NORTHEAST OHIO REGIONAL SEWER DISTRICT

WATERSHED WORKBOOK

5TH GRADE

Northeast Ohio Regional Sewer District

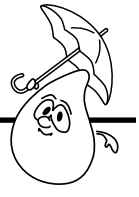
Your Sewer District...

Keeping our Great Lake great.

Waste not, want not

What were the differences between the water-supply container and the water-used container?

How could Group 1 have conserved more?



Why do we consider the Great Lakes one of our greatest natural resources?

WATER CONSERVATION QUIZ: SAVING OR WASTING?

Print an S on the line if the action SAVES water.

Print a W on the line if the action WASTES water.

_____ 1. Take long showers.

_____ 2.Fill the bathtub full.

_____ 3. Delay fixing a leaky faucet.

_____ 4. Fix a leaky toilet.

_____ 5. Wash only full loads in the laundry or dishwasher.

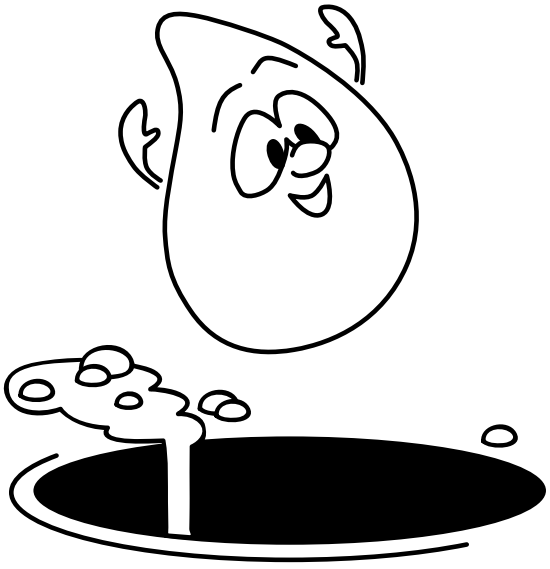
_____ 6. Fill the bathtub 1/4 full.

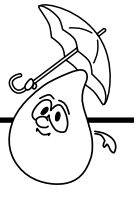
_____ 7. Turn off water while brushing teeth.

_____ 8. Fix leaky faucet.

_____ 9. Wash a few clothes every day.

_____ 10. Let water run while brushing teeth.



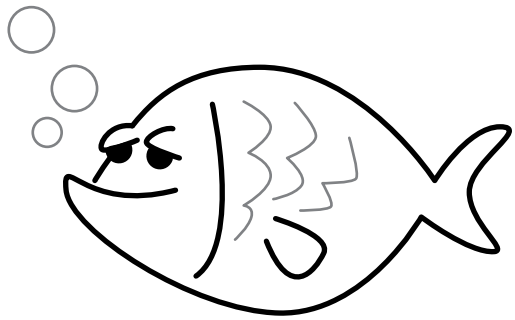


A fish story

Imagine a river as it meanders through the countryside, past the farmer's field, widening into a lake, but narrowing again as it passes through the city. In this river lives a fish. *Put a fish in the clear blue water in the plastic container.*

The fish swims down river past an eroding stream bank. When it rains what will happen to the bank? What if it rains a lot? *Put soil into the water.* **What does this do to the fish?**

Suppose part of the soil eroding into the water came from farm land. The farmer has just put fertilizer on the field. Instead of staying on the field and helping the crops, the fertilizer rides "piggyback" on the eroding soil and goes into the river.



What effect will the fertilizer have on the plants in the river? If the plants grow too abundantly and too fast, the river can't support them and supply the necessary nutrients. They die, fall to the bottom, and start to decompose. Decomposing things use oxygen.

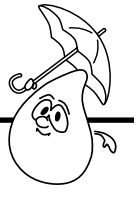
What else in the river needs oxygen? What does this do to the fish?

Farm fields aren't the only source of fertilizer in a river. Homes may also be a source, too. Where the river flows into a lake, several families have built their homes. Perhaps their lawn fertilizer has washed into the water.

What does this do to the fish?

As the lake flows into a river, our fish continues downstream past the city. Even though the city people don't pollute the water directly, what they do at home can affect the quality of the water in the stream. Have you ever seen a car leaking oil? Or litter flowing into a street drain? Where does this polluted water go? *Put oil into the water.*

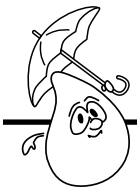
What does this do to the fish?



In the winter, what do we put on our roads to make it easier to drive? Does it stay on the street, or does it flow anywhere else? *Put salt into the water.* **What does this do to the fish?**

As the river leaves the city, it winds past several factories along the way. Factories must protect the water around them, but some companies have broken the law and polluted nearby streams. *Put detergent into the water.* **What does this do to the fish?**

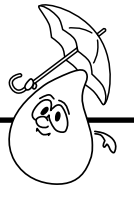
The wastewater treatment plant for the city is also located along this section of the river. Treatment plants clean wastewater before it is released to the river, but in some cities, old sewers overflow during heavy rain storms, and some wastewater never makes it to the treatment plant. It would be like putting 2 drops of this food coloring into this jar of water. The amount of pollution in one overflow might be small, but put it is still polluted. *Put two drops of food coloring in the water. Stir it.* **What do you see? What does this do to the fish?**



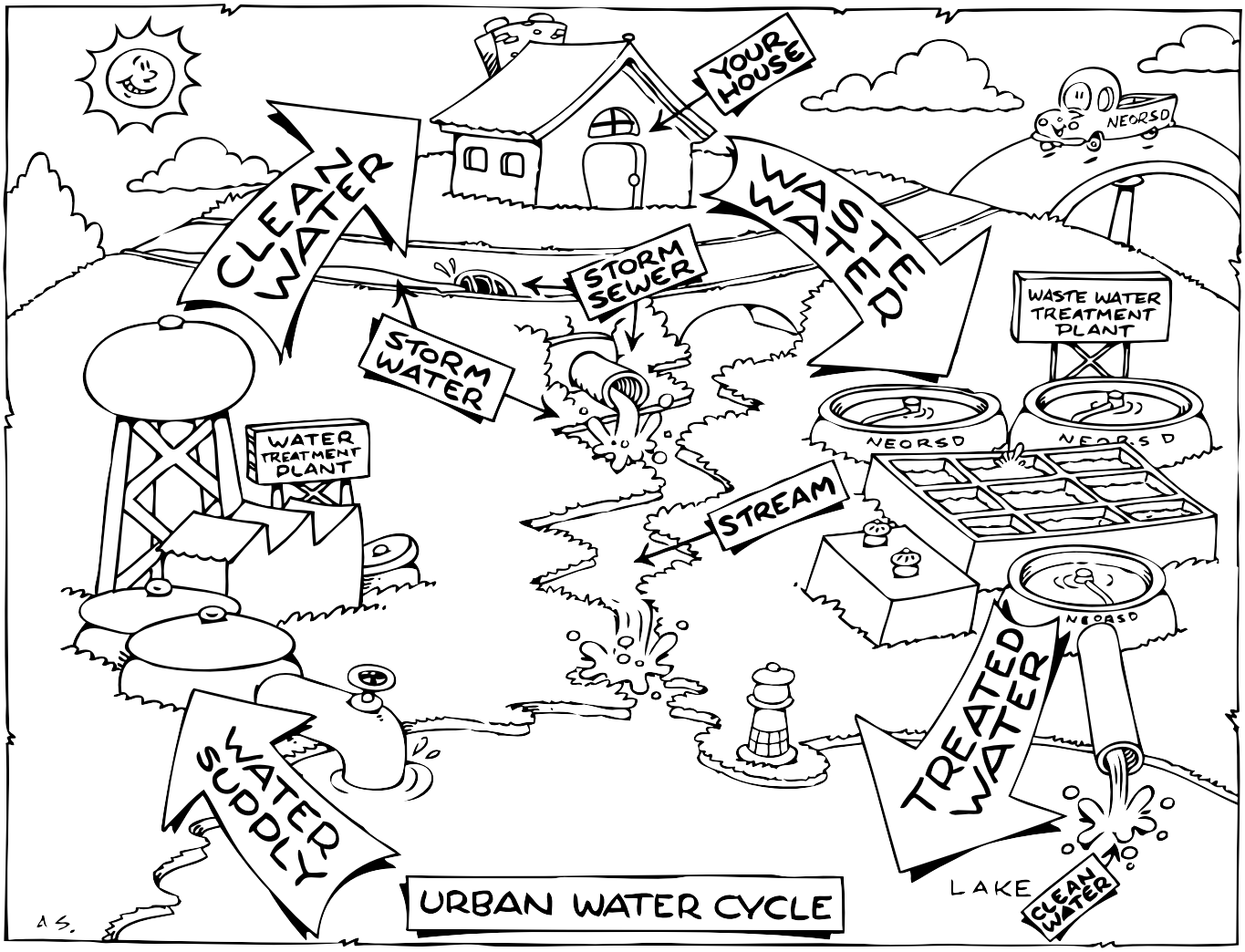
CAUSE AND EFFECT GRAPHIC ORGANIZER

List the topic or problem that you are exploring in the center of your organizer. Under the CAUSES section, record what you think makes the problem happen. Under the EFFECTS section, record what happens because of the causes.

CAUSES	TOPIC/PROBLEM	EFFECTS



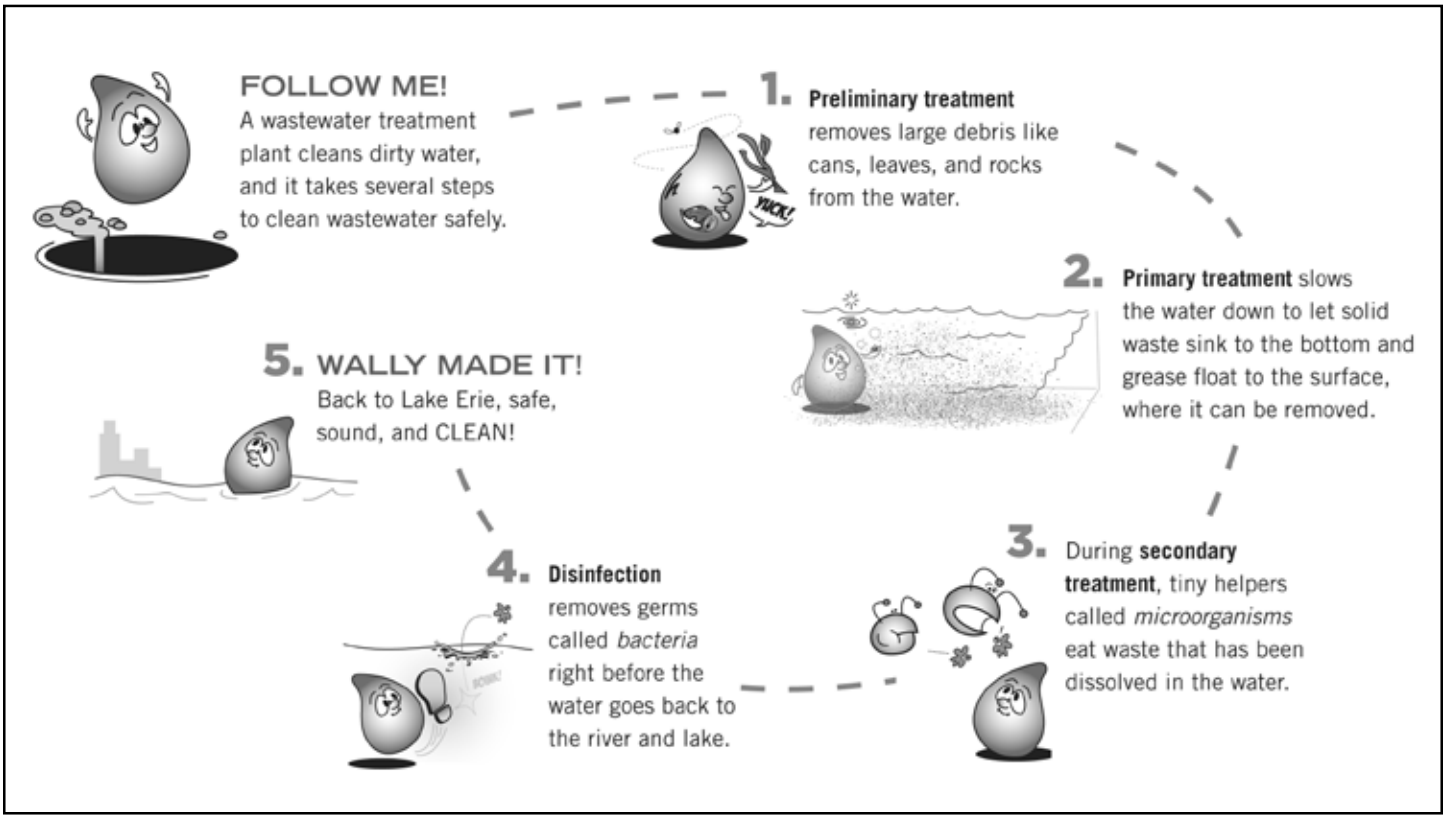
The urban water cycle



This is how water flows in a URBAN WATER CYCLE. Where does the water come from? Where does wastewater go? Where does stormwater go?

Wastewater treatment: How dirty water gets clean

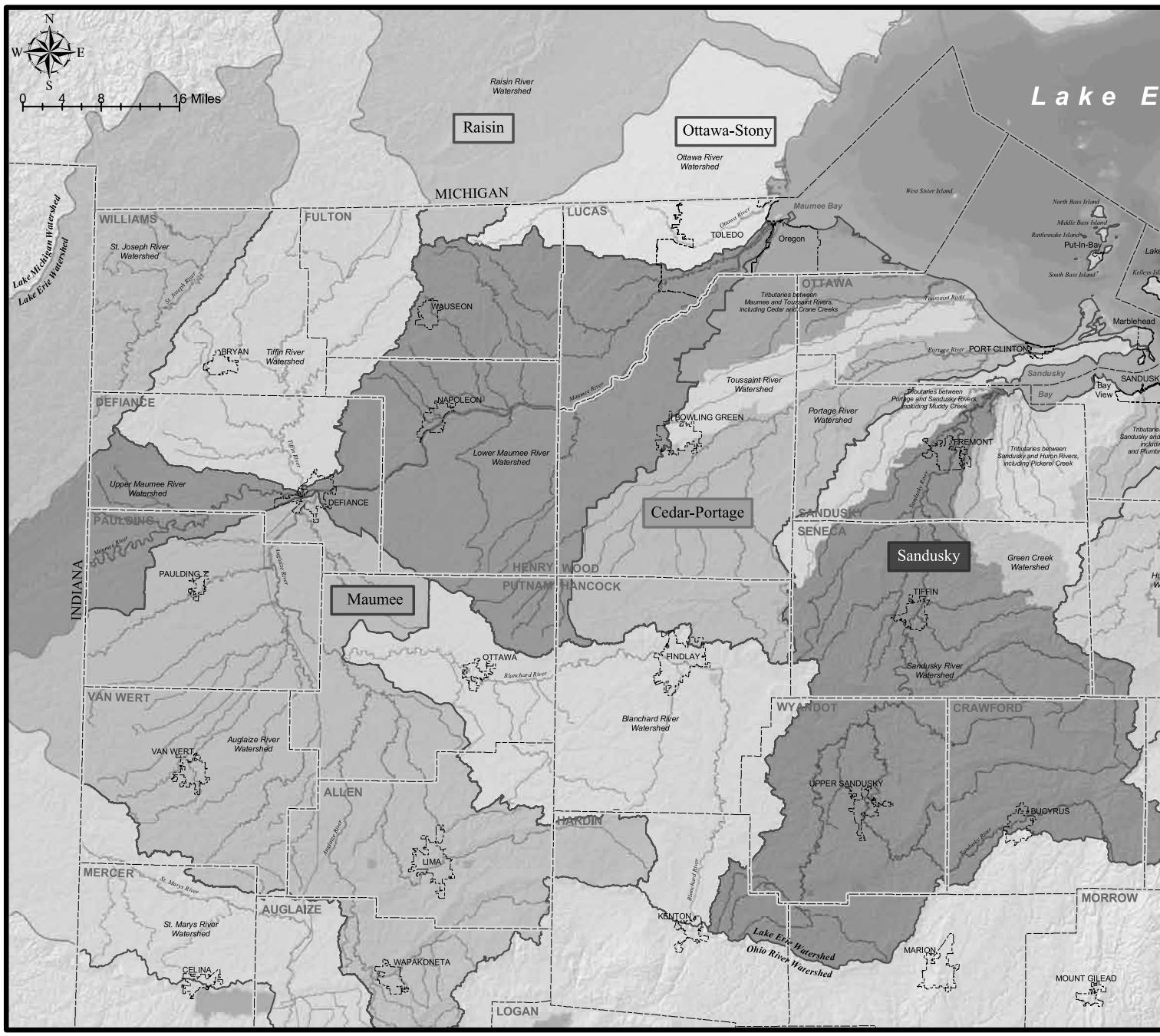
Wally Waterdrop from the Northeast Ohio Regional Sewer District knows all about the wastewater treatment process. Once flowing down the drain at home and into the wastewater treatment plant, it takes five steps before he's safe to go back to Lake Erie.



Watersheds and stormwater management

Ohio's Lake Erie Watershed

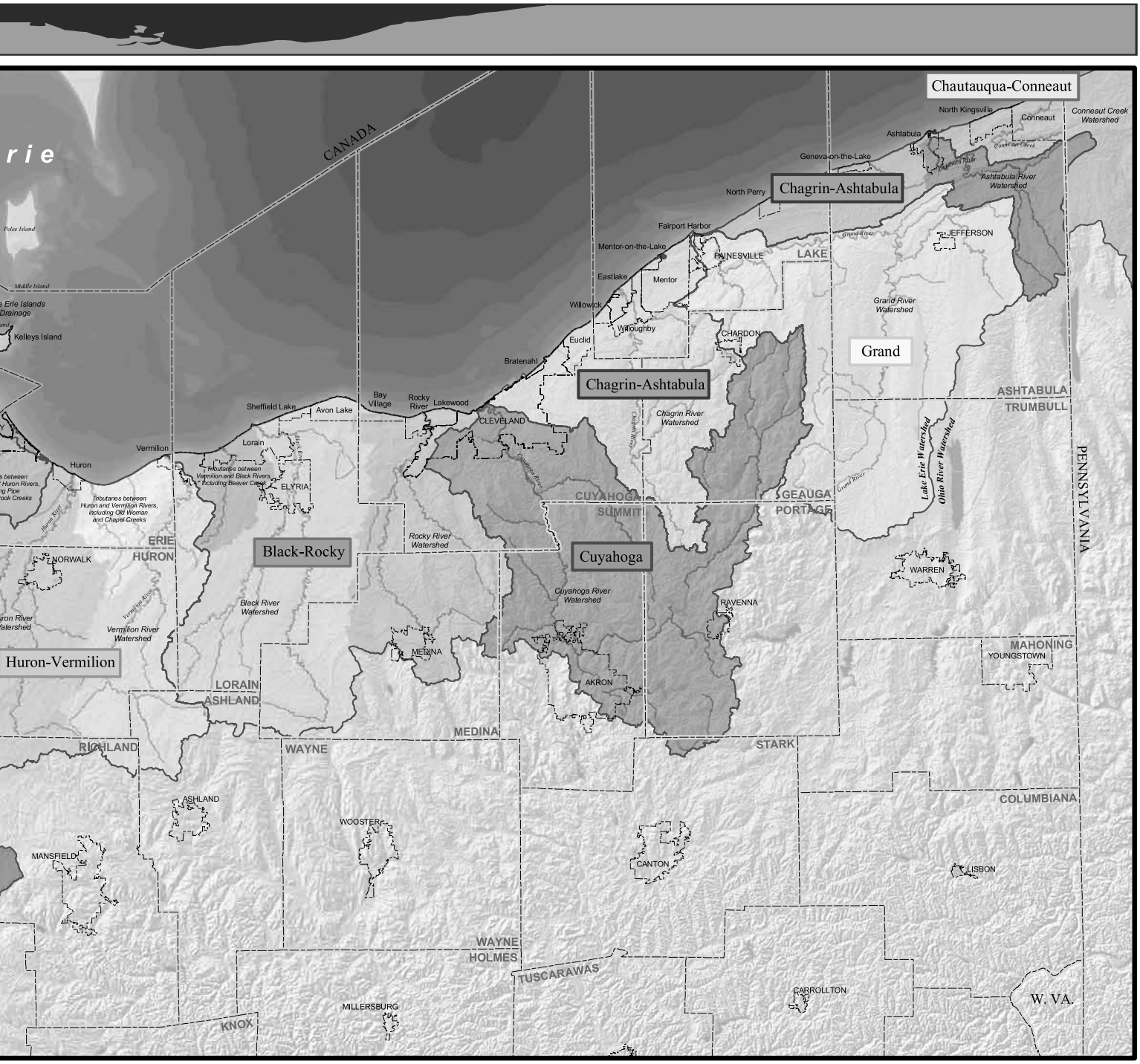
Ohio Department of Natural Resources



Ohio Coastal Atlas - Map Library 10/2007

Ohio Department of Natural Resources
Office of Coastal Management
105 West Shoreline Drive
Sandusky, Ohio 44870

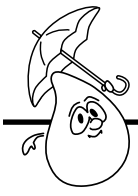
In a watershed, all water flows downhill to the lowest point. What happens to stormwater as it flows downhill from the highest point to the lowest point?

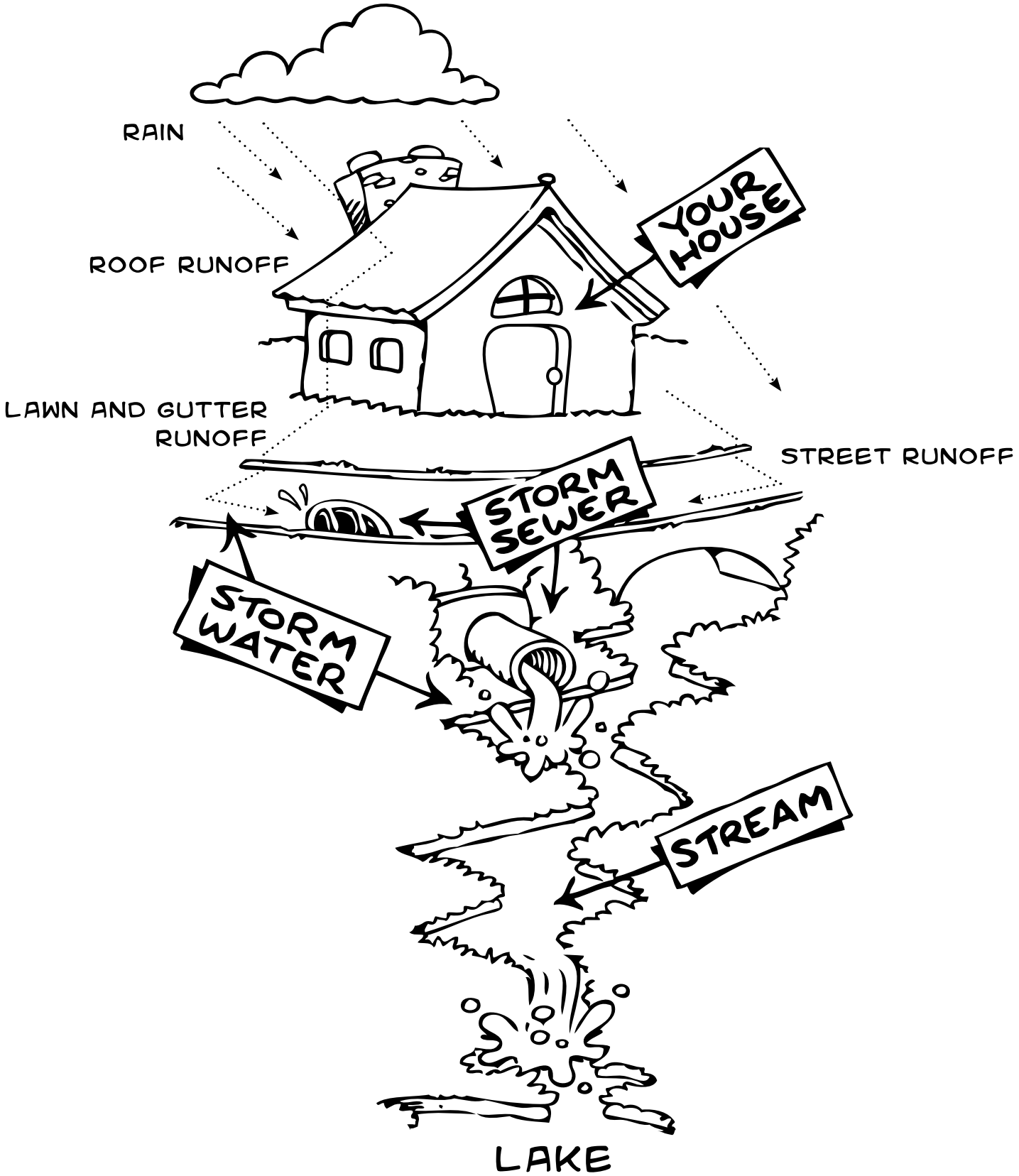


GIS Data Sources:
Bathymetry - NOAA, 2004
County and Municipal Boundaries - ODOT, 2004
Hydrography - USGS, various dates
Ohio Digital Elevation Model - ODNR Division of Geological Survey, 2004
Watershed Boundaries - USGS, ODNR, OEPA, NRCS, 1999

Look at the illustration on the next page. Identify **nonpoint sources** of pollution. Why should we be concerned with stormwater runoff that ends up in local streams untreated? How can we reduce nonpoint source pollution?

Make a list of living things that can be affected by water pollution.




RAIN
ROOF RUNOFF
YOUR HOUSE
LAWN AND GUTTER RUNOFF
STREET RUNOFF
STORM SEWER
STORM WATER
STREAM
LAKE

Definition in your own words

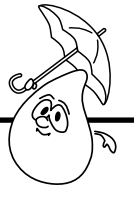
Draw a picture

WATERSHED

Examples: Names of different watersheds in Ohio

List non-examples

NOTES

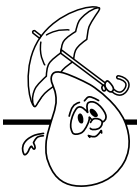


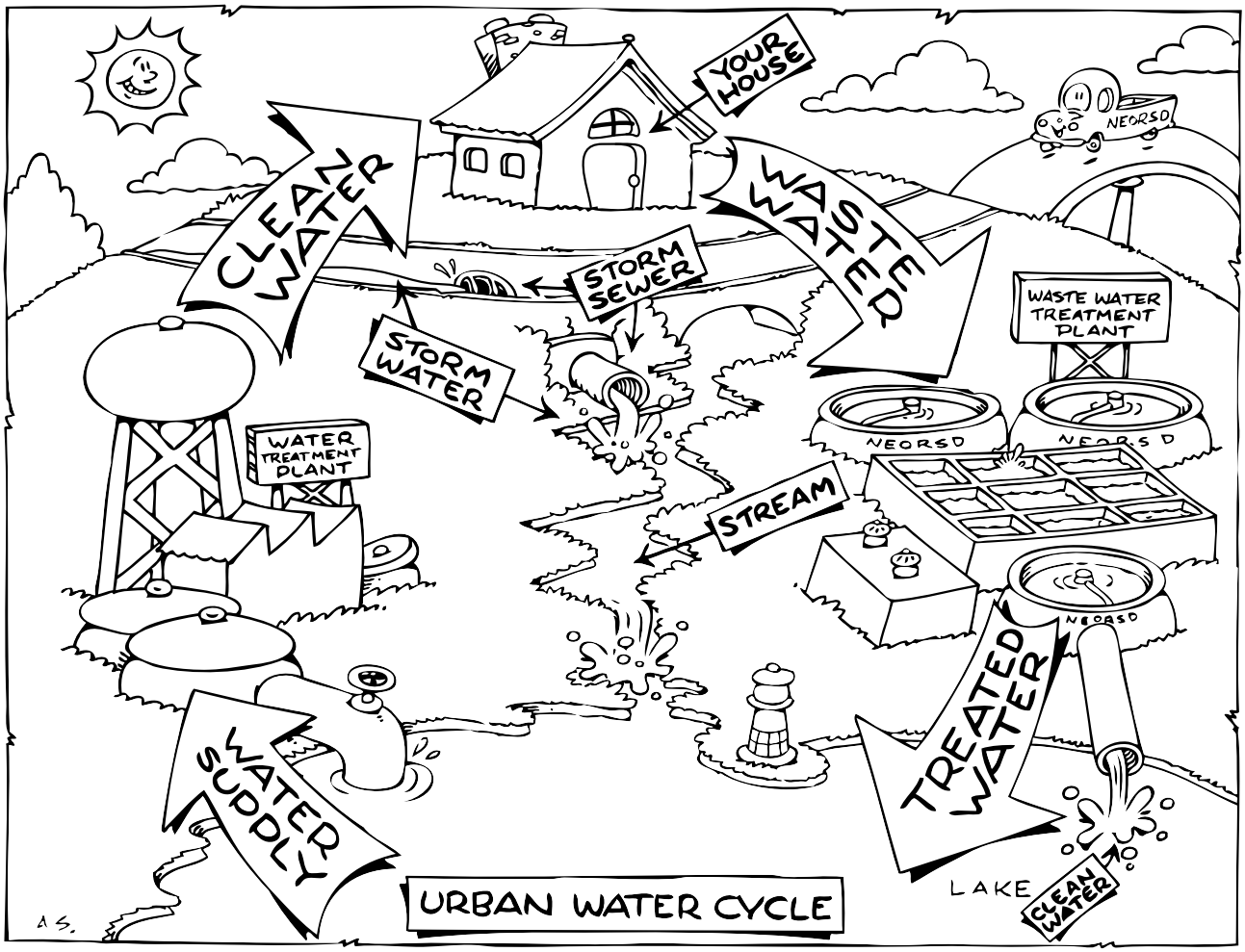
Lapbook GRADING RUBRIC

	4 ADV	3 PRF	2 PRG	1 BEG
Vocabulary • Multiple literacies • Science	All vocabulary words are included. Each word has a colored picture, definition and sentence.	No more than three vocabulary words are missing. Words have a colored picture, definition and sentence.	No more than seven vocabulary words are missing. Many words are missing a sentence, definition, or colored picture.	More than seven vocabulary words are missing. Notes are incomplete or illegible.
Notes • Science • Writing	Student took legible notes. He/she wrote in complete sentences explaining his/her learning. Answers are written in paragraph form.	Student took legible notes. Answers are written in complete sentences.	Notes are messy and illegible. Answers are written in complete sentences.	Notes are messy and illegible. The student did not answer all journal questions. Answers are incomplete.
Charts/Data/Graphs • Science • Multiple literacies	All charts are completed and attached to or enclosed in the lapbook.	Charts are completed, but not attached to the lapbook.	Charts are partially incomplete but included in the lapbook.	Charts are blank or missing from the lapbook.
Other • Science • Effort	All other pieces of the lapbook are completed.	One piece of the lapbook is missing. Remaining pieces are completed legibly.	Two pieces of the lapbook are missing. The remaining pieces are illegible.	Several pieces of the lapbook are missing, and the included pieces are illegible.

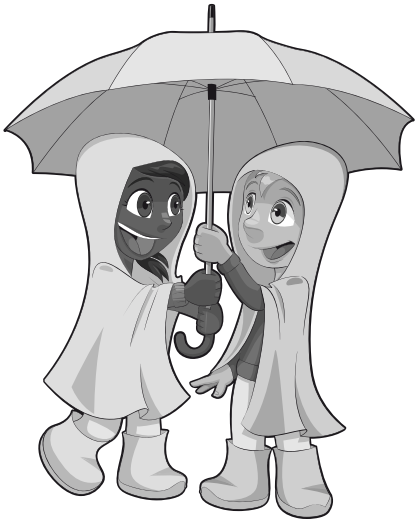
The following pages are activities for your Watershed Lapbook.

You will work with your classmates and teacher to put the pieces together.

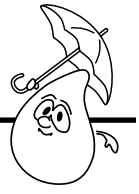


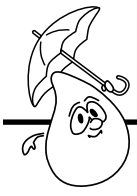


MY **WATERSHED** LAPBOOK



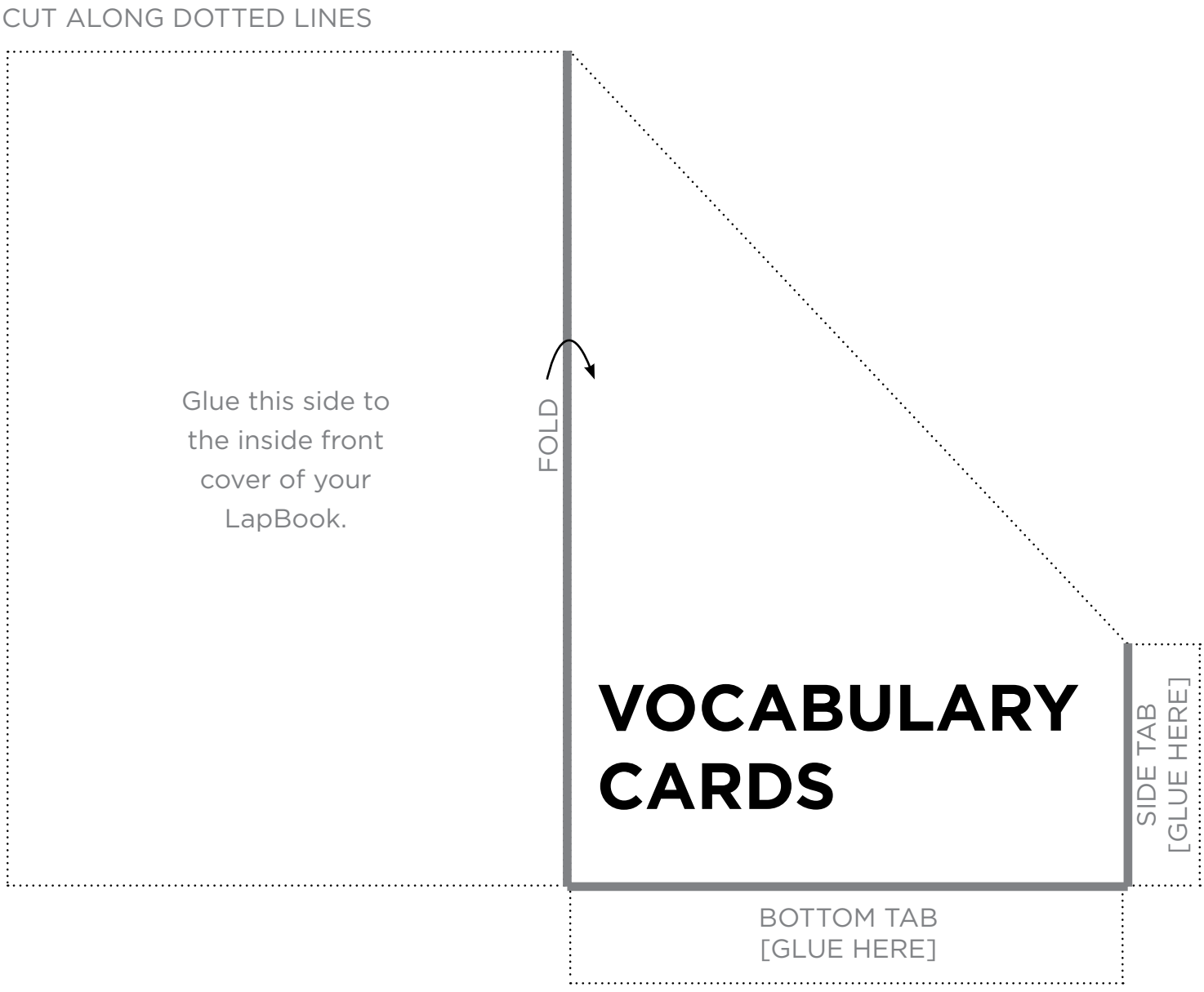
Northeast Ohio
Regional Sewer District

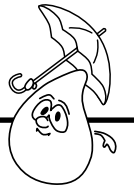


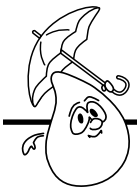


Create a LapBook pocket

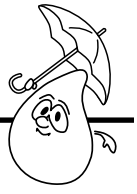
Cut along the dotted lines, and fold the pieces to create a LapBook pocket for your vocabulary cards.

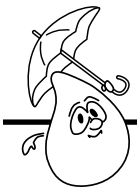




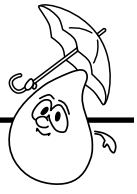


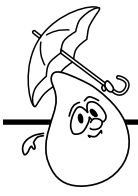
aeration	**aquifer**
bacteria	**coagulation**
combined sewers	**conservation**



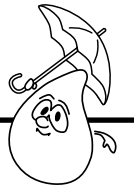


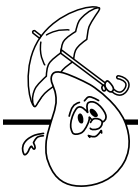
Cuyahoga River	**disinfection**
erosion	**freshwater**
filtration	**groundwater**



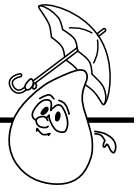


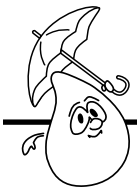
impervious surface	**interceptor**
impurities	**lakes**
Lake Erie	**microorganism**



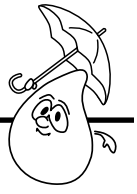


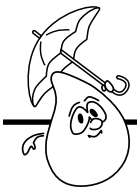
natural resources	**non-point source pollution**
oceans	**pervious surface**
ponds	**point source pollution**



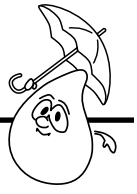


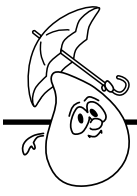
primary treatment	**rivers**
salt water	**secondary treatment**
separate sewers	**sewer district**





sedimentation	**stormwater**
surface water	**water treatment**
wastewater	**watershed**





Water purification foldable book

You will create a five-tab flip book that explains five steps of the water treatment process. Cut along the dotted lines.

STAPLE

WATER PURIFICATION

How water is cleaned

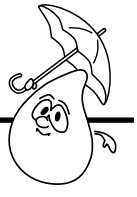
STAPLE

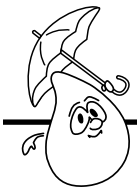
AERATION

CUT THIS SECTION OUT. YOU DON'T NEED IT.

COAGULATION

CUT THIS SECTION OUT. YOU DON'T NEED IT.





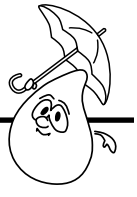
SEDIMENTATION

CUT THIS SECTION OUT.
YOU DON'T NEED IT.

FILTRATION

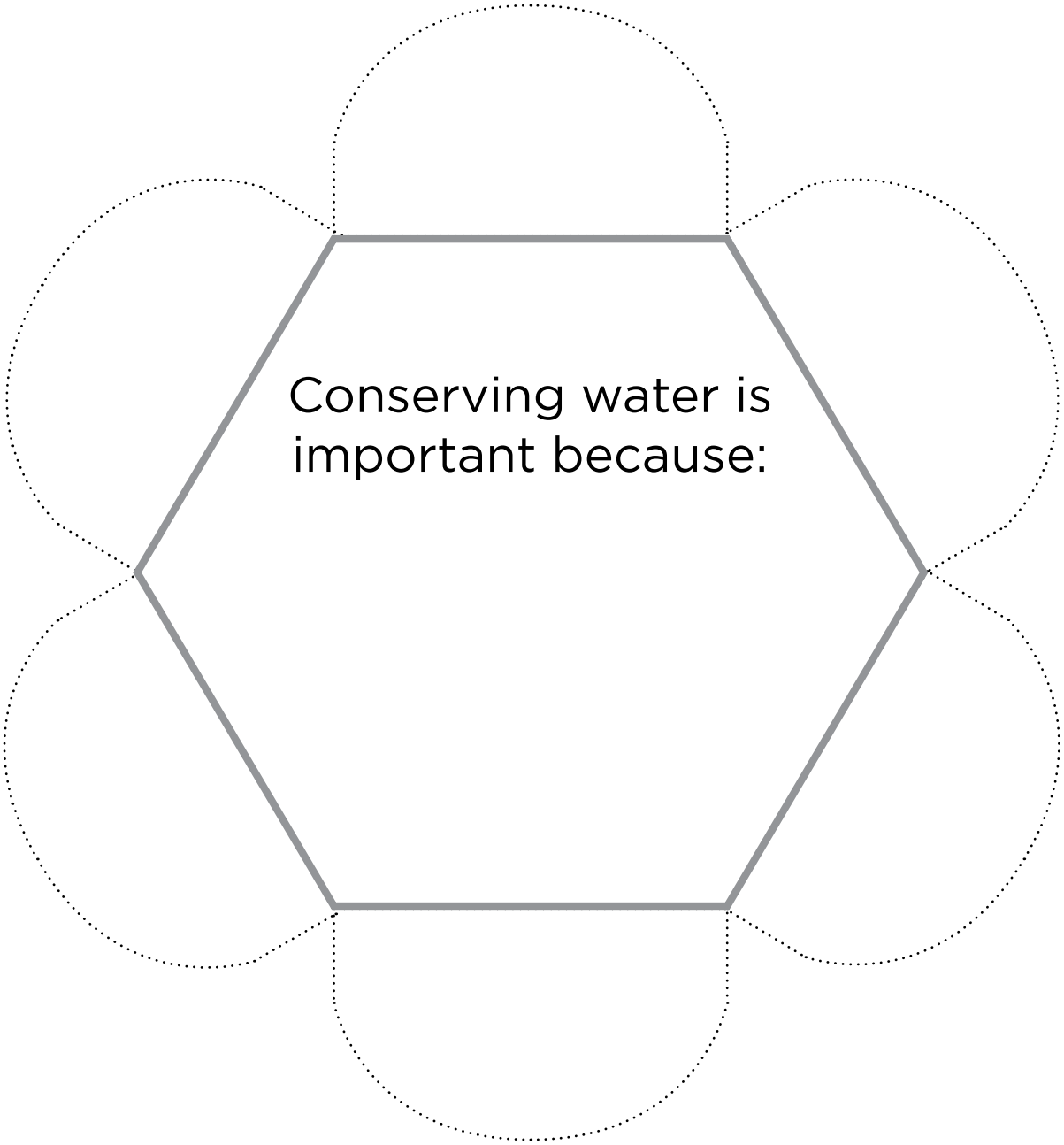
CUT OUT

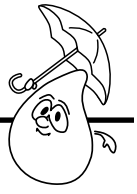
DISINFECTION

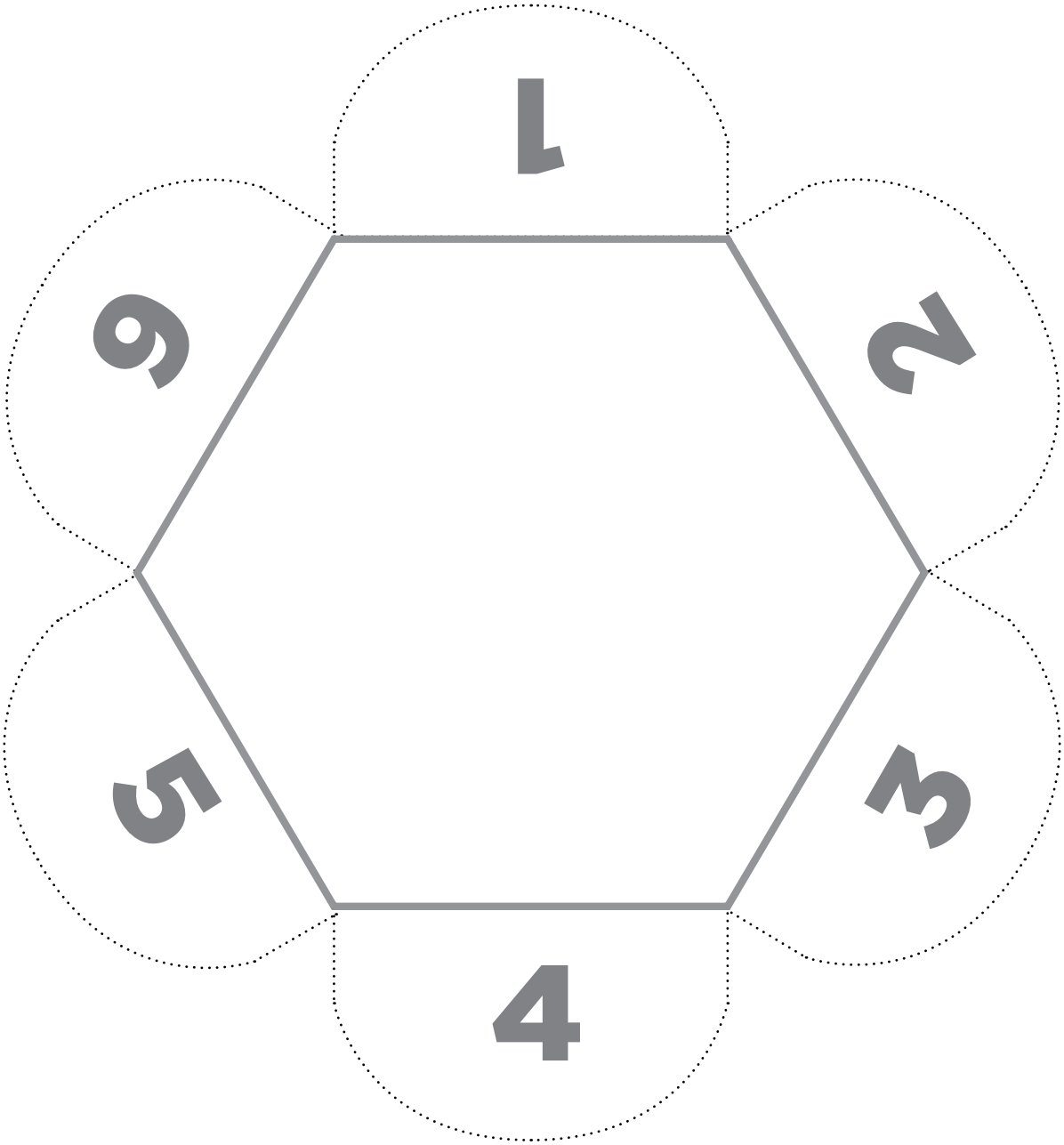


Conservation flap book

Can you think of six ways to conserve water? Cut out the flower shape below, and write one conservation fact on each petal. Then fold the petals along the solid lines so the numbers are showing.



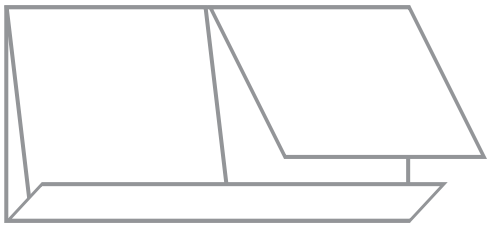



1
2
3
4
5
6

Water pollution causes and effects

What are some of the sources or causes of water pollution? What are the problems or effects from water pollution?

Cut out the square below along the dotted lines. Then fold along the solid lines to create a two-flap book for the back of your LapBook. It should look like this:



CUT HERE

WATER POLLUTION

FOLD

Glue this side to the back
inside cover of your LapBook.

FOLD

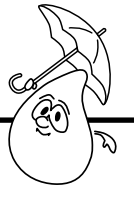
FOLD

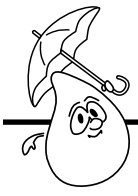
CAUSES

EFFECTS

DRAW A SOURCE OF POLLUTION.

DRAW A PROBLEM CAUSED BY POLLUTION.





Water pollution causes and effects: Mini books

CUT HERE

CUT HERE

WATER POLLUTION

FOLD

WATER POLLUTION

FOLD

CAUSE

FOLD

EFFECT

FOLD

WATER POLLUTION

FOLD

WATER POLLUTION

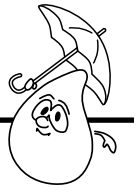
FOLD

CAUSE

FOLD

EFFECT

FOLD



The Earth's water: Three-flap foldable

Cut along the dotted lines and fold along the solid lines.

THE EARTH'S WATER

FOLD

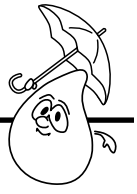
97%

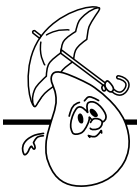
FOLD

2%

FOLD

1%



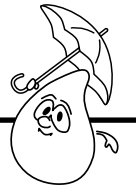


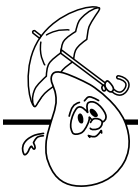
Independent and extension activities

Want to learn more about water, the water cycle, conservation or protection? Here are a few more ideas for activities with your class, family or friends.

Independent	Group and Partner Projects		Whole Class
Create an Edible Aquifer *	**Create** a cross-section model of an aquifer	**Measure** mass of a rock. Soak rock overnight. Measure mass again. Do rocks soak up water?	**Assist class** in designing a water conservation mural to be displayed
Create a poster on Water Conservation	**Choose and complete** a Webquest *	**Create** a vocabulary game (crossword, word search)	**Develop** a recycling program for school
Investigate your home for products that could contaminate the groundwater if they were poured down the drain or dumped on the ground outside. Take digital pictures and create a display board.	**Build** a Water Purification System *	**Create** a game that can be played by a group of students	**Create** a groundwater education day
Create Your Own Watershed *	**Design** a series of posters to hang in your community that display educational message about groundwater protection	Create a **video** or **presentation** on Water Conservation	**Tour** a wastewater treatment plant

* Additional links and descriptions are available at **neorsd.org/grade5**





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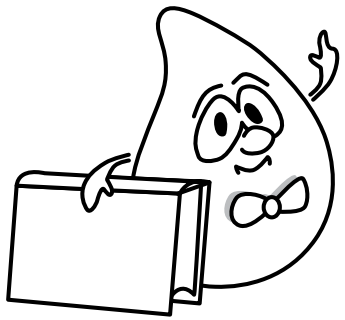

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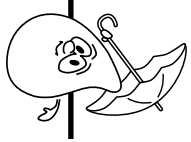


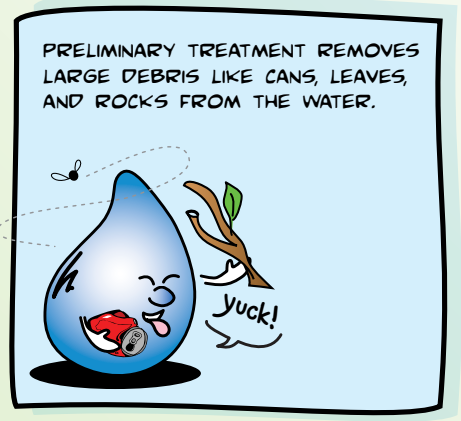
Your Sewer District...

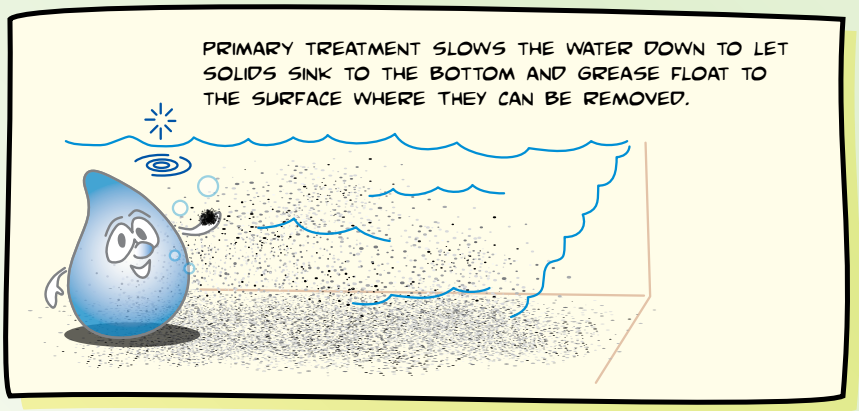
Keeping our Great Lake great.

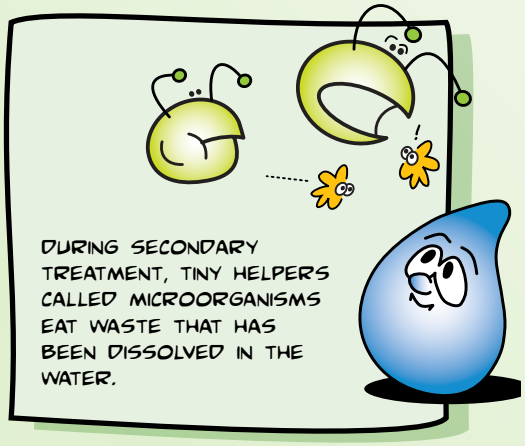
HOW DOES DIRTY WATER GET CLEAN?

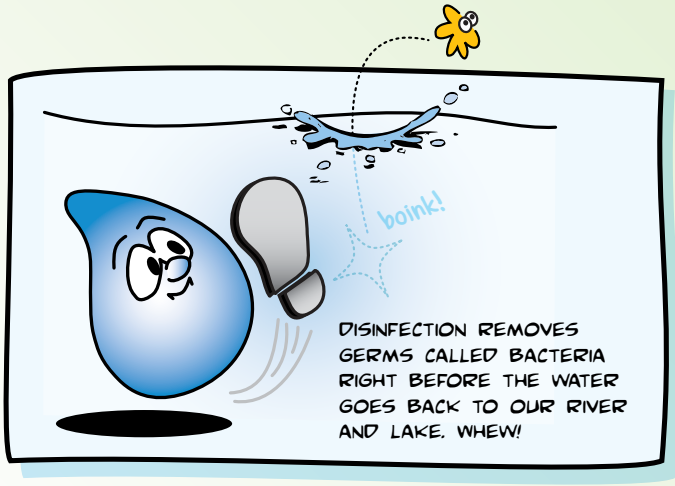
STARRING WALLY WATERDROP

A WASTEWATER TREATMENT PLANT CLEANS DIRTY WATER, AND IT TAKES MANY STEPS TO CLEAN OUR WATER SAFELY!



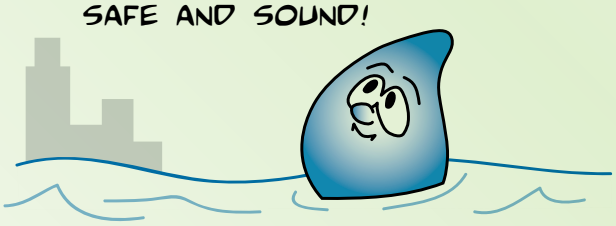






WALLY MADE IT!

BACK TO LAKE ERIE, SAFE AND SOUND!



FOR ADDITIONAL INFORMATION: Call Communications & Community Relations (216) 881-6600 or visit **wheredoesitgo.org**