

Lesson at a Glance

In this fun game, students will act as seals and polar bears in an Arctic food chain, and learn how shrinking Arctic ice affects the polar bears' ability to find food.

Grade

4-6

Time

30 minutes to 1 hour

Core Connections

- 4th Grade Science 5.2.b *Cite examples of physical features that allow particular plants and animals to live in specific environments*
- 5th Grade Science 5.2.c *Describe how a particular physical attribute may provide an advantage for survival in one environment but not in another*

Materials

- Seal tokens (game tokens or pieces of cardboard)
- Jump ropes or hula hoops
- Vests, bandannas, or cloth strips
- Population Chart

Background Information

Polar bears are classified as marine mammals, meaning that they spend a significant amount of their life out at sea. Most of this time is spent on pack ice that forms yearly in the polar region, hunting seals. Unable to catch the seals in open water, the bears rely on open holes in the ice that the seals use to breathe, haul out, or to get to their birthing dens.

Over the last 20 years, the hunting season for bears that live in the Hudson Bay area of Canada has decreased by over three weeks due to earlier ice melts. Unable to hunt the large, blubber-rich seals as much as they used to, the bears now have increased cub mortality, lower weights, and reduced fat stores. These fat stores are particularly crucial, as the bear is almost totally unable to hunt in the summer and lives on the fat stores until the sea ice returns again in the fall.

Activity

This game should be played on a soccer field, or in the school gymnasium.

1. Divide the class into two groups: polar bears and ringed seals. About two-thirds of the class should be seals, and the other one-third polar bears. Have each polar bear wear a vest or bandanna as identification. Record the number of seals and polar bears at the beginning and end of each round on the population chart.

2. Give each seal 10 food tokens to represent seals caught by polar bears. Each time a seal is tagged by a polar bear, it must give the bear one of its tokens.
3. Use the hula hoops or jump ropes to create four “safe zones” on the playing field.
4. In each round, the seals must run from one end of the playing field to the other six times. The “out of bounds” area at the end of the field is a safe zone, but the seals can only stay there for a maximum of 10 seconds. The safe zones on the playing field represent open holes in the sea ice, and seals can stay safe there for 5 seconds. Start each round with the seals at one end of the field, and the bears scattered throughout the field.
5. The bears try to tag the seals as they run from one end of the field to the other. When tagged, the seal must give the bear one of its tokens. When a seal has lost all of its tokens, it must go to the sidelines and wait for the round to end. A seal cannot be tagged twice in a row by the same bear.
6. After the seals have made it to the other end of the field six times, the hunting season is over. Have each polar bear count up the number of tokens it has captured, and record the data on the population chart.
7. In order for a polar bear to survive to the next round, it must have captured at least four tokens. Any polar bear that did not survive will be a seal in the next round.
8. If a bear captured at least 8 tokens have found enough food to reproduce. They can choose a seal that ran out of tokens to be a bear cub in the next round. (If all seals survived the round, they can pick any seal.) Record the number of cubs born on the population chart.
9. Repeat the game as before, but the “bear cubs” must stick with their “mother bear” and cannot catch their own seals. At the end of this round, single bears must have collected four tokens to survive, but mother bears need to have collected at least six tokens. If they have collected at least four, but less than six, the cub dies and returns to be a seal in the next round. If they have collected less than four tokens, both bears die and return as seals. Bear cubs that survived this round will be adults in the next round, able to hunt on their own. Bears who captured eight or more tokens get a new cub for the next round.
10. Record population changes on your population chart.
11. For the next round, changing Arctic conditions are introduced. To simulate more open water in the Arctic, add three more safety zones on the playing field. To simulate earlier ice melt, decrease the number of times the seals must run the field, from six to four.

12. Continue playing the game, recording data before and after each round on the population chart. You may choose to increase the number of safe zones or decrease the length of the hunting season each round.
13. Return to class and discuss the data on the population chart. How did the bear population change over time? How did the seal population change? What change did the number of safe zones represent? What change was represented by the number of times the seals had to run the field? How did these changes affect the polar bear population in the game? If the hunting season continues to get shorter, what do you think will happen to the bears?
14. Make a multi-line graph on the board, tracking the total population numbers of bears and seals during each round. Add a line to track the amount of open ice (safe zones) during each round.

Climate Change Connections

How do you think animals like polar bears will adapt to shorter hunting seasons? Can you think of any other animals that might have to adjust their patterns or what they eat due to climate change?

Extension

To compare this Arctic food chain to Utah, play “How Many Bears Can Live in This Forest?” from Project WILD to simulate food chains and hunting seasons for black bears.

Adapted from Project WILD and climatechangenorth.ca