

MUDPUPPY POND

K-2

OBJECTIVES

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

1. Describe, orally or in writing, the amount and distribution of water on the Earth in fresh water and sea water;
2. Identify, orally or in writing, causes of water pollution;
3. Describe and evaluate, orally or in writing, the effects of different kinds of land use on wetland habitats; and
4. Give an oral or written definition of new terms: habitat, lake, pollution, pond, river, runoff, urban stormwater runoff, and watershed.

BACKGROUND INFORMATION

For years people believed that materials dumped into water supplies would decompose or be diluted to the point that they were virtually harmless. It has been shown that unlimited and unmonitored dumping of wastes can be very harmful to water supplies. The vast quantities of industrial, animal, and human wastes produced must first be treated, either physically or chemically, before they are allowed to re-enter lakes, streams, rivers, and oceans. Bodies of water cannot clean themselves as fast as people pollute them—so people must try to keep out pollutants from water.

Frogs are an indicator species because they are among the first animals to be affected by habitat destruction and environmental pollution. The disappearance of frogs from any habitat signals a coming ecological crisis. By recognizing the importance of saving frogs and acting to stop environmental contamination, we can save other species including ourselves.

SUBJECTS:

Science, Language Arts, Art, Music

TIME:

1 hour preparation time
50 minutes

MATERIALS:

12-14" x 22" poster board
glue
plastic frog
1 gallon jar
tablespoon
cold tap water
36" x 24" cardboard box or refrigerator box
1 heavy duty 33 gallon trash bag
sand
aluminum foil
2-4 index cards
popsicle sticks
7 small paper cups or baby food jars
soil
small rocks or gravel
brown sugar ("fertilizer")
pancake syrup or molasses ("oil")
salt
punched paper dots ("litter")
detergent (no phosphate type)
warm tap water
red food coloring ("sewage")
green food coloring ("toxic waste")
yellow food coloring ("animal waste")
wood ashes from fireplace

Terms

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

lake: a standing body of water which undergoes thermal stratification and turnover by mixing.

pollution: an unwanted change in air, water, or soil (usually through the introduction of pollutants or contaminants) that can affect the health and survival of humans and other organisms.

pond: a still body of water smaller than a lake where mixing of nutrients and water occurs primarily through the action of wind (as opposed to turnover).

river: a large body of flowing water that receives water from other streams and/or rivers.

runoff: water (originating as precipitation) that flows across surfaces rather than soaking in; eventually enters a waterbody; may pick up and carry a variety of pollutants.

urban stormwater runoff: road salt, soil, lawn and garden chemicals, and pet wastes travel via streets and storm drains to nearby rivers, lakes, and ponds.

watershed: land area from which water drains to a particular surface waterbody.

ADVANCE PREPARATION

- A. To set up Verde Frog's habitat, cut sides of cardboard box leaving a depth of 8 inches. Slit the heavy duty garbage bag down one side and across the bottom. Line the cardboard box with the plastic bag. Place about 4-5 inches of sand in box forming a watershed area, river, creek, and pond. Line the waterways with aluminum foil to hold water in these areas.
- B. Place a plastic frog in pond.
- C. Number the baby food jars 1-9. Place soil in jar 1. Label it No. 1 - SOIL. Put 1/4 to 1/2 cup of water and 4-5 drops of yellow food coloring in jar 2. Label it No. 2 - ANIMAL WASTE. Put 1/4 cup brown sugar in jar 3. Label it No. 3 - FERTILIZER AND PESTICIDES. Put 1/4 cup molasses or syrup in jar 4. Label it No. 4 - OIL. Place paper punched dots in jar 5. Label it No. 5 - TRASH. Put 1/4 cup salt in jar 6. Label it No. 6 - SALT. Put 1/2 cup of warm water and a squirt of dishwashing detergent into jar 7. Label it No. 7 - FACTORY WASTE. Set out red and green food coloring. Label the red "sewage" and the green "toxic waste". Put 1/4 to 1/2 cup ashes in jar 8. Label it No. 8 - ASHES. Fill jar 9 with small rocks and cover with vinegar. Label it No. 9 - ROCKS.
- D. Make big book from suggested pages in activity.
- E. Make student copies of Verde (Spanish for green) Frog student activity page.

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PROCEDURE

I. Setting the stage

- A. If all of the Earth's water fit in a gallon jug, available fresh water would equal just over a tablespoon. About 97 percent of the planet's water is seawater; another two percent is locked in icecaps and glaciers. Vast reserves of fresh water underlie the Earth's surface, but much of it is too deep to tap economically. Help students understand the notion by modeling the gallon jug of water and a tablespoon of water.
- B. Tell the students that water pollution has become one of the most serious environmental problems facing the United States as well as countries around the world. Industry, government, cities, and towns have spent billions of dollars on research and treatment plants to try to reduce water pollution. Three chief sources of water pollution are: industrial (factory) wastes, municipal (city), wastes (sewage), and agricultural (farm) chemicals and wastes. Oil spills are another source of pollution. This activity will help students realize how water is polluted and the effects of pollution on animals.

II. Activities

- A. Ask students to identify pollution and ways in which water becomes polluted. Use a semantic map or word web to organize the students' ideas.
- B. Make word labels - watershed, pond, creek, frog habitat - using index cards and popsicle sticks. Ponds and freshwater wetlands are known as standing water habitats. Many species of animals live in these areas of freshwater. Habitats are areas where animals find food, water, and shelter necessary for their daily living and reproduction. Ponds and wetlands are some of the best places for frogs and amphibians to live. Place labels at appropriate places in the box of sand.
- C. Invite the students to see what happened to Verde Frog's habitat as pollution begins to invade Mudpuppy Pond. Pass out the activity jars, food coloring, and Verde Frog student activity page.
- D. Read the big book story, The Disappearance of Mudpuppy Pond - a story about the destruction of Verde Frog's habitat at Mudpuppy Pond. Pause after each page for students to add "pollution" to the frog's habitat. Every student should write down a different describing word each time they are asked the question, "How does Verde Frog feel?"
- E. After the "pollution" has been added to the habitat, discuss the appearance of the frog and his habitat. Record the describing words on a master list.

III. Follow-Up

- A. Go back to the semantic map organizer and with a different color marker, identify more ways water can be polluted.
- B. Follow-up this activity with “The Big Clean-Up.”

IV. Extensions

- A. Divide the class into up to 11 groups. Write a class comic strip about Verde Frog’s predicament. Assign a different pollution activity to each group. As groups place their pages on the wall, have students sequence the stages of polluting Mudpuppy Pond.
- B. After the discussion, have the students form a circle (symbolic of the water cycle), and sing the following song about Verde Frog.

SONG

Sing to the tune of “Froggie Went a-Courtin”.

Froggie was a floatin’ in Mudpuppy Pond, uh-huh, uh-huh.
Froggie was a floatin’ in Mudpuppy Pond, uh-huh, uh-huh.
His long sticky tongue helped him catch his prey;
Slurping his worm and a croakin’ all day, un-huh, uh-huh.

Pollution threatened to end his life, uh-huh, uh-huh.
Pollution threatened to end his life, uh-huh, uh-huh.
Contaminatin’ all his food;
And destroyin’ his home, oh how rude! Uh-huh, uh-huh.

Soon Froggie wasn’t feeling very well, uh-huh, uh-huh.
Soon Froggie wasn’t feeling very well, uh-huh, uh-huh.
Eroded soil filled his pond;
He lost his home since the water’s gone, uh-huh, uh-huh.

Be careful not to pollute the water, uh-huh, uh-huh.
Be careful not to pollute the water, uh-huh, uh-huh
Help our world and dispose your waste;
Put it in its proper place, uh-huh, uh-huh.

RESOURCES

Lind, Karen K. Water, Stones, and Fossil Bones, Council for Elementary Science International and National Science Teachers Association, Washington, D.C., 1991.

Polluted, United States Environmental Protection Agency, Office of Water, Washington, D.C.

Ranger Rick’s Nature Scope. Let’s Hear It For Herps! National Wildlife Federation, Washington, D.C., pp. 19-35, 1987.

Water-The Power, Promise, and Turmoil of North American's Fresh Water. National Geographic Special Edition (1993), Vol. 184, No. 5.

Poster - Water-Precious Resource can be obtained from the National Geographic Society, 1745 Seventeenth Street, NW, Washington, DC, 20013-7138. Poster includes a map of the United States and surface water, groundwater, sources of water pollution, hazards of irrigation maps, and facts about water use.

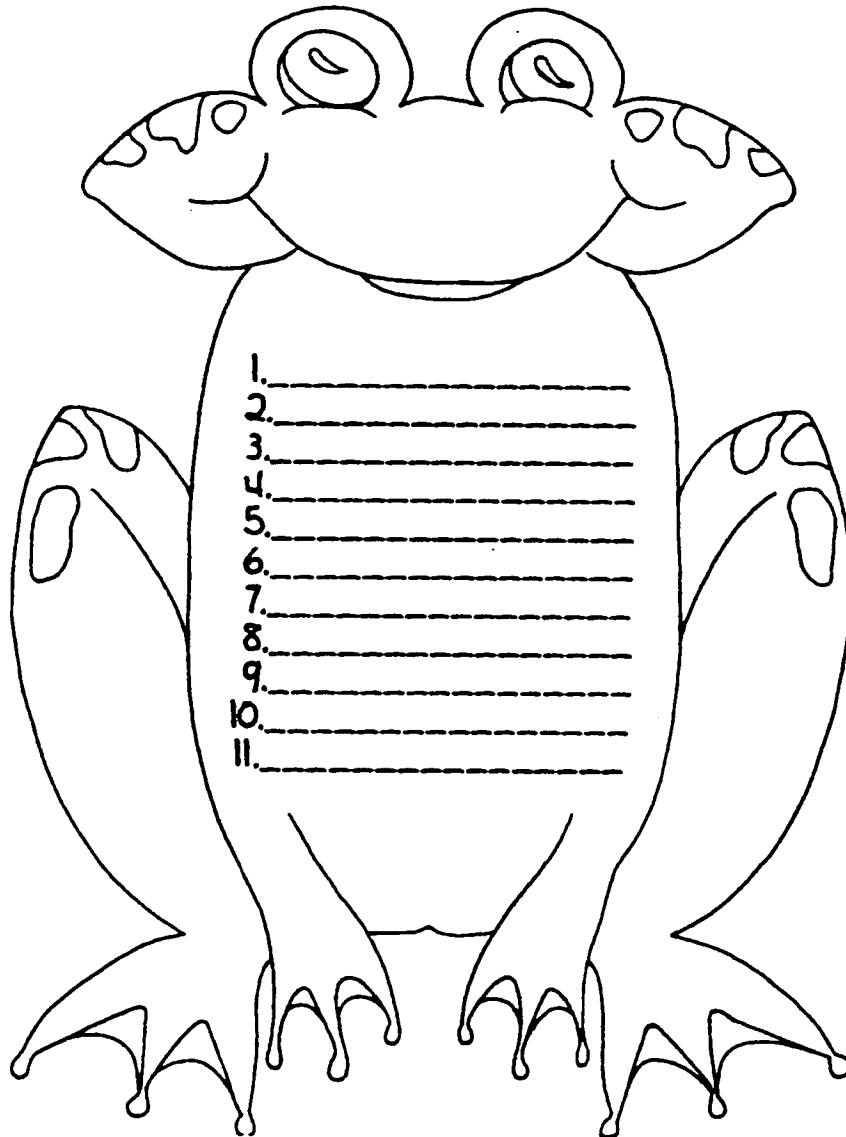
Poster - Water Quality and others can be obtained from the U.S. Geological Survey by writing to the following address:

U.S. Geological Survey, Box 25286, Denver Federal Center, Denver, CO 80225. In your letter, please identify the poster title and grade level.

Videos - National Geographic Programs and Products
Great Lakes, Fragile Seas, general, 59 min., 1991.

Water: A Precious Resource, general, 23 min., 1980.

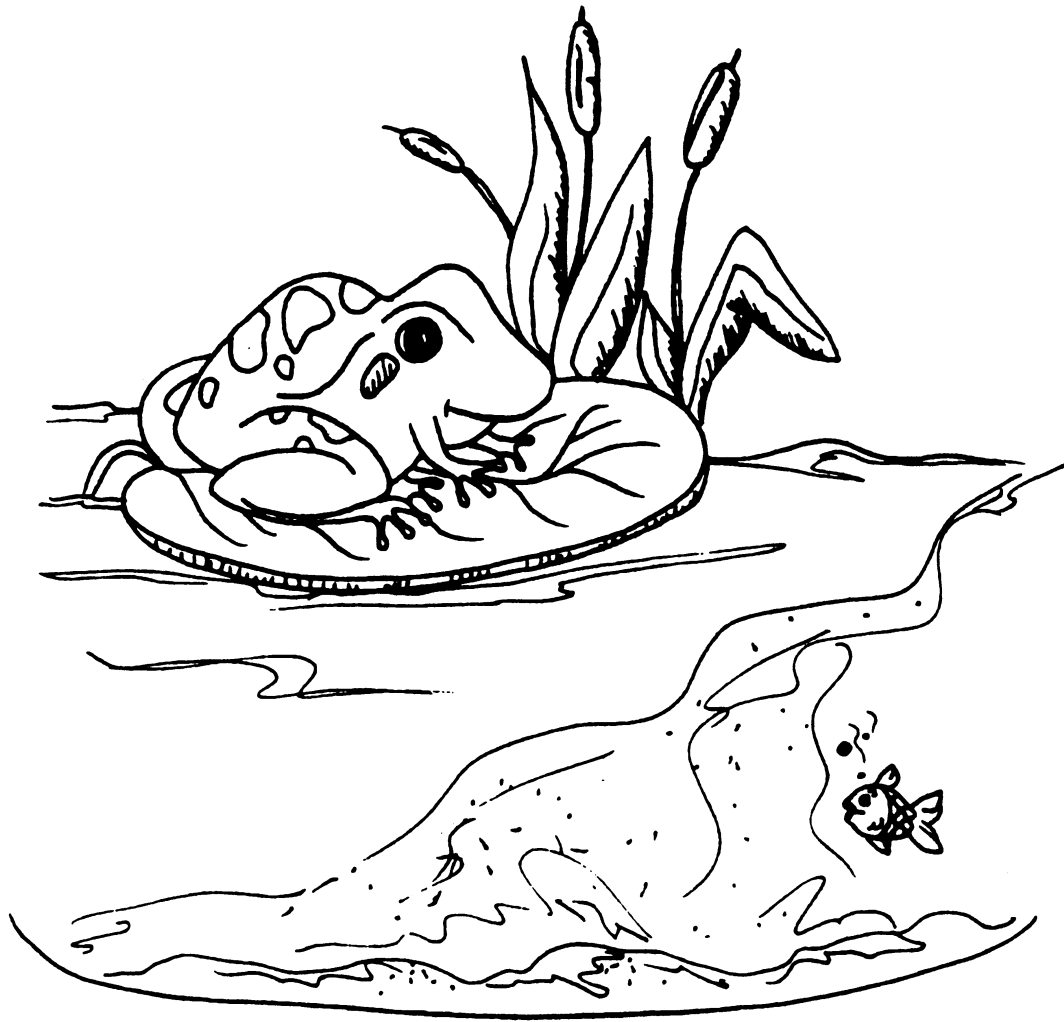
HOW IS VERDE FROG?



Directions: Write down a different describing word each time you are asked the question, " How does Verde Frog feel? "



In the spring, Verde Frog began his life at Mudpuppy Pond. Like all amphibians, he went through several changes or metamorphoses before he became a frog. The unpolluted waters of Mudpuppy Pond helped him grow from an egg, to a tadpole, and finally to an adult frog. Verde loved to hop and swim in Mudpuppy Pond. Slurping bugs and worms with his long sticky tongue was the best part of the day. Life was good. Until . . .

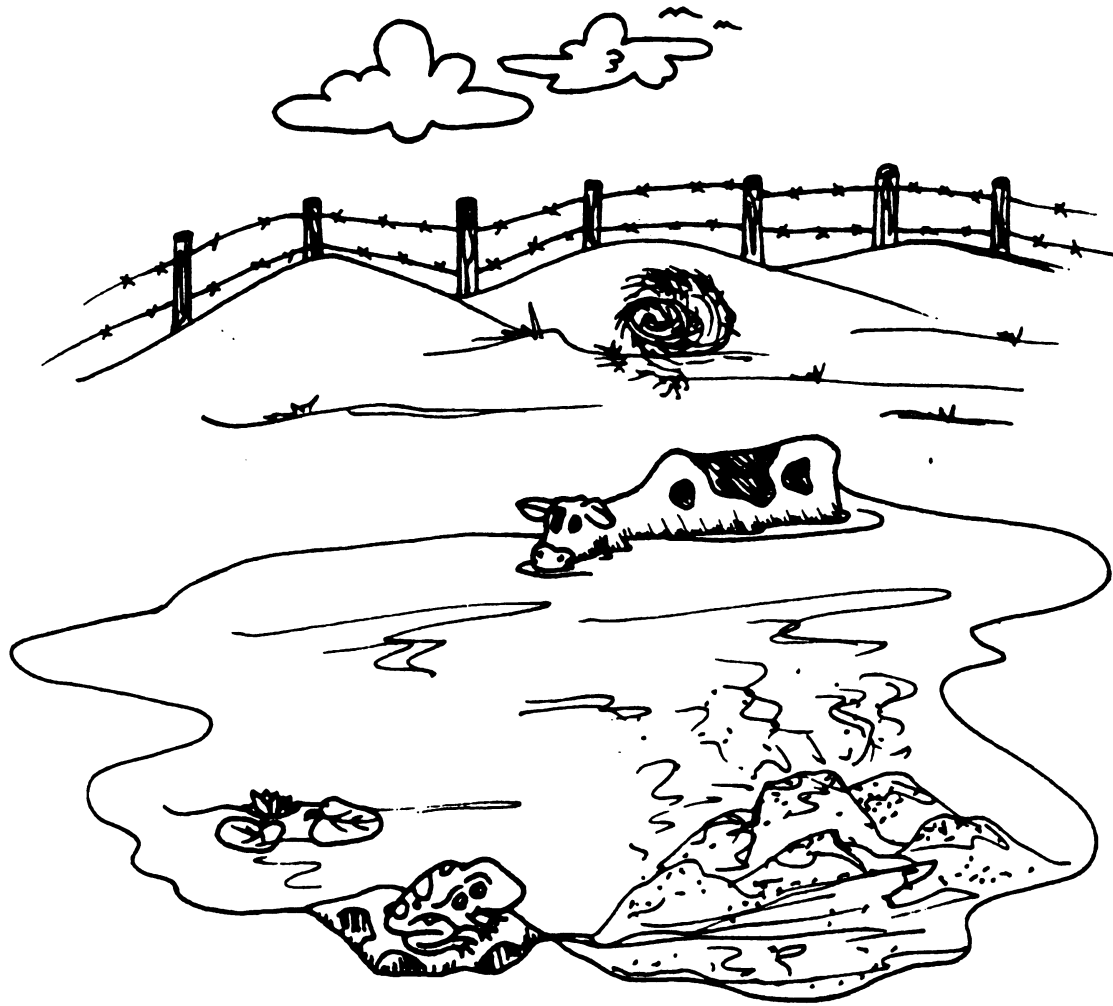


People became careless. They did not think about all the species of animals that lived in Mudpuppy Pond and the creek upstream from it. Water, the most abundant liquid on the earth, provides a variety of valuable habitats or homes for wildlife. Verde's habitat began to change.

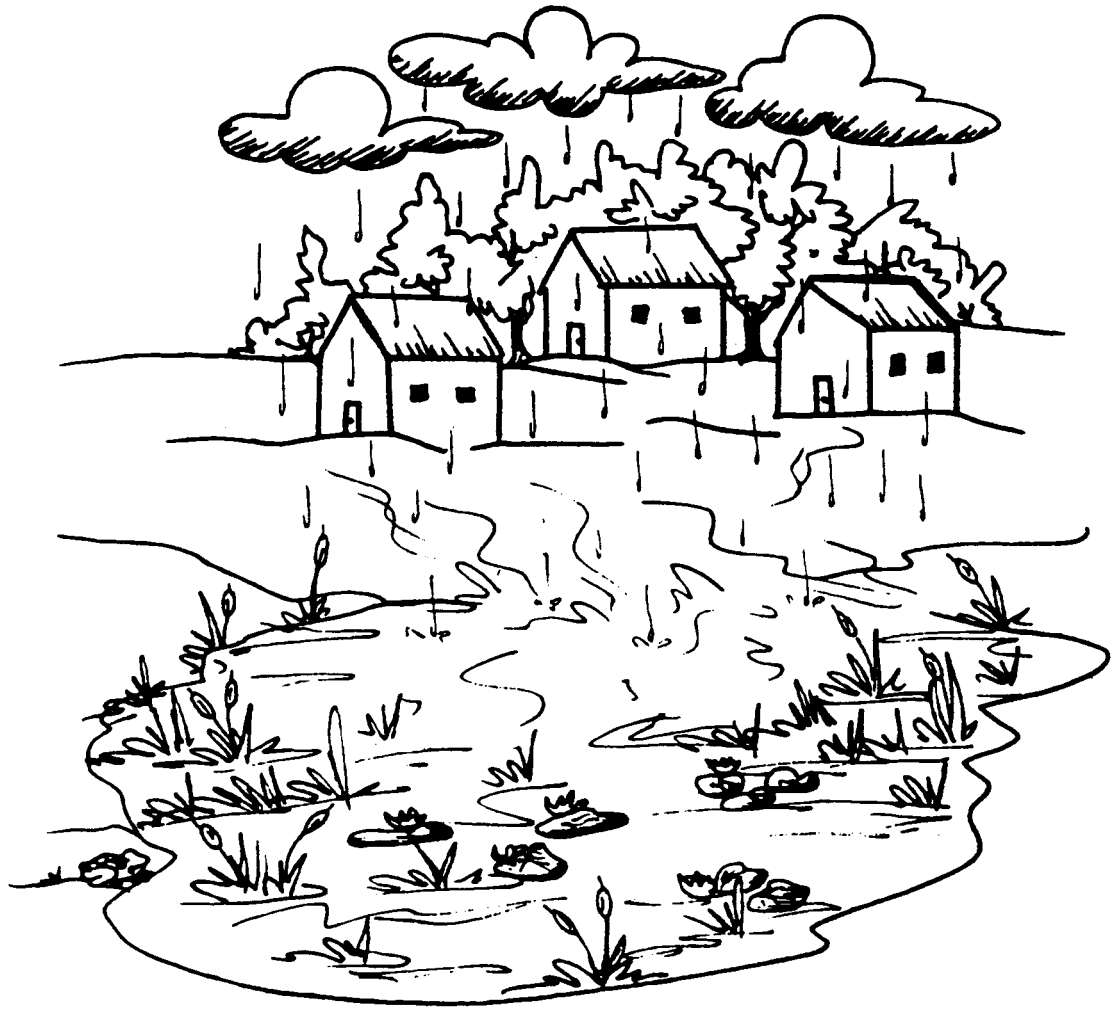


Mr. Farmer freshly plowed his field near the creek. It begins to rain and some soil erodes into the creek near Mudpuppy Pond. Large amounts of sediment are beginning to fill in the creek and pond. (Pour contents of jar 1 into the creek near Mudpuppy Pond.) How does Verde frog feel?

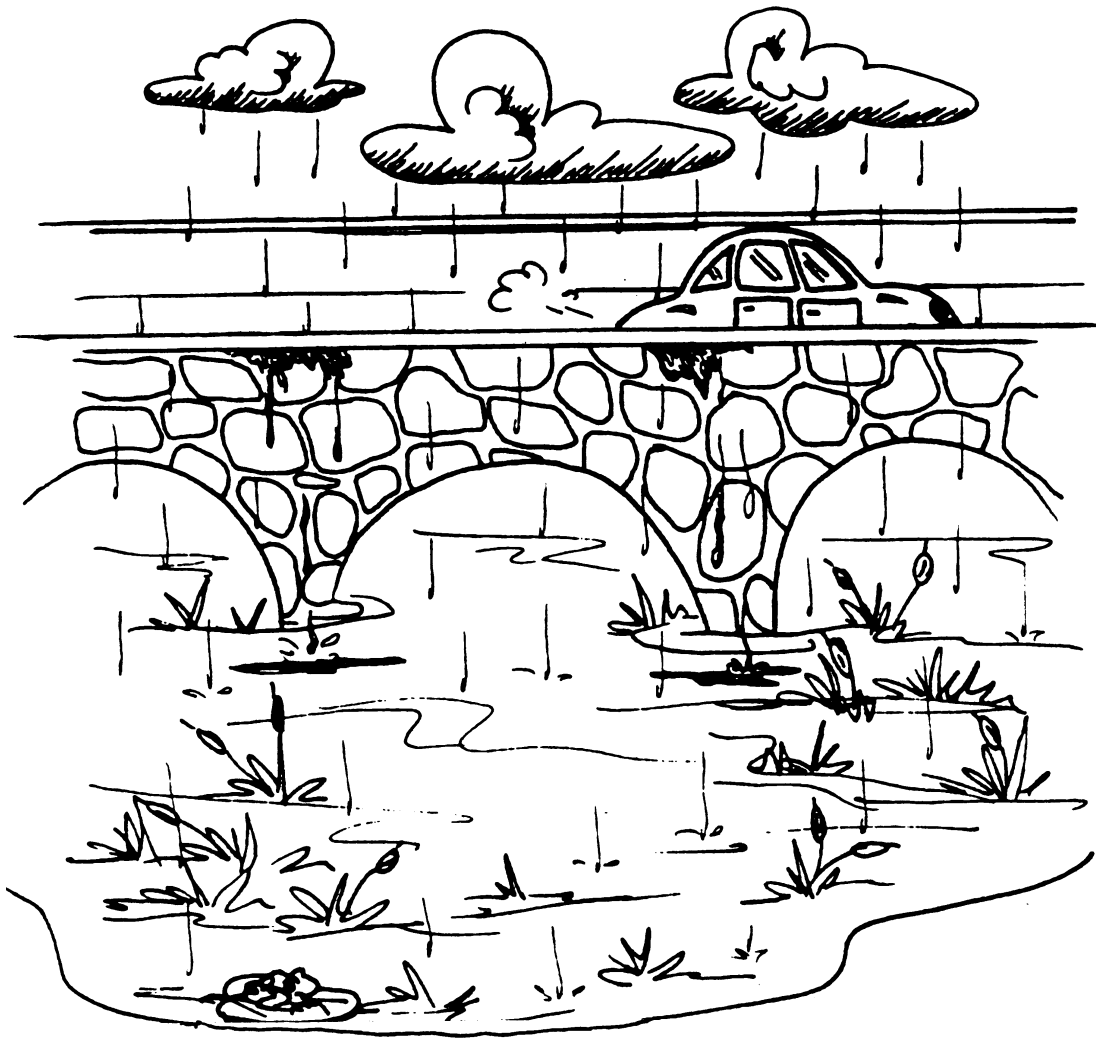
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The cows are grazing on the green grass next to the creek. Sometimes they wade out into the creek to get a drink of water or to cool off on a hot summer day. The animal waste washes into the pond. (Pour the contents of jar 2 into Mudpuppy Pond.) How does Verde Frog feel?



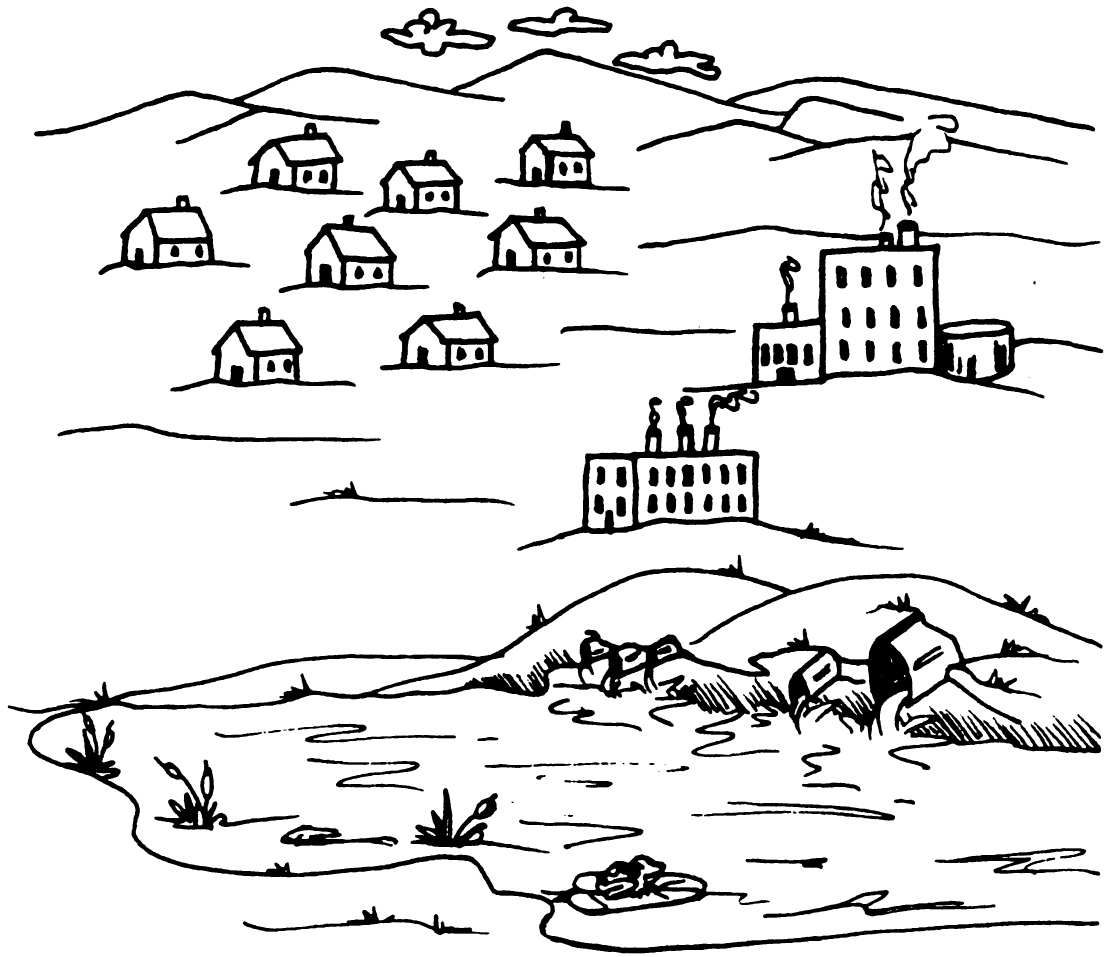
Many houses are built near the pond. Fertilizer and pesticides used on the lawns and gardens wash into the pond after a heavy thunderstorm. The fertilizer makes the plants in the pond grow very fast and thick. Mudpuppy Pond can't support all those plants. They begin to die and are starting to rot. Their decomposition (rotting) is using up some of the oxygen Verde's food sources need to live. (Pour contents of jar 3 into Mudpuppy Pond.) How does Verde Frog feel?



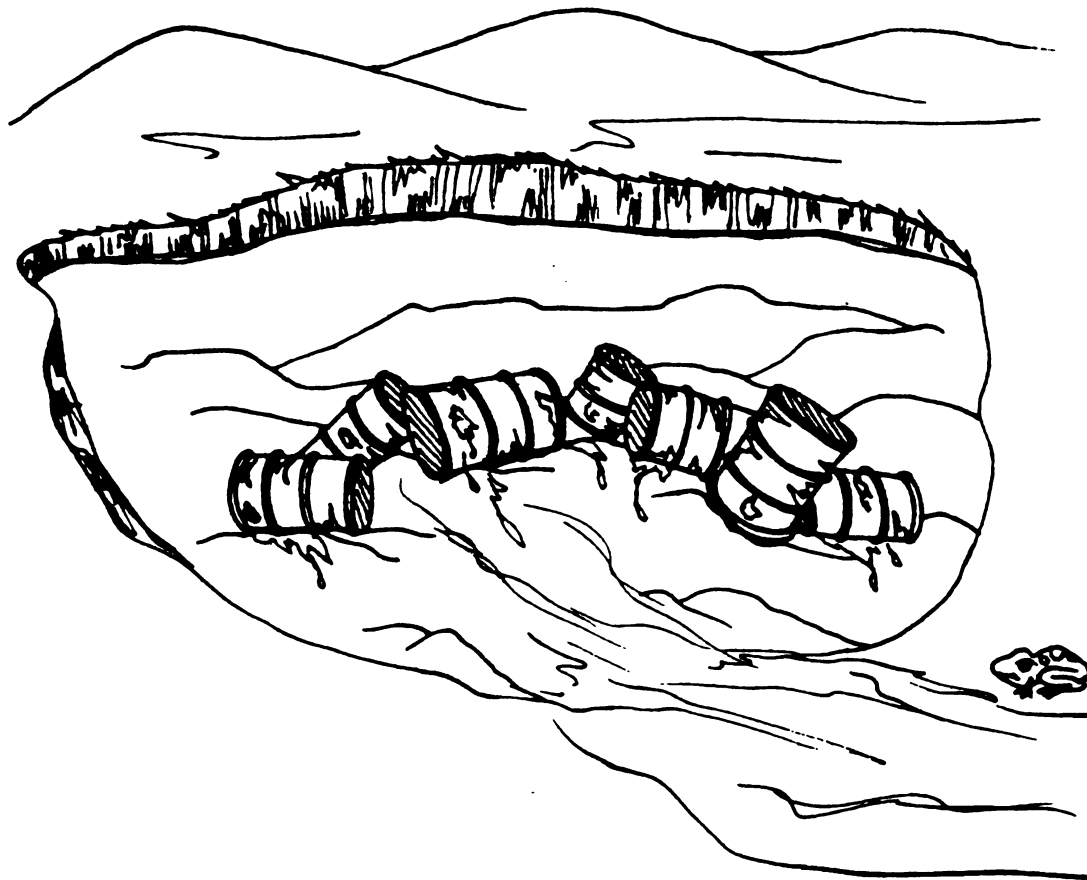
A beautiful park was built on the other side of the creek near Mudpuppy Pond. A bridge was built over the creek so people could travel back and forth. Some cars traveling across the bridge are leaking oil. The rain is washing the oil into the creek. (Pour contents of jar 4 into the creek.) How does Verde Frog feel?



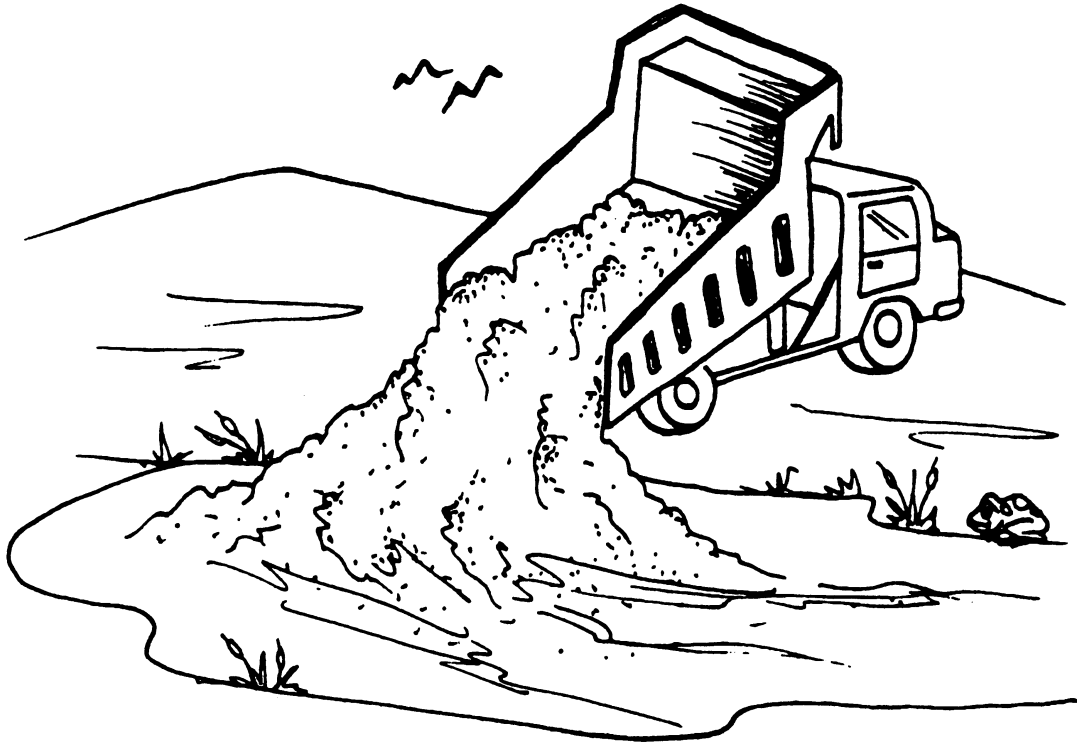
People visit the park often. They play games and picnic near the water. Some people don't throw their trash into the garbage cans provided by the Parks and Recreation Department. The wind is blowing paper into the creek and pond. (Pour the contents of jar 5 into the pond and creek.) How does Verde Frog feel?



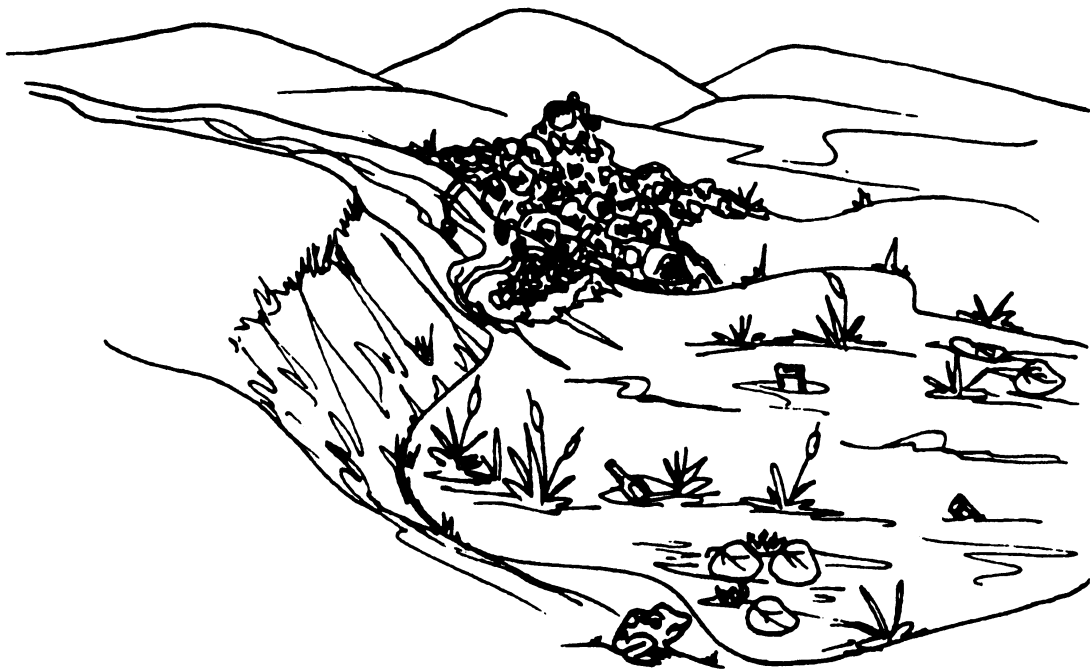
The town began to grow and several factories were built near the creek upstream from Mudpuppy Pond. Although laws limit the amount of pollution the factories are allowed to dump into the water, the factory owners don't always obey the laws. (Pour contents of jar 7 into Mudpuppy Pond.) How does Verde Frog feel?



A hazardous waste landfill was built to store dangerous materials. The town's people knew how important it was to prevent them from getting into surface water and groundwater. Over time, the barrels become rusty and toxic chemicals start leaking onto the ground. The rain washes these chemicals into Mudpuppy Pond. (Squirt one drop of green food coloring into Mudpuppy Pond for every barrel that is leaking.) How does Verde Frog feel?



The growing town needed more electricity than the neighboring town's power plant could supply. The town built a coal-burning power plant close to Mudpuppy Pond. The pollution laws and rules aren't as strict as they should be, so the plant dumps the ashes left from burning coal into the pond. The ashes have a lot of metals in them. Mercury is one of those metals that is harmful to the wildlife living at Mudpuppy Pond. (Pour contents of jar 8 into Mudpuppy Pond.) How does Verde Frog feel?



Local residents discovered a mineral on a hill near Mudpuppy Pond. Mining is started to remove the mineral. The owners dump the rocks removed from the hill near the pond. As the rock pile grows, some of them fall into the pond. The rocks are filling in the place where the creek runs into Mudpuppy Pond. Fresh water cannot flow in. Soon, the water becomes smelly. (Pour contents of jar 9 into the creek where it runs into the pond.) How does Verde Frog feel?

Mudpuppy Pond has changed. People forgot that every living thing has a purpose and exists so that other living things can continue to live. The pollution in the lake has upset the balance in Verde's environment. How can we help Mudpuppy Pond become healthy again?

CERTIFICATE

for
being a
FRIEND
of the
EARTH



Name _____

Date _____