Our Great Lake

Description:

Type of Program: School Field Trip
Grade Level(s):
Duration: 90 minutes (one and a half hours)
Season(s): Fall, Spring, Summer
Location(s): Lighthouse Beach

Program Objectives

Big Idea: Lake Michigan is an extremely unique and precious resource. The goal of this program is to give students a better understanding of how the Great Lakes ecosystem was formed.

Learning Goals:
Students will:

- Be able to describe how glacial advancement and retreat formed the Great Lakes Basin
- Identify some of the rocks and fossils that can be found within the sand of Lake Michigan beaches
- Define glacial moraines and identify different types of moraines (older groups)

Educational Standards (format below):

4-ESS1-1: Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.
4-ESS2-1: Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
MS-ESS2-2: Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying temporal and spatial scales.

Content and standards fit within the District 65 grade and unit (format below):
4th grade unit: 4.1 Earth Features

Materials

- Bag of flour
- Baking sheet or lunch tray
- Oil or pam spray
- Large ice cubes with dirt and grass inside (use a small cup to make)
- Rock and Fossil ID Sheet (print image from this link)
- Cat litter scoops (for finding rocks and fossils in the sand)
- Some rocks and fossils to add to the search area (if available)
- Paper (to sketch the landscape after glacial activity demo)
- Bucket
- Measuring cup

Set Up

Location setup: *Before students arrive, designate an area on the beach for rock and fossil collection. If available, bury some rocks and fossils in this area for students to find. Make sure to purchase several scoops for them, cat litter scoops being ideal to allow for the sand to fall through while the rocks/fossils are preserved.*

Activity setup: *For the glacial activity demonstration, spray a baking sheet or lunch tray with oil/pam then fill it with flour. Make sure to create a couple large ice cubes using a small/medium plastic cup. Fill the water with a bit of dirt and grass before freezing to represent sediment in the glacier.*

Supplies setup: *Make sure to have a piece of paper for each student after the glacial demonstration. Students can sketch the landscape and note where they think rivers or lakes would form.*

Field Trip Outline

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*For more detailed information on the topics you will be presenting, see background information and useful links in the **Background Information** section*

Introduction (10 minutes)

- Have students sit in a circle on the rug. Introduce yourself, the topic for today, and the rules for the field trip.

Lesson: How Glaciers formed the Great Lakes (30 minutes)

- Use the lesson outline to teach the students about glaciers and how their activity is responsible for the creation of the Great Lakes. See OurGreatLake_LessonOutline. Instructors will also give two short visual demonstrations to help students understand the scale of the formation of the Great Lakes. Both demos are outlined in the lesson outline.
    a. Water percent bucket demo: showing the different proportions of water on the globe (i.e. amount of saltwater, freshwater, ice caps, great lakes).
    b. Arm-span geologic time scale: a physical scale model where your outstretched arms represent Earth's entire history
- Using a baking sheet of flour and some large ice cubes (to represent the glaciers) the instructor will demonstrate how glaciers move across a landscape. Students can sketch the resulting landscape and mark where they think rivers or lakes would appear as the glacier melts. See OurGreatLake_DemoOutline for more instructions on the glacial activity demonstration. Also see this video for a visualization.

Activity: Dunes Walk (10 minutes)

- Take the students for a short walk through the dunes on the way to the next activity (fossil and rock collection). Make sure to note the interesting items below!
    - Lake Michigan is home to the largest freshwater dunes ecosystem in the world!
    - Sand deposited by glacial activity has been pushed in shoreline ecosystems for many, many years by waves and wind forming the unique dunes ecosystem.

Activity: Fossil/Rock Collection at the Beach (15 minutes)

- Instructors should mark an area of the beach off prior to the students arriving. If available, instructors can bury some fossils or rocks of interest just below the top of the sand. This will ensure students dig up something fun and interesting. See the Field Museum's beachgoers guide to Lake Michigan Rocks and Fossils
    - Students may find the following within Lake Michigan beaches: Fossils (coral fragments, crinoid stems, brachiopods, trilobites), Petoskey stones (fossilized coral in a specific pattern), mussel/clam shells, sea glass
    - Students can think of the collection of rocks they find as a fingerprint left by glacial activity. They may find things from Illinois's original bedrock, things dragged from Canada, and fossilized materials from when Illinois was a sea.

Activity: Fossil/Rock Sorting and Identification (15 minutes)

- Bring students back to the classroom to sort and identify their rocks using the Beachgoer's guide to Rocks and Fossils although they will likely find things not found in this guide!

Conclusion (About 10 minutes)

- End the program back in the area you started. Have the students sit on the floor or in their chairs and ask them about what they have learned.

Background Information

Before the Great Lakes formed, the region existed as a system of low-lying valleys including a major preglacial river named the Laurentian River. Over the past 2.5 million years, our Earth experienced a series of ice ages during which glaciers repeatedly advanced and retreated over the land we now call the Great Lakes. As glaciers pushed south, valleys deepened and eventually widened them into basins capable of holding enormous amounts of water. The glaciers were also responsible for picking up and carrying huge amounts of sediment across the landscape, depositing them as ridges called moraines. As glaciers retreated and melted back, the meltwater filled the newly formed basins and created the Great Lakes as we know them today. This glacial history is the reason why such interesting fossils, rocks, and minerals exist around Lake Michigan beaches.