



Learning Activity:

Race to Leave No Trace

Activity Type	Active Group Game
Focus Area	Science, Math, Physical Education
Time Required	10–15 minutes for prep; 20–30 minutes for activity

Overview

The Arctic is a major supplier of oil and natural gas. These resources help power our homes, fuel our vehicles, and provide energy for those who live far away from the region. But gaining access to these resources can be dangerous and costly when they are extracted irresponsibly. In this activity, learners will participate in a team challenge that demonstrates the difficulties in acquiring valuable resources while preserving the natural surrounding environment. This game will help participants understand the dangers associated with natural resource extraction in fragile places, such as the Arctic, and brainstorm alternatives that could allow us to continue using Earth’s resources in a way that better protects the environment.

Objectives

At the completion of the activity, students should be able to

- understand how the various components of the game serve as models representing human activities and their impacts on nature
- explain in terms of cause and effect the increased shipping and natural resource extraction occurring in the Arctic
- develop ideas for solutions, on both small and large scales, that could help reduce shipping-related threats facing the Arctic



Iceberg, Greenland



Standards

Next Generation Science

- 4-ESS3-1 Earth and Human Activity
 - Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
- MS-ESS3-3 Earth and Human Activity
 - Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

Materials Needed

- Large cups (preferably clear) to fill with water
- Open space (outdoors or a large indoor area)
- Cones, tape, or other material to create lane(s) on the floor or ground
- Rulers (to measure the water level lines on cups)
- Markers or tape (to mark the initial water levels on cups)
- Large obstacles (e.g., chairs, desks, trash cans, moveable furniture) that students will be navigating around
- Student handout (included)
- *Educator's Resource Guide* (for reference)
- Optional: Display board for recording the team results
- Optional: Towels or a tarp to cover the floor





Vocabulary

- **Ecosystem:** the living (e.g., humans, polar bears, fish) and nonliving (e.g., air, ice, water) components of an area that interact with each other in an interconnected way
- **Fossil fuels:** fuels (such as coal, oil, and natural gas) formed in the Earth from fossilized plant or animal remains and burned to generate energy; the biggest drivers of climate change
- **Glacier:** a slowly moving mass or river of ice formed by the accumulation and compaction of snow on mountains or stretches of land near the poles
- **Natural resource:** something (e.g., water, a mineral, a forest, a type of animal) that is found in nature and is valuable to humans
- **Noise pollution:** annoying or harmful noise in an environment
- **Sea ice:** frozen sea water that floats on the ocean's surface

Activity Procedure

Part 1: Teacher Preparation

- In an open space, design an obstacle course for participants to complete in teams. The obstacle course should consist of a curved path that extends from one point in the space to another on the opposite side. If spacing allows, create a path for each team; otherwise, have the teams take turns on one path.
- Have the obstacles (e.g., chairs, trash cans, desks) located nearby, ready to be placed in the middle of the obstacle course after each round. If the activity is indoors, consider placing towels or another covering such as a tarp on the floor to prevent it from getting wet.
- Divide the individuals evenly into small teams, preferably of four or five participants, if the group size allows. If the group is small, a team can consist of one person and the activity can be performed as a race between individuals instead of a relay race.
- For each team, fill one cup close to the top with water and then mark the water level with a marker or tape.
- Distribute the rulers and copies of the included student handout—one per group (or one per individual if the group is small).



Part 2: Introductory Discussion

- Pose the following warm-up questions to learners: *What are some examples of natural resources? How do we get them? What do we use them for?*
 - Hold a group discussion around how we obtain resources from nature and what purposes these resources serve in our daily lives. If it would be helpful, create a display chart to compile the answers.
- Guide the discussion towards resources found in and around the ocean (such as fish, oil, and metals) and how humans go about getting them. Be sure to mention the role of ships.
 - In this activity, the focus is on oil, a natural resource known as a fossil fuel because it forms from the remains of ancient plants and animals. We use oil for many things in our daily lives, including for electricity (such as for cell phone and computer use), to heat our homes, and to fuel our vehicles. To access oil, it must be extracted from deep beneath the ocean floor. Oil companies typically use large drills, which pump the oil out, and then they transport it, through pipes or ships, to land to be processed.

At the completion of this activity, students should be able to answer the key question.

KEY QUESTION: What happens to natural environments such as the Arctic when they become contaminated?



Walrus, Svalbard Archipelago, Norway, Arctic Ocean



Part 3: Activity

- Introduce the activity by explaining that the class or group has been divided into teams and given a full cup of water that represents oil. Each member of the team represents a ship tasked with transporting their oil safely to its destination, avoiding spills, contamination, or damage to their surroundings. Each round of the race presents different obstacles, and the challenge is to keep all of the water (oil) in the cup (ship) and avoid spilling it (and contaminating the area).
- For each round of the relay race, each member of the team takes a turn carrying the team's cup through the obstacle course. When one participant returns to the starting line with the cup, it is handed off to the next person. When each team member has completed the course, the round ends.
 - If teams are uneven in number, teams should select which team member will participate more than once.
- The goal of each round is to be the team that completes the course with the most water remaining in the cup (i.e., the least spillage).
 - At the completion of each round, teams use a ruler to measure the distance between the starting water line and the final water line and record it in the data table on their student handout.
 - As needed, refill the cups between rounds to the marked fill line.



Oil tanker leaving Valdez, Alaska



- Introduce each round by reviewing the objective and what the obstacles represent.
 - *Round 1: Oil Spill Challenge.* This first round has no obstacles aside from navigating the curvy path. This round introduces participants to the challenge of transporting oil from one point to another and to the precision and care that ships must take to do so.
 - *Round 2: Glacier/Iceberg Challenge.* Before beginning this round, place desks, chairs, trash cans, or other medium- to large-sized obstacles randomly in the path. These obstacles represent icebergs and glaciers that ships could encounter in the water and must avoid colliding with.
 - *Round 3: Narrow Traffic Challenge.* Before beginning this round, adjust the width of the path(s) to make it (them) narrower. This represents the challenge of a crowded ocean that increased shipping traffic would bring.

Part 4: Reflection and Assessment

- After completing the game, have participants reflect on the different rounds by answering the questions included in their student handout either individually or as part of a large group discussion.
- To tie the activity back to the key question, have learners discuss the following issues and questions with their team or as a follow-up assignment:
 - Oil spills are one of the greatest threats to the Arctic. Most of the time, oil spills occur when there are accidents while drilling or using pipelines, or from ship collisions, all of which introduce large amounts of oil and pollutants into natural areas.
 - Why are oil spills so damaging and harmful to ecosystems such as the Arctic?
 - The Arctic supplies the world with 10% of its oil through drilling. Between 2013 and 2019, the number of ships in the Arctic ocean increased by 25%.
 - What are the risks associated with the increased number of ships moving through the Arctic? Why might the number of ships continue to increase? (Hint: Think about human needs and how changes in climate may lead to increased shipping.)
 - Sometimes, ships in the Arctic cause damage to the environment that cannot be undone.
 - Do you think it is worth the risk to collect valuable resources for humans? Why or why not?
- To conclude the activity (using an exit ticket), have students submit written answers to the following question:
 - Based on this classroom activity and what you already know about resources in the Arctic,



threats, and shipping patterns, how might irresponsible shipping activity in the Arctic affect your daily life?

– For a more advanced option, have students compose a brief written response to the following prompt:

- Because of the impacts that increased shipping can have on the Arctic ecosystem, many people and environmental organizations want to set guidelines around shipping activities. What changes do you think need to happen to reduce shipping in the Arctic? How might your actions or your community's actions contribute to these changes?
- For a fun way to assess student comprehension on this topic and others associated with the Arctic, go to the Wild Classroom Kahoot! Collection [Habitat spotlight: the Arctic](#).

Extended Learning Options

- To increase the level of competition, consider setting a time limit for each round. Depending on the size of the space, this could be a limit of several minutes. Having the pressure of a time limit could represent the pressure that oil companies might feel in meeting consumer demand.
- Teach about other threats to the ocean related to shipping, including noise pollution, which interferes with communication among species such as whales, and trawling, a damaging fishing practice. Trawling can tear up the seafloor and damage cold-water corals. Have participants research these and other threats posed by irresponsible shipping practices and challenge them to think about how they would create a round of the race that models and demonstrates the impacts of these threats.

Additional Resources

Use the information found at the following links to enhance the class discussion, if desired, or share the links directly with learners as appropriate.

- **Web story:** [Five reasons why America's Arctic should remain off-limits to new drilling for oil and gas](#)
- **Web story:** [How would offshore oil and gas drilling in the Arctic impact wildlife?](#)
- **Web story:** [Five species that stand to lose the most if the US allows drilling in the Arctic refuge](#)

For more fun classroom activities with a focus on wild species and conservation, visit wildclassroom.org.

Race to Leave No Trace: Student Handout

Data Table: After each round of the activity, fill in the data table below. First, evaluate the amount of water that was lost in that round of the race by measuring the distance between the fill line and the water line. Then record some notes of what you observed or how you felt during that round.

	Round 1 Oil Spill	Round 2 Glacier/Iceberg	Round 3 Narrow Traffic
Distance between the fill line and the end-of-round line. (Don't forget to include units!)			
Observations			



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Post-activity Questions

At the completion of the activity, answer the following questions, reflecting on each round.

1. Which round did you/your team perform the best (i.e., lost the least amount of water)?
2. Using the observations you recorded after each round, which round was the most challenging? Why?
3. In round 2, what would happen in actuality if a ship transporting oil were to collide with a glacier or iceberg?
4. Round 3 represents a current challenge in the Arctic of increased shipping traffic due to more ocean becoming accessible. Why is the ocean opening up?
5. Aside from drilling for oil, what other activities might result in more ships traveling through the Arctic?