

FRIENDS OF THE
MISSISSIPPI RIVER

ONLINE LESSON
SERIES:
LANDSCAPES &
EROSION



2020



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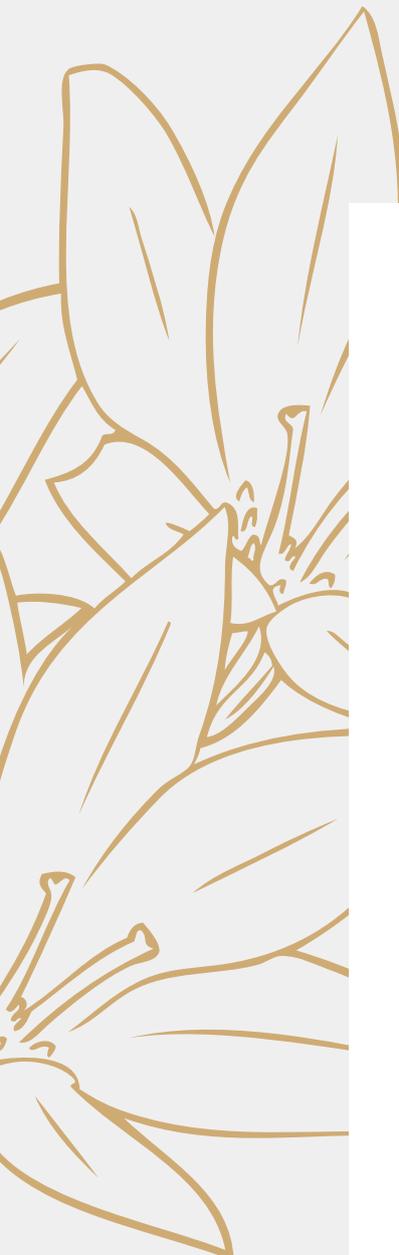


INTRODUCTION

Friends of the Mississippi River engages people to protect, restore and enhance the Mississippi River and its watershed in the Twin Cities region. This in-person classroom lesson has been adapted for homeschooling and remote teaching and has corresponding videos that can be found on the FMR website (<https://fmr.org/events-online-education>). Other educator resources can be found on our Online Environmental Education with FMR Facebook Group (https://www.facebook.com/groups/202957270996905/?source_id=81498431082).

Our **landscape**, the visible features of an area of land, is constantly changing. Day to day, you may not notice the differences, but over a long period of time you can see that the land around us does not stay the same. Unlike living things like plants and animals, land isn't growing or changing on its own but is influenced by weather and climate. **Weather** is the state of the air around planet Earth at a specific time and place. Examples of weather include rainstorms, sunshine, clouds, wind, tornados, monsoons and snow, among others. **Climate** is the average weather condition of a specific place over a period of 30 or more years. The climate in Minnesota is hot and humid in the summer and cold and snowy in the winter.

Ten thousand years ago, the climate of Minnesota was much different than it is today. The ice age was ending and Minnesota's landscape had been covered in a thick sheet of ice called a glacier. A **glacier** is a large mass of ice that is created when snow accumulates year after year faster than it melts. Because of their enormous size, glaciers move very slowly under their own weight and often carry dirt, rocks and even massive boulders with



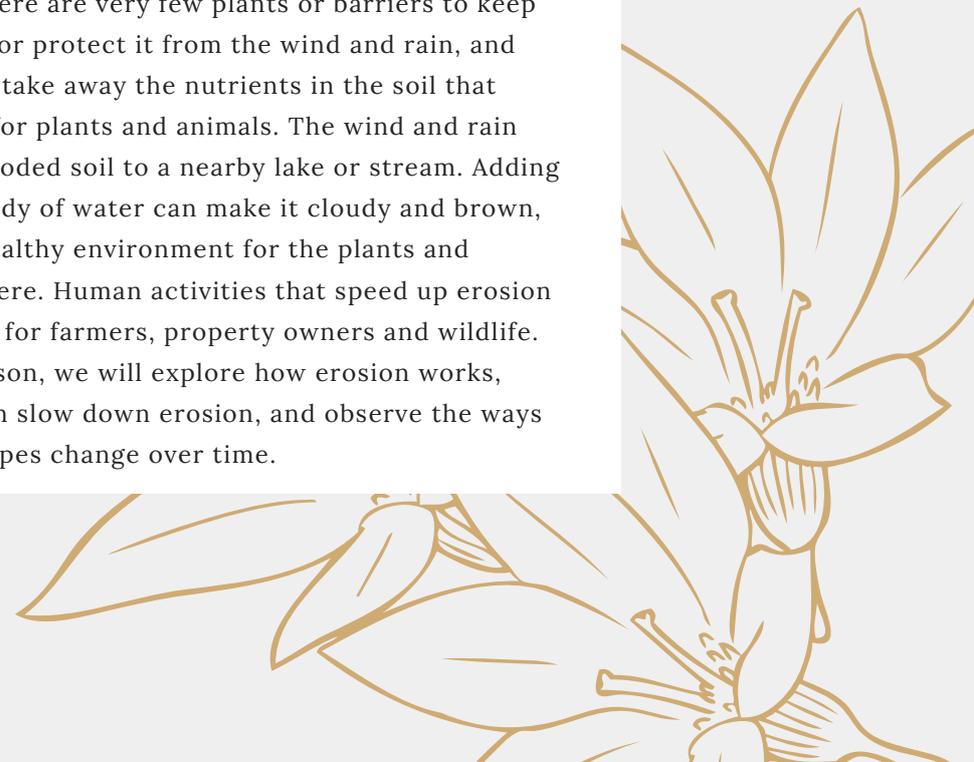
them as they move across the land. You can imagine how a glacier carrying rocks and boulders could have dug out all of Minnesota's many lakes as it moved across our landscape.

As the climate warmed ten thousand years ago, streams and rivers from the melting glaciers began to carve through the soil and rock in a process called erosion. **Erosion** is the process of a moving thing that transports soil and rock from one location to another. Erosion is a natural process caused by water, ice (glaciers), snow, air (wind) and animals.

While erosion is a natural process, humans have also impacted the erosion of our landscape. Nearly 400 years ago, European settlers began making their way to what we now call Minnesota, and eventually they fought against and displaced the native Dakota and Ojibwe people that had lived on the land for thousands of years. The Europeans brought with them different ways of using the land than the native people had been using, reshaping the landscape as they cleared native forests and prairies to make way for houses and farms. Recent human development has caused erosion to happen ten to forty times faster than it did before European settlers came to the area.

For example, imagine a large farm field in the fall or spring when there are not plants growing. Usually, it looks brown because it is bare dirt. Now imagine that it is really windy and rainy, causing the soil in the field to be swept away quickly. There are very few plants or barriers to keep the soil in place or protect it from the wind and rain, and this process can take away the nutrients in the soil that make it healthy for plants and animals. The wind and rain can also bring eroded soil to a nearby lake or stream. Adding more soil to a body of water can make it cloudy and brown, creating an unhealthy environment for the plants and animals living there. Human activities that speed up erosion can cause issues for farmers, property owners and wildlife.

In today's lesson, we will explore how erosion works, learn how we can slow down erosion, and observe the ways in which landscapes change over time.



LANDSCAPES & EROSION: LEVEL 1

1. What land formations can you see from your home?

2. What are some causes of erosion?

3. Where in the world might there be a lot of wind erosion and where might there be a lot of water erosion?

4. What can help prevent erosion?



5a. Measure out root lengths of the following plants to compare them using tape, chalk, yarn, string or even family members. Take a photo and send it to us if you can!

Fescue Lawn Grass (non-native): 6 inches

Daylilies (non-native): 2 feet

Spirea (non-native): 3 feet

Fountain Grass (non-native): 3 feet 6 inches

Buffalo Grass (native): 8 feet

Prairie Dropseed (native): 8 feet

Black-eyed Susan (native): 6 feet

Common Ninebark (native): 15 feet

5b. Which plants do you think will be best at preventing erosion? Why? What do they have in common?



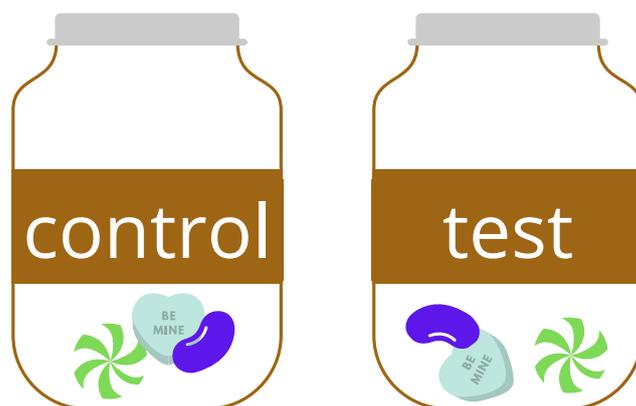
INVASIVE SPECIES: AT-HOME ACTIVITY

MATERIALS

- Two jars with at least one tight fitting lid
- Two to six pieces of hard, sugar-based candy (like mints, lifesavers, jelly beans, m&ms, etc.)
 - Water
- Tape and marker (optional)

DIRECTIONS

1. Set out your two jars on the table. If you have tape and a marker, label one "test" and the other "control."
2. Divide up the pieces of hard candy into two piles, there should be one to three pieces of candy in each pile. If you have more than one type of candy, put the same amount of each kind of candy in each pile.



3. Pour the same amount of water into each jar and put the lids on. Double check to make sure the lids are on securely.



4. Shake the "test" jar for as long as you can. Time yourself for at least two minutes as you shake the "test" jar. The most important thing is to not shake or disturb the "control" jar.

5. After shaking the "test" jar, how do the candies compare to the candies that were in the "control" jar? Why do you think that happened? Share pictures of your experiment with us on our Online Environmental Education with FMR facebook group!

6. What does this experiment explain about water erosion? How might a river with fast currents have different rates of erosion than rivers or ponds with little to no currents?

7. Describe three examples of water erosion that occurs in nature.

8. What other erosion experiments could you try with this method? What if you were to tape down candy in the jar so it can't move around in the water?