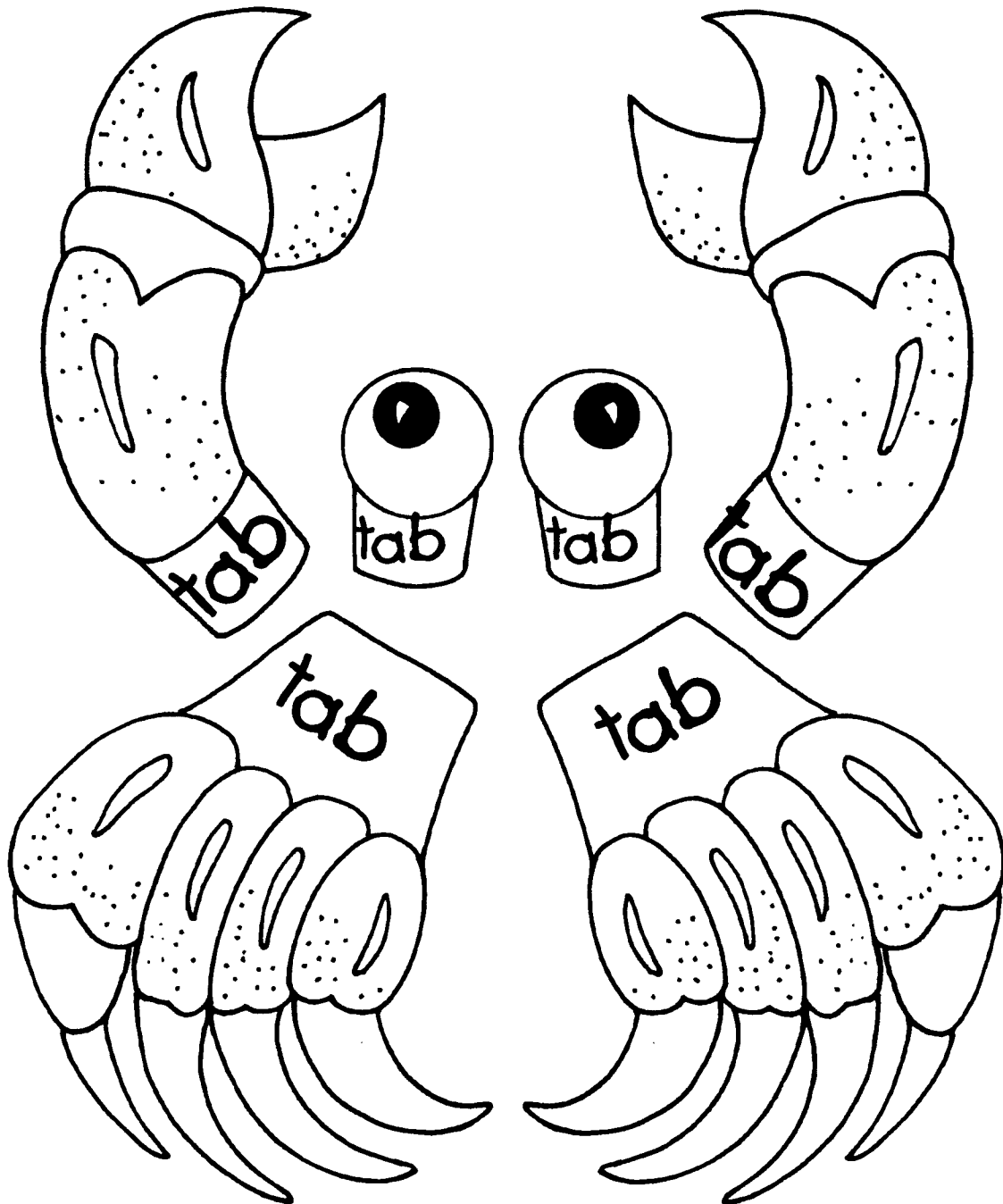


# " My Home Is A Tidal Pool "



# Hermy the Hermit Crab

Fold a small paper plate in half and glue the tabs to it.



# GET THE OIL OUT!

K-2

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## OBJECTIVES

At the end of this lesson, the students shall do the following:

1. Hypothesize, orally or in writing, what will happen when oil and water are mixed;
2. State, orally or in writing, that oil is less dense than water; and
3. Give an oral or written definition of the new terms: absorbents and oil spill.

### **SUBJECT:**

Science

### **TIME:**

20 minutes

### **MATERIALS:**

colored water  
oil  
shredded paper, or sawdust  
feathers  
containers for the oil, water,  
and shredded paper

## BACKGROUND INFORMATION

Water pollution, one of the most serious types of environmental abuse, is evident in streams, lakes, rivers, and oceans throughout the world.

Oil pollution is a growing hazard and a new source of water pollution. It can potentially destroy the ecosystem of the water environment.

The oil and water do not mix. The oil is less dense than water so it will stay on top of the water, even if it is shaken or mixed. The oil can be removed from the surface of water through the use of detergents and emulsifiers. However, a significant amount of pollution from oil eventually settles as sediment in the rivers, lakes, and oceans.

### Terms

**absorbents:** shredded paper, sawdust, and other materials that have the power to absorb; these can be dipped into or spread across an oil spill to absorb or soak up the oil.

**oil spill:** a form of pollution in which oil from various sources leaks into the water.

## ADVANCE PREPARATION

- A. Have water, oil, and shredded paper or sawdust in separate containers.

## PROCEDURE

### I. Setting the stage

A. Have children hypothesize what will happen when oil and water are mixed.

1. Pour the water and oil in a clear jar. Observe what happens. Shake the jar and let the students observe how oil and water will separate.

### II. Activities

A. Sprinkle shredded paper or sawdust on top of the oil. Let the students observe how the paper and sawdust act as a sponge to absorb the oil. Dip sawdust or paper out and let a student run a feather (or their finger) across the water to see if the oil has been removed. Estimate how many times it will take before this procedure cleans the water. Repeat the feather test after each cleaning.

### III. Follow-Up

A. Show the film “Free Willy II” and talk about how oil affects different kinds of wild life. You should also talk to the class about the disadvantages to this clean-up method. (The absorbents themselves have to be disposed of after they are used.)

### IV. Extensions

A. Have the class bake a cake to show that sometimes with other ingredients, oil and water will mix and the results can be delicious! Let the class decorate the cake to culminate a special unit of study.

## RESOURCES

Freeman, Don, The Sea and the Slick, Viking, 1974.

“Alaska’s Big Spill: Can the Wilderness Heal?,” National Geographic, Vol. 177, No. 1, January, 1990.

# SIFTING THROUGH THE WETLANDS

K-2

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## OBJECTIVES

At the end of this lesson, the students shall be able to do the following:

1. Predict, orally or in writing, if sand will go through a screen;
2. Form an oral or written hypothesis related to the experiment;
3. Create a commemorative stamp to display at the post office; and
4. Give an oral or written definition of the new terms: bog, marsh, and swamp.

### SUBJECTS:

Science, Social Studies, Math, Art

### TIME:

45 minutes

### MATERIALS:

pictures of different wetlands  
coffee filter  
dirty water  
3 glass jars  
window screening  
construction paper  
colored markers  
sand, sticks, rocks, leaves  
glass or clear plastic container

## BACKGROUND INFORMATION

Many wetland areas which have been lost to farming and commercial development were a valuable resource as natural sewage systems. Environmentalists have discovered that wetland plants can absorb excess nitrogen and phosphorous from sewage and can filter waste from runoff and streams that flow into the wetland area protecting bodies of water downstream. Dangerous wastes are absorbed by the wetlands until they have time to breakdown to safer levels. Many rich nutrients that are lost through runoff fertilize wetland plants which, in turn, feed wetland animals.

This lesson will help students to realize how wetlands are nature's kidneys or filtering system. By sifting sand (representing the water) through a window screen (representing the wetlands), students can see how the finer sand is filtered through leaving the larger pieces (the pollutants) behind. Wetlands play an important role in the balance of our world.

### Terms

**bog:** freshwater marsh with build-up of peat and high acidity that typically supports mosses adapted to acidic soil conditions, many are located in colder regions.

**marsh:** wetland dominated by grasses.

**swamp:** wetland dominated by shrubs and trees.

## ADVANCE PREPARATION

- A. Locate pictures of swamps, marshes, and bogs.
- B. Place a coffee filter on top of a glass jar. Have dirty water with sticks, mud, leaves, and rocks in another glass jar.
- C. Reproduce the Sand Box Graph on poster board for the number of students in the class. For younger children, do one graph with the whole class.
- D. For each student make a 6" x 6" wetland window by stapling folded pieces of 6" x 2" construction paper to a 6" x 6" cut piece of window screen. Write on the top of the frame "Wetland Window, To See the Future of Our Wetlands." And on the sides write "Swamps," "Marshes," and "Bogs." (See attached diagram.)

## PROCEDURE

- I. Setting the stage
  - A. Find pictures of different kinds of wetlands (see resources) and discuss with students the difference between a swamp, marsh, and bog. Discuss how important these wetlands are to our Earth.
  - B. To show students how wetlands filter pollutants and waste, pour dirty water with sticks, leaves, and mud through a coffee filter. Compare the dirty water with the filtered water. Then discuss how swamps, marshes, and bogs are nature's filters to get rid of unwanted substances.
- II. Activities
  - A. Place a kitchen colander or strainer over a glass or clear plastic container with a glass of regular sand on a table for all students to see. Display the Sand Box Graph at the students' level with two different colored markers.
  - B. Show students the screen and a glass of sand. Ask students to predict what will happen if the sand is poured on the screen by coloring a square on the Sand Box Graph. Count how many students predicted all of the sand would fall through and how many predicted only some of the sand would fall through. Discuss which prediction had more. Then, ask how many more students predicted this. Using the prediction that had more, have the students to form a hypothesis. (Example: When pouring sand through a screen all of the sand will fall through the holes. Help the students to become more familiar with the word hypothesis by describing it as a guess that scientists make for their experiments). Then place the sand on the screen and discuss with the students what happened. Ask if their hypothesis is correct. (Scientists often rewrite their hypotheses to fit their experiments.)
  - C. Place students in small groups with their own "Wetland Window" to explore with "dirty" sand (sand mixed with sticks, leaves, and rocks) what happens when they pour it through

the screen. The children will enjoy watching the screen filter out the larger materials and create the fine sand. Later, in large groups, ask the students how the Wetland Window is like the wetlands and which way they like the sand best, with the sticks, leaves, and rocks or without. Relate this to the wetlands. Just as the Wetland Window filters the sticks, leaves, and rocks from the sand to make it cleaner, the Wetlands filter pollutants from the water to make it cleaner. Have students take their windows home to show their parents.

### III. Follow-Up

- A. Discuss with the students what might happen if all the wetlands were eliminated from the planet. Discuss how valuable the wetlands are to our world. Ask students what they think they could do to help save the wetlands or reduce losses of wetlands. Direct them in drawing a commemorative stamp or writing a class letter to their state senator reminding him/her of the value of wetlands. Have them draw pictures of wetlands and how they are being destroyed for farmland or industry, and display them at the post office and/or send them to one of the following addresses:

Soil and Water Conservation Society  
7515 Northeast Ankeny Road  
Ankeny, Iowa 50021

Water Pollution Control Federation  
601 Wythe Street  
Alexandria, Virginia 22314

Worldwatch Institute  
1776 Massachusetts Avenue NW  
Washington, D.C. 20036

Help your students to understand that there is something they can do and that whatever they do will make a big impact on the health of our planet.

### IV. Extension

- A. Have students help write a letter for other information on wetland activities to:

WETLANDS  
Mail stop 6217, Main Interior Building  
U.S. Department of the Interior  
Washington, D.C. 20240

## RESOURCES

Cortesi, Wendy W., Explore a Spooky Swamp, National Geographic Society, Washington, D.C., 1978.

Dobrin, Arnold, Marshes and Marsh Life, Coward-McCann, New York, 1969.

Facklam, Margery, And Then There Was One, The Mysteries of Extinction, Sierra Club Books/Little, Brown and Company, San Francisco, 1990.

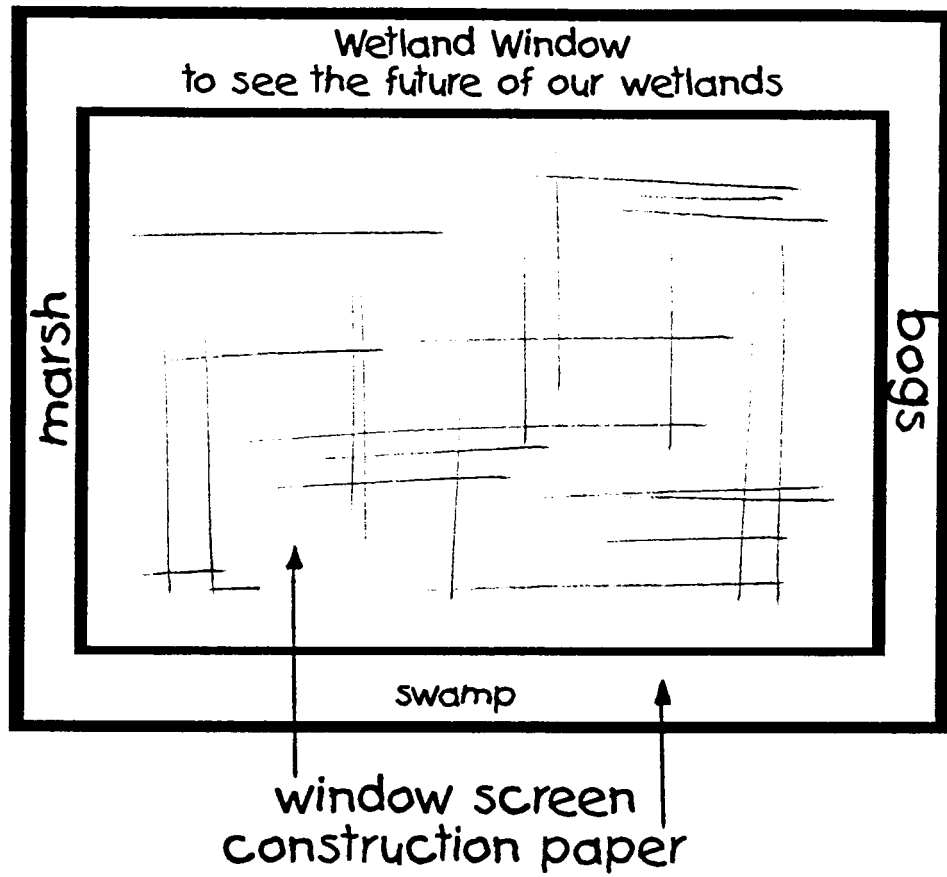
Greenway, Shirley, Animal Homes, Water, Newington Press, Connecticut, 1990.

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Liptak, Karen, Saving Our Wetlands and Their Wildlife, Franklin Watts, New York, 1991.



# Diagram



# Sand Box Graph

**Hypothesis:**

<b>All of the sand will go through the screen.</b>	<b>Some of the sand will go through the screen.</b>

# Wetlands Commemorative Stamp

