



# Nature at School Pre-lesson

## Rise and Fall of the Great Lakes of North America

### See what your students know:

Use this fun [Kahoot](#) to help the DNR understand what your students know on this topic before the program.



### Learning outcomes:

Join Alan Wernette from the shores of Lake Michigan at Ludington State Park to learn about the Great Lakes, a large freshwater ecosystem that defines life in Michigan. The Great Lakes contain over 20% of all the world's surface fresh water and provide drinking water, recreation, transportation, wildlife habitat and economic benefits for the region. During our 30-minute lesson, students will:

- Build a foundation of knowledge of the geologic forces that formed the Great Lakes and the unique features of this large freshwater system.
- Learn how weather and water cycles impact the lakes and the region.
- Understand the basic food web in the Great Lakes and the impacts of invasive species on plants, animals, and people.

### Background information:

The Great Lakes of North America is the world's largest freshwater ecosystem, containing 20% of all available fresh water on the Earth's surface. Each of the lakes contains unique natural features and its own watershed of rivers and streams. The Great Lakes were formed by glacial action but are dynamic and continue to change over time. They affect weather patterns in our region, including lake-effect snowfall, surface evaporation and rainfall that directly results in changing the lake's water levels. The Great Lakes have a huge economic impact on our region and are used for transportation, drinking water, fishing, farming and recreation. Invasive species and human activity have changed the balance of the ecosystem over time, but scientists continue to study ways to mitigate these impacts.

### Resources:

- [Alliance for the Great Lakes curriculum](#)
- [Great Lakes water level forecast](#)
- [Great Lakes watershed](#)
- [Facts and figures about the Great Lakes](#)

### Suggested pre-activity:

- [Where Does Water Run?](#)

### Directions for your DNR Nature at School virtual program:

1. You will receive a reminder email from SignUp Genius three days prior to your scheduled *DNR Nature at School* program. Please read and follow the directions, so we all can have a successful program.
2. At least one day prior to your lesson, send your instructor the link to your Zoom/Google Meet/Skype/Teams for your lesson time. Starting 10 minutes early with just your instructor is encouraged.

#### Day of

3. Make sure students have their sound muted and their cameras on to participate (with thumbs up, number on fingers).
4. If you use the chat feature, we encourage the students to ask their questions there, and the teacher can ask them at the end of the program.
5. See further directions in your SignUp Genius confirmation.

# Nature at School NGSS Correlation

## Rise and Fall of the Great Lakes of North America



Join DNR educator Alan Wernette from the shores of Lake Michigan at Ludington State Park to learn about the Great Lakes, the largest freshwater ecosystem in the world. The Great Lakes contain over 20% of all the world's surface fresh water and provide drinking water, recreation, transportation, wildlife habitat and economic benefits. This 30-minute presentation will meet the following learning outcomes:

- Learn the geologic forces that formed the Great Lakes and the unique features of this large freshwater ecosystem
- Learn how weather and water cycles impact the lakes and the region.
- Understand the basic food web in the Great Lakes ecosystem and the impacts of invasive species on plants, animals and people.
- Learn how citizens can take positive conservation actions to help the Great Lakes.

### Guiding question/phenomenon:

How do various cycles affect and shape the Great Lakes unique ecosystems and why?

Science and Engineering Practice	Disciplinary Core Idea	Cross Cutting Concepts
<p><b>Analyzing and Interpreting Data</b></p> <p>Analyze data using tools, technologies and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.</p> <ul style="list-style-type: none"> <li>• In the EPA Great Lakes facts and figures pre-activity, data is analyzed by students.</li> </ul>	<p><b>ESS2.A: Earth Materials and Systems</b></p> <p>Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils and sediments into smaller particles and move them around.</p> <ul style="list-style-type: none"> <li>• Students review glacial impact on the landscape, weather and water cycles.</li> </ul>	<p><b>Stability and Change</b></p> <p>Feedback (negative or positive) can stabilize or destabilize a system.</p> <ul style="list-style-type: none"> <li>• Discussed as part of the water cycle and food web. Investigated in Alliance for the Great Lakes curriculum Lesson 14 Habitat Analysis.</li> </ul>
<p><b>Developing and Using Models</b></p> <p>Develop a model to describe phenomena.</p> <ul style="list-style-type: none"> <li>• Students simulate watershed flow in the pre-activity "Where Does the Water Run?"</li> </ul>	<p><b>ESS2.A: Earth Materials and Systems</b></p> <p>Food webs are models that demonstrate how matter and energy is transferred between producers, consumers and decomposers as the three groups interact within an ecosystem. Transfer of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem.</p> <ul style="list-style-type: none"> <li>• Students understand the Great lakes ecosystem food web and its impact on water quality.</li> </ul>	<p><b>Energy and Matter</b></p> <p>The transfer of energy can be tracked as energy flows through a natural system.</p> <ul style="list-style-type: none"> <li>• Students will learn the Great Lakes water cycle and food web. Post activities for the classroom in Alliance for the Great Lakes curriculum to model cycles and populations.</li> </ul>

**Recommended grade band(s):** upper elementary and middle school

All Nature At School virtual programs have been created to introduce students at any grade level to life and/or earth science core ideas, when used with pre- and post-lesson suggestions.



# Nature at School Post-lesson

## Rise and Fall of the Great Lakes of North America

### See what your students learned:

Use this fun [Kahoot](#) to help the DNR understand what your students know on this topic, after the program. This data helps the DNR create and update free programming for teachers across the state.



### Activity wrap-up:

Visit a Great Lake or all five! Learn about the lake you are going to visit. Find it on a map and locate cities, towns, rivers and unique natural and historical features. Using a map, trace your watershed route to a Great Lake. If you are not living in the Great Lake's watershed, go ahead and trace your watershed route to find out where raindrops that fall on you will travel to.

Go fishing, swimming, boating, or just walk the beach picking up colorful stones. Find or locate a Petoskey Stone (state stone of Michigan) or any stone you pick up along the shoreline and, using books and computer, find out what it is and how it was made. Petoskey stones used to be part of a living saltwater warm coral ocean! Find out how that is possible when there is no ocean near by the Great Lakes.

### Resources:

- [Great Lakes Learning: Resources for Remote Teaching](#)

### Connect to home:

Read or listen to “Paddle to the Sea” by Holling C. Holling. See a [video](#) about the book. Look at [maps of the Great Lakes](#).

### Post-activities:

- [ROVe the Great Lakes](#)
- [Great Lakes In My World](#) from the Alliance for the Great Lakes
  - Unit 2: “Sand Dunes”
  - Unit 3: “Wetlands”
  - Unit 4: “Human Communities”
  - Unit 5: “History,”
  - Unit 6: “Geology and Water Flow”
- [Aquatic WILD](#)
  - Watered-Down History, section two: Social & Political Knowledge
  - How Wet is our Planet?, section three: Sustaining Fish & Wildlife Resources
  - Facts and Falsehoods, section three: Sustaining Fish & Wildlife Resources
  - What's in the Water?, section three: Sustaining Fish & Wildlife Resources
  - Alice in Waterland, section three: Sustaining Fish & Wildlife Resources

### Connect with DNR content:

For a daily dose of nature, like [MiNatureDNR](#) on Facebook.

Visit the [DNR Nature at Home page](#) for educational video series, resources, lessons, virtual tours and more.