

Junior Watershed Explorers

Name: _____



Photo by S. Schmalowsky



Come learn about the
Nine Mile Creek Watershed
and how to protect it!

All ages welcome.

**JUNIOR
WATERSHED
EXPLORER**

**9 MILE CREEK
WATERSHED DISTRICT**

Hello, this booklet will help you on your
journey to become a

JUNIOR WATERSHED EXPLORER.

Here's what you need to do—

1. Look through and complete at least ____ pages.
(your age)
2. Email or mail in the last page of this booklet to the address below to receive your Junior Watershed Explorer sticker and water bottle!

Nine Mile Creek Watershed District
12800 Gerard Drive, Eden Prairie, MN 55346
esniegowski@ninemilecreek.org

3. Share what you have learned with your friends and family!

Photo by D. Bergstrom

Let's go check out the
Nine Mile Creek Watershed District!

What is a Watershed?

A watershed is a section of land where water moves downhill over the surface and through stormwater pipes to a common low spot like a lake. Watersheds can be big or small. This picture shows a small watershed. The water from the nearby land flows downhill into Shady Oak Lake in Minnetonka. Did you know that much of Minnesota's water will go through the Mississippi and end up in the Gulf of Mexico? That watershed spans the height of the entire United States, 1.2 million square miles! That's a huge watershed!



Shady Oak Lake

Let's
Think...

Write a T for true or an F for false:

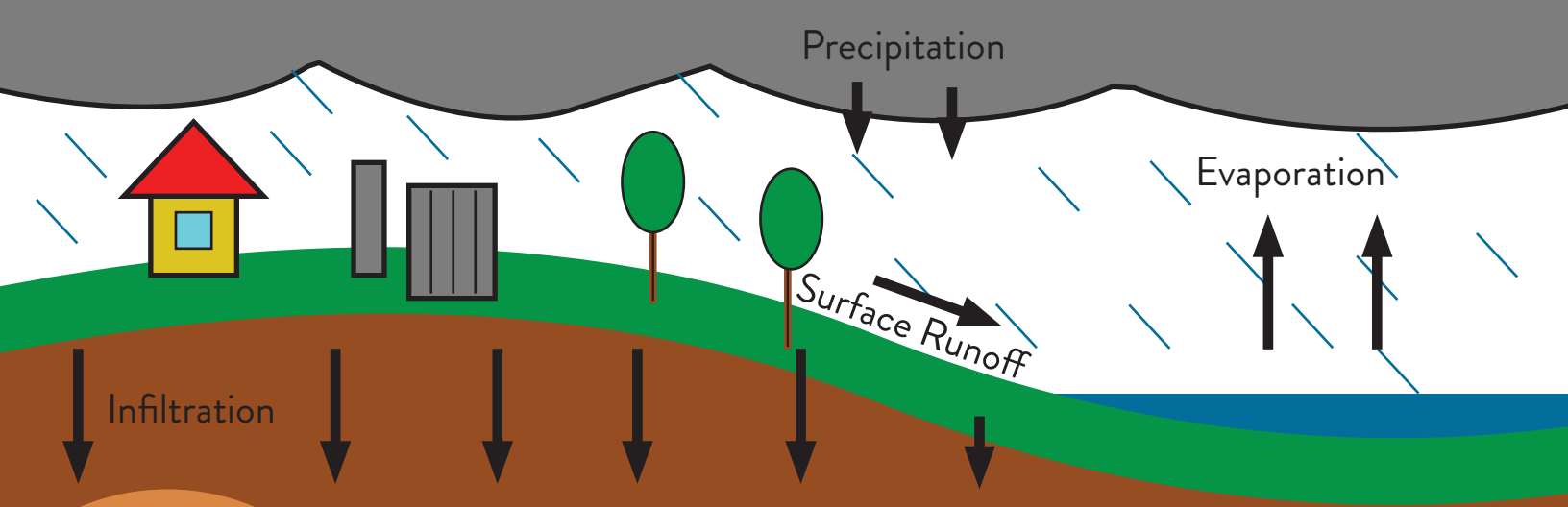
- ____ A watershed is a man-made structure used to collect water.
- ____ Watersheds are all about the same size.
- ____ A watershed can get polluted.
- ____ Watersheds help store water for many plants and animals, including humans.
- ____ Watersheds can drain to a stream, river, pond, lake, or ocean.
- ____ Some people live in a watershed, some people do not.

Nine Mile Creek Watershed

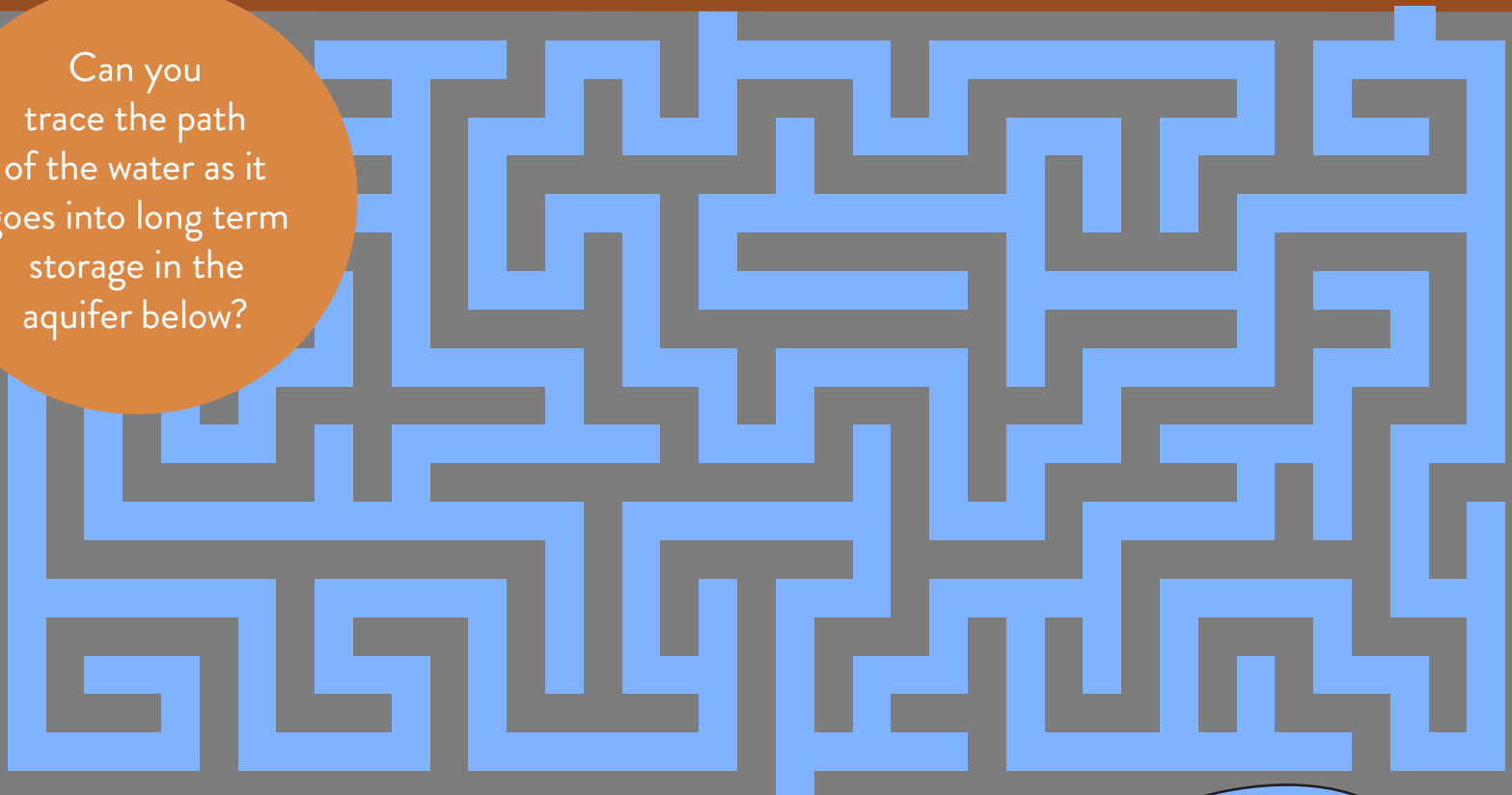
Take a look at our watershed! Parts of six different cities send water to Nine Mile Creek. Any rain water and snowfall inside the dotted black line will end up in Nine Mile Creek. An average of 26,936,768,000 gallons of water flow into Nine Mile Creek each year!

Can you find these lakes on the map? Check the lakes you have visited. Star the ones you would like to explore.

- Anderson Lakes
- Birch Island Lake
- Bryant Lake
- Bush Lake
- Glen Lake
- Lake Cornelia
- Lake Rose
- Lake Smetana
- Lone Lake
- Minnetoga Lake
- Normandale Lake
- Penn Lake
- Shady Oak Lake
- Wing Lake



Can you trace the path of the water as it goes into long term storage in the aquifer below?



Aquifer—space in underground rock that holds water

When it rains, water flows over surfaces like driveways, sidewalks, and sometimes grass into our streams and rivers. But, some of the water infiltrates. This means it soaks down through the ground into an aquifer. Groundwater can be polluted like our surface waters. So cleaning up spills of oil, paint, or other pollutants like road salt on dry pavement is important to keep our drinking water clean.

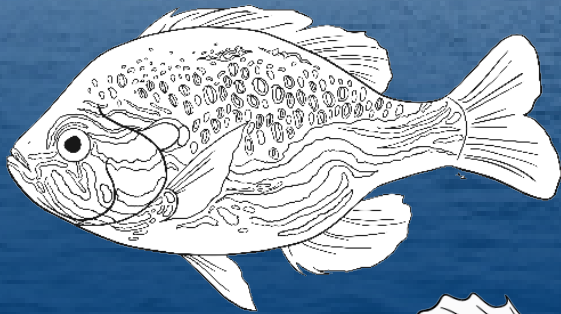
Drawing Nature

Let's go outside! Go outside, or better yet, go with your family to a stream or lake near you and draw the animals, insects, and plants that you see.

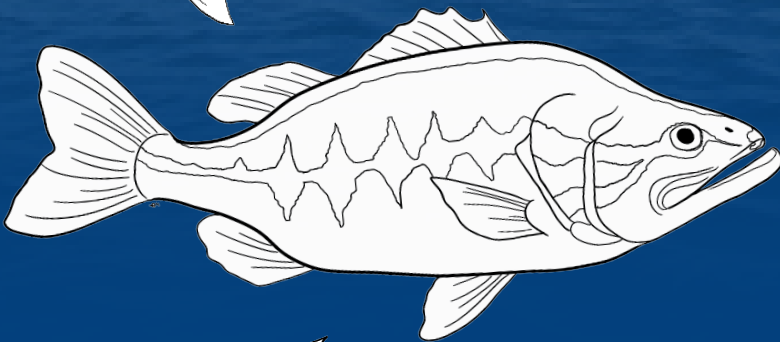
Draw:

What kinds of creatures do you think you would see at different times of the year?
What can you do to make sure this area stays healthy and clean?
Write or draw your answers here:

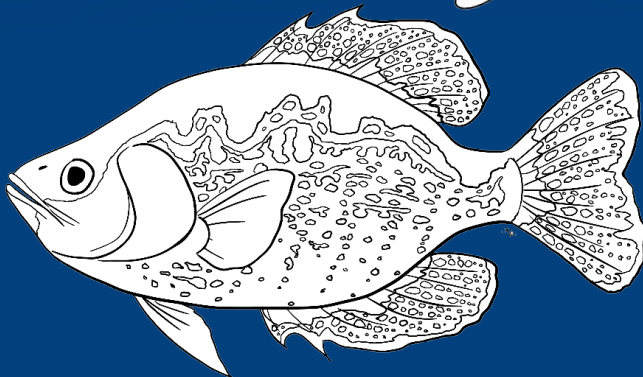
Color in a Native Fish!



PUMPKINSEED SUNFISH. These colorful fish have a yellow or orange belly, and many brown dots on their sides. They usually reach about 5-8 inches in length.

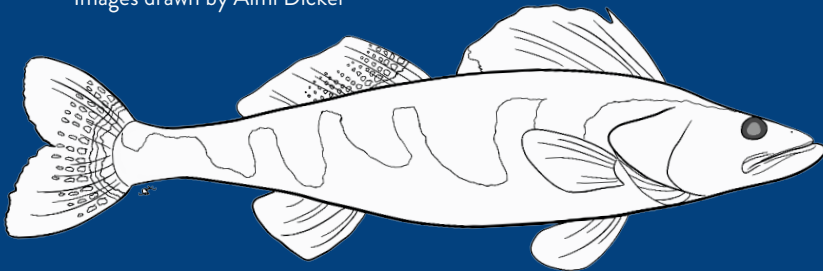


LARGEMOUTH BASS. These fish have a dark stripe across their sides. They eat insects and other fish, including sunfish. They reach nearly 2 feet in length and can live more than 15 years in the wild.



BLACK CRAPPIE. These darkly colored fish grow to about 12 inches in length. Females lay up to 30,000 eggs in one nest. Young fish eat zooplankton and insect larvae, and adult crappie eat small fish.

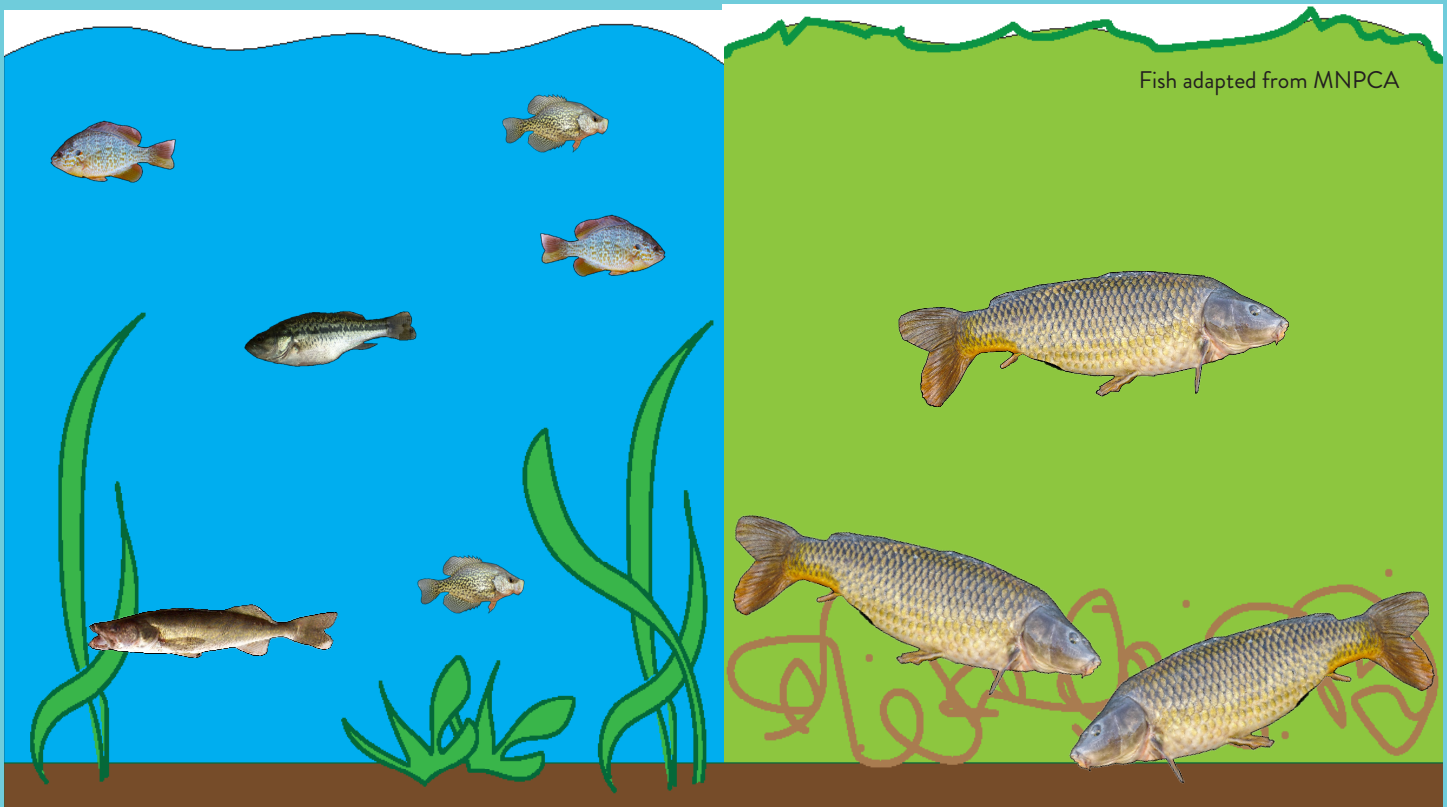
Images drawn by Aimi Dickel



WALLEYE. These fish are generally gold and green, with dark bands on their backs. They can grow up to 3 feet in length and are very popular for fishing. The walleye is the state fish of Minnesota!

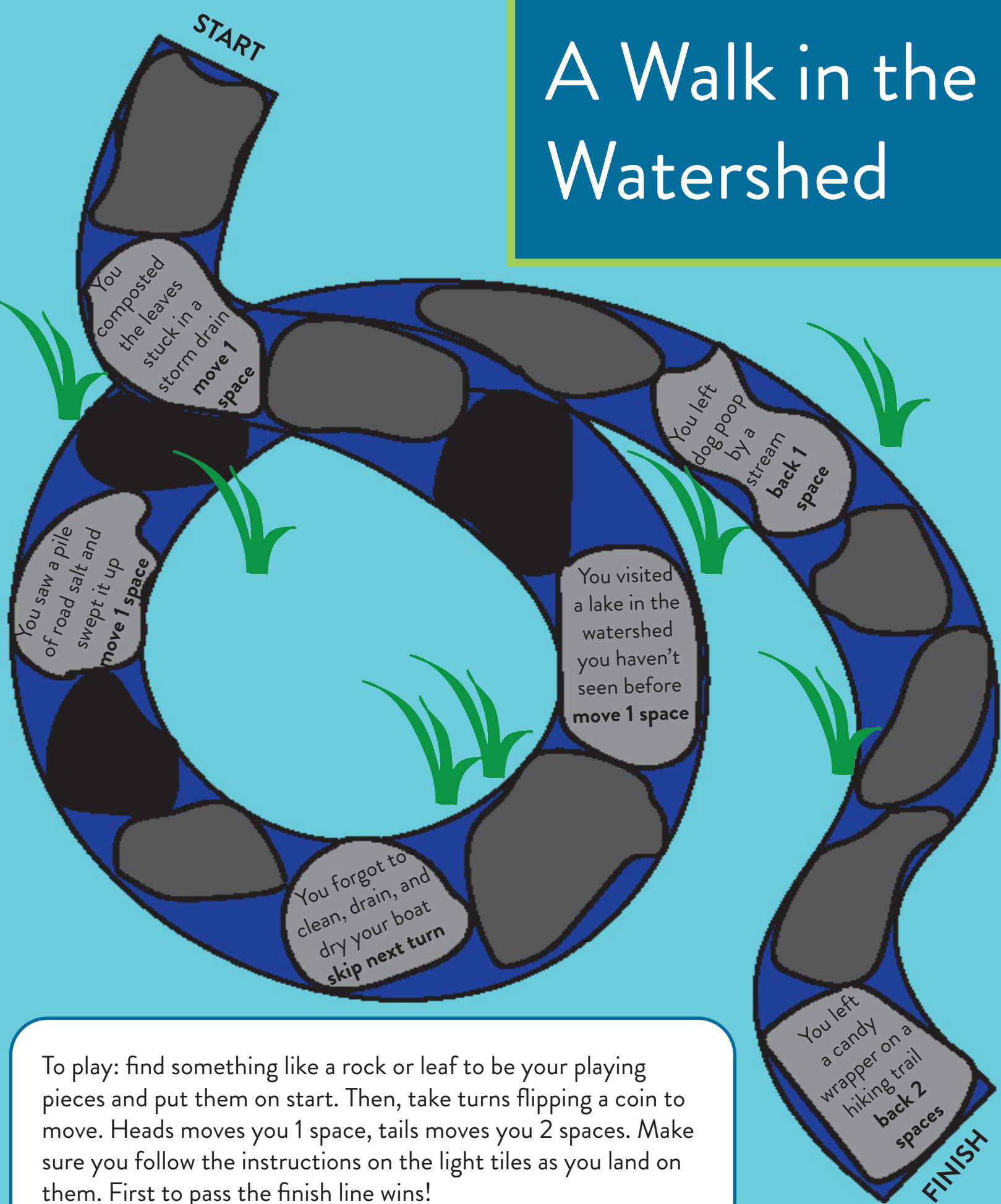
What are AIS?

AIS stands for Aquatic Invasive Species. These are plants and animals that are not from Minnesota and cause ecological harm. They are the bullies of our lakes and streams. Once AIS are found in a lake, they can overtake it and make life difficult for Minnesota's native species. AIS can also disturb the ecosystem they live in. Take a look at the differences between these two lake bottoms. One has the invasive species Common Carp living in it. Can you guess which one? Circle or star all the differences that you see between the two lake bottoms.



Did you find them all? The Common Carp is considered an “ecosystem engineer” because it dramatically changes the ecosystem it lives in. The Common Carp eats from the lake bottom, which stirs up dirt and nutrients. Then the nutrients are mixed into the water causing algae to grow. This is what makes the lake look green. The Common Carp also disturbs rooted plants as it eats, so fewer plants survive.

A Walk in the Watershed



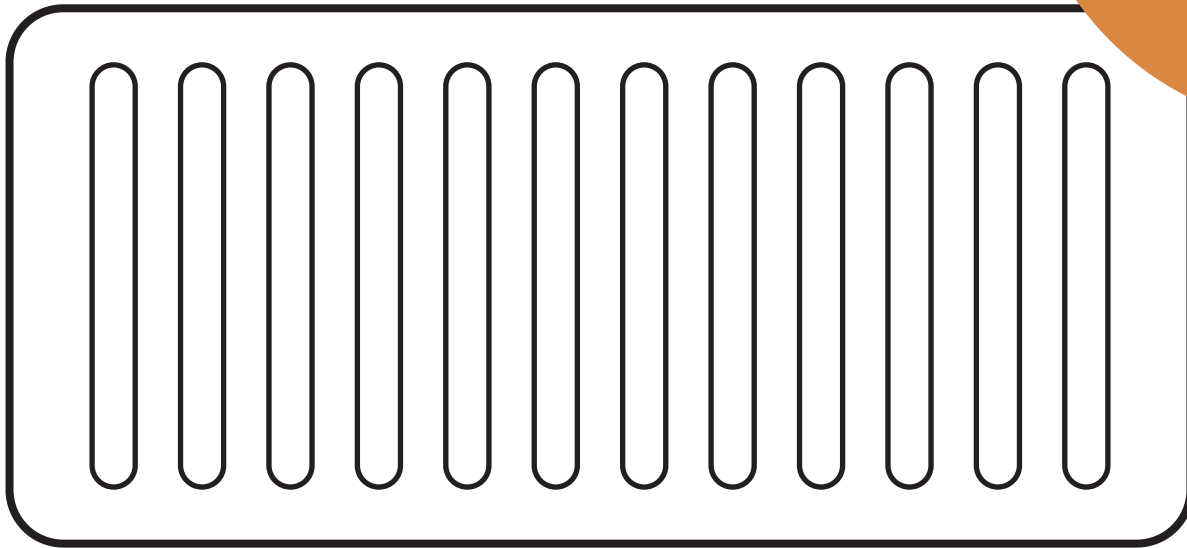
To play: find something like a rock or leaf to be your playing pieces and put them on start. Then, take turns flipping a coin to move. Heads moves you 1 space, tails moves you 2 spaces. Make sure you follow the instructions on the light tiles as you land on them. First to pass the finish line wins!

Rainy Day Hike

Let's go on a walk! Go outside and look for the nearest storm drain to where you live. What is on or around the drain? Is there anything inside it? Draw what you see on the storm drain below.

Remember, storm drains are connected to lakes and streams. So make sure to keep storm drains clean!

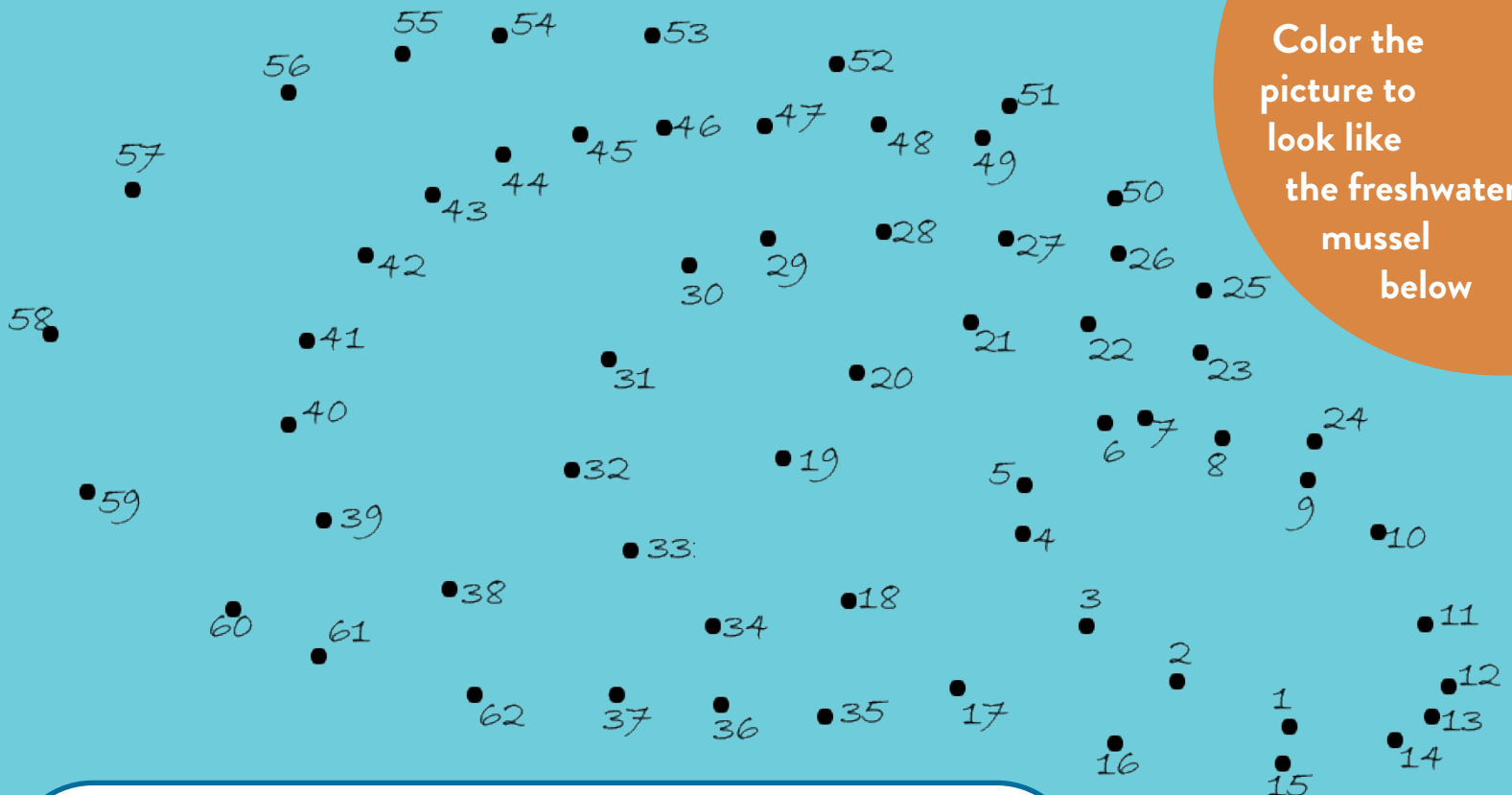
Draw:



Where does the water that goes down the drain come from? If you are unsure, take a look next time it is raining! Where do you think the storm drain takes the water? Write or draw your answers in the box below.

Connect the Dots!

Color the picture to look like the freshwater mussel below

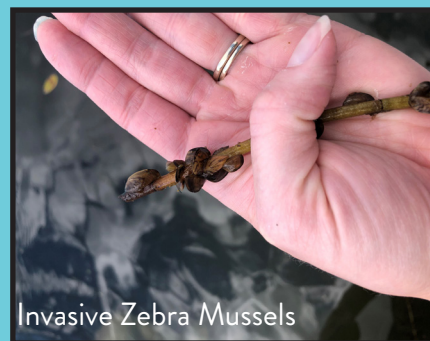


You drew a freshwater mussel! Freshwater mussels are very important animals in stream ecosystems. Their gills help filter out nutrients from the water and put the nutrients into the soil so fish, invertebrates, and plants can use them.

WARNING: Zebra mussels, like the Common Carp, are an invasive species. Do not confuse them with Minnesota's native mussels. They are fingernail sized or smaller and pose many threats to our waters. They encrust equipment, attach to native mussels and kill them, and can cut your feet if you step on them. To prevent them from spreading to more lakes, help your friends and family remember to clean, drain, and dry their boats.



Native Freshwater Mussel



Invasive Zebra Mussels

Climate Change

An area's climate is a combination of its temperature and precipitation trends. Our climate is changing because humans have released gases into the atmosphere faster than ever. These gases blanket the Earth and warm it up. This changes our climate. Changing either temperature or precipitation is like a spark that creates a chain of events that can be harmful to the animals and plants who cannot adjust to environmental change well.

Can you number these events started by climate change from one to four in the order that they happen?

- ___ Fish are stressed
- ___ The temperature increases
- ___ There are less fish for other animals to eat
- ___ Fish have fewer babies

- ___ Lakes and creeks flood
- ___ More water flows through storm drains
- ___ Precipitation and rain intensity increases
- ___ Shoreline and streambank erosion occurs

Outdoor Scavenger Hunt

Get outside and see what you can find! There are lots of plants, animals, and insects throughout our watershed. Try to find all nine listed below. Draw the ones you find in their box.

Fish

Plant Growing in Water

Flying Insect

Leaf

Seed

Animal Tracks

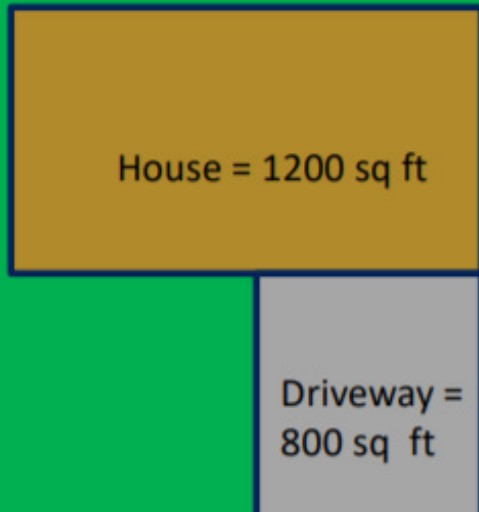
Bird

Flower

Tree

Stormwater Runoff Challenge

How much rain water runs off the place where you live into the storm drains? Let's figure it out.



You need to find the total surface area (sq ft) where water can't soak into the ground. In this example, that's the area from the house and the driveway. Add those areas together. Now you need to calculate the volume of water collected on that surface when there is 1 in of rain (don't forget to convert inches to feet!). Multiply your answer by 7.5 to convert cubic feet to gallons. Check your work below.

$$2,000 \text{ sq ft} \times 1 \text{ in} \times 1 \text{ ft} / 12 \text{ in} = 166.67 \text{ cubic feet (cf)}$$
$$[1 \text{ cf} = 7.5 \text{ gallons}]$$
$$166.67 \times 7.5 = 1,250 \text{ gallons}$$

For this example, 1250 gallons would be flowing off the roof and driveway to the street, down the storm drain. This water carries leaves, grass, dirt, salt, fertilizer and other pollutants into our wetlands, streams and lakes.

Wow! That's thousands of gallons of water and pollutants that flow from a home into your watershed.

Now try the 1 in. runoff calculation for your home or school. Have an adult help figure out the area of impermeable (water can't flow through) surfaces around your home, like the roof and driveway. Then insert that area into the equation above. Show your work here:

Extra challenge: Now figure out the runoff from your home for the entire year using the average rainfall in Minnesota. Hint: The Twin Cities has an average of 32 in. of rain per year.

Adapted with permission from VLAMO.

Pollution Problems

Some things that people leave on the ground can be picked up by storm water runoff and pollute our lakes and streams. The pictures below show some examples. Draw a line between the pollution with its environmental impact.

Pollution

Environmental Impact

Leaves
in storm
drain



Fish
stressed

Excess
road salt



Animals
caught in
trash

Littering



Green
lakes

You
can help limit
pollution by cleaning
up trash, leaves, or extra
salt that you see.

Congratulations!

_____ has completed the necessary number of activities in this booklet to be a certified Junior Watershed Explorer of the Nine Mile Creek Watershed District. They have earned their Junior Watershed Explorer Sticker and water bottle.



Junior Watershed Explorer Pledge: As a Junior Watershed Explorer, I pledge to appreciate and protect the lakes, streams, wetlands, and groundwater resources in the Nine Mile Creek Watershed District. I will learn about the natural world around me, do what I can to protect clean water, and encourage others to do the same.

Mail the bottom of this page:
Nine Mile Creek Watershed District
12800 Gerard Drive
Eden Prairie, MN 55346

OR

Email Erica Sniegowski at esniegowski@ninemilecreek.org with your name, age, and mailing address.

Your Name: _____ Age: _____

Address: _____

City: _____ State: _____ Zip: _____

Parent Email: _____

Parent/Guardian Signature: _____

My child has completed this activity book to the best of their ability.