

It's a Tough Life!

Adapted with permission from "Plover Survival: A Simulation Game." U.S. Fish and Wildlife Service.

Grade Level: upper elementary/middle school

Duration: one 50-minute class period

Skills: vocabulary, critical thinking, discussion, visualization, and interpretation of data

Subject: science and physical education; language arts (with additional activity)

Concepts

- During a shorebird's breeding season, its habitat is where it courts, nests, and raises its young.
- Shorebirds nest on the ground.
- Some shorebirds defend breeding territories.
- Shorebirds have elaborate behavioral adaptations for courtship display and protection of their nests and young.
- Shorebird nests are well camouflaged. Chicks use both camouflage and behavior to stay concealed from predators.
- Your local environment may be important breeding habitat for many migratory shorebirds.
- Shorebirds face numerous threats in their breeding habitat.
- Disturbance from human activities, animals, and trash limit a shorebird's opportunity to feed and nest successfully.

Vocabulary

- invertebrates
- behavior
- threat
- human disturbance
- predator
- chicks

Overview

Students play a game that simulates the challenges shorebirds face when trying to feed along coastal beaches. Students begin to think about shorebirds' needs and what

threatens their survival.

Materials

- Outdoor or indoor playing field with enough room to move around freely
 - One rope at least 16 feet long
 - Four small brown bags or sandwich bags
 - One beach ball, Frisbee, or small ball
 - One additional 16-foot rope marked in four foot intervals or five orange goal cones or other markers to establish boundaries
 - Soda cans, candy wrappers, a couple of bags of chips (to simulate litter)
 - One to two bags of dried beans, the same color as the playing field
 - One copy of *It's a Tough Life! Record of Feeding and Survival Success* data chart
 - One large sheet of paper or flip chart for recording data
 - Markers for recording data
- ## Optional
- One large inner tube, tire, or ball
 - One kite

Introduction

Shorebirds face many *threats* and *disturbances* that can interfere with their ability to nest and feed. One of the biggest threats to beach-nesting shorebirds is *human disturbance*. As our population grows, so does our need for recreational space. This is especially true in rapidly growing coastal communities. Many times shorebird nesting coincides with the peak of our summer beach recreation season. Since shorebirds are naturally wary, they will move away from their nests and important feeding areas when disturbed, often before people even notice their presence. Of course, noisy beach activities such as personal water crafts and off-road vehicles scare shorebirds away; but so do more passive, seemingly unobtrusive activities like jogging or walking along the beach.

For more information about the threats shorebirds face, read *Threats to Migrating Shorebirds* in the *Shorebird Primer*. To learn more specific information about a sandy beach-nesting shorebird, read the *Snowy Plover Shorebird Profile* located in the *Appendix*.

Activity Preparation

1. Draw the *It's a Tough Life! Record of Feeding and Survival Success* data chart on a flip chart so you can record data as you play the game. You may also want to prepare a transparency of this data sheet for use in the classroom

Procedure

Set up the Scenario

1. Ask students to describe the wave action on a beach or lake. Is the water always at the same level or does it vary? Describe the area where a wave has just passed; is it wet or dry? Ask for two volunteers to move the rope to simulate gentle wave action. Have them demonstrate this motion.
2. Ask students if they have ever seen small birds along the water's edge. If so, what did they observe? Were the birds feeding? Did they move when the water approached? How? (If students have not observed these behaviors, explain that birds move back and forth with the advancing and retreating waves. They peck and poke with their beaks for small invertebrates in the mud.)
3. Ask for four volunteers—two to model the behavior of the adult shorebirds and two to model the behavior of the chicks. You may actually want to label these volunteers so you can distinguish between the adults and chicks.



4. Explain that in this game, or simulation, the birds (played by the students) will be feeding on beans (representing small *invertebrates* found in the mud). Spread the beans on the ground near the “water’s edge” and hand out small sacks or bags (a “stomach”) to each of your shorebirds. When the shorebirds find an “invertebrate,” they must pick it up with one hand and put it in their “stomach.” They can only pick up one bean at a time with one hand—the other hand must be holding their “stomachs.”

5. Have the shorebirds move with the waves. Model this feeding behavior for about 30 seconds. Count each bird’s beans at the end of this time and record the number on the *It’s a Tough Life! Record of Feeding and Survival Success* data chart.

Note: The range of beans collected during this first round will be your standard healthy diet. As the game progresses, if a shorebird collects only half of this amount, it will survive but be unhealthy. If a shorebird collects only one quarter of this number, it may eventually die.

6. Introduce students to the shorebird they will be representing. Select a shorebird that you might find at your local beach, lakeshore, or flyway from the list below.
- Atlantic Flyway: Piping Plover, Wilson’s Plover
 - Central Flyway: Piping Plover, Snowy Plover, Wilson’s Plover
 - Pacific Flyway: Snowy Plover, Wilson’s Plover
7. Explain that this activity will help them understand some of this bird’s *behaviors* and needs, as well as the things that are threatening its survival.

Add Human Disturbance to the Game

8. Ask students what a typical lakeshore or ocean beach looks like. Ask them to describe different types of people-related activities that take place there. Make sure their responses include some sort of game activities (playing Frisbee or catch, flying kites, etc.). What do you think shorebirds do if people or other animals come too close? Can shorebirds feed when they are constantly avoiding people?

9. Establish an area that will be a “safe haven” for the shorebirds. This should be located at least ten feet away from where they are feeding at the water’s edge. Mark off this area with the second rope, goal cones, or other objects. Establish four foot wide “corridors” through which the plovers will move from the water’s edge to the safe haven if any form of disturbance, like people, approaches. (See the diagram.)

10. Explain to the students that each shorebird will have a corridor in which to feed and move. If a person comes into the shorebird’s corridor, the shorebird has to be in the “safe haven.” This means that the shorebird must anticipate the approach of a human and run to the “safe haven” before the person is actually in its corridor. (In real life, most shorebirds will move long before people get too close.)

11. Ask for six new volunteers. Ask the plovers to resume feeding along the water’s edge. Tell the plovers they must “fly” to the “safe haven” when disturbed and go back to feeding when it is safe again. Then send two student volunteers to walk along the water’s edge at normal walking pace. When they are through, send another two students into

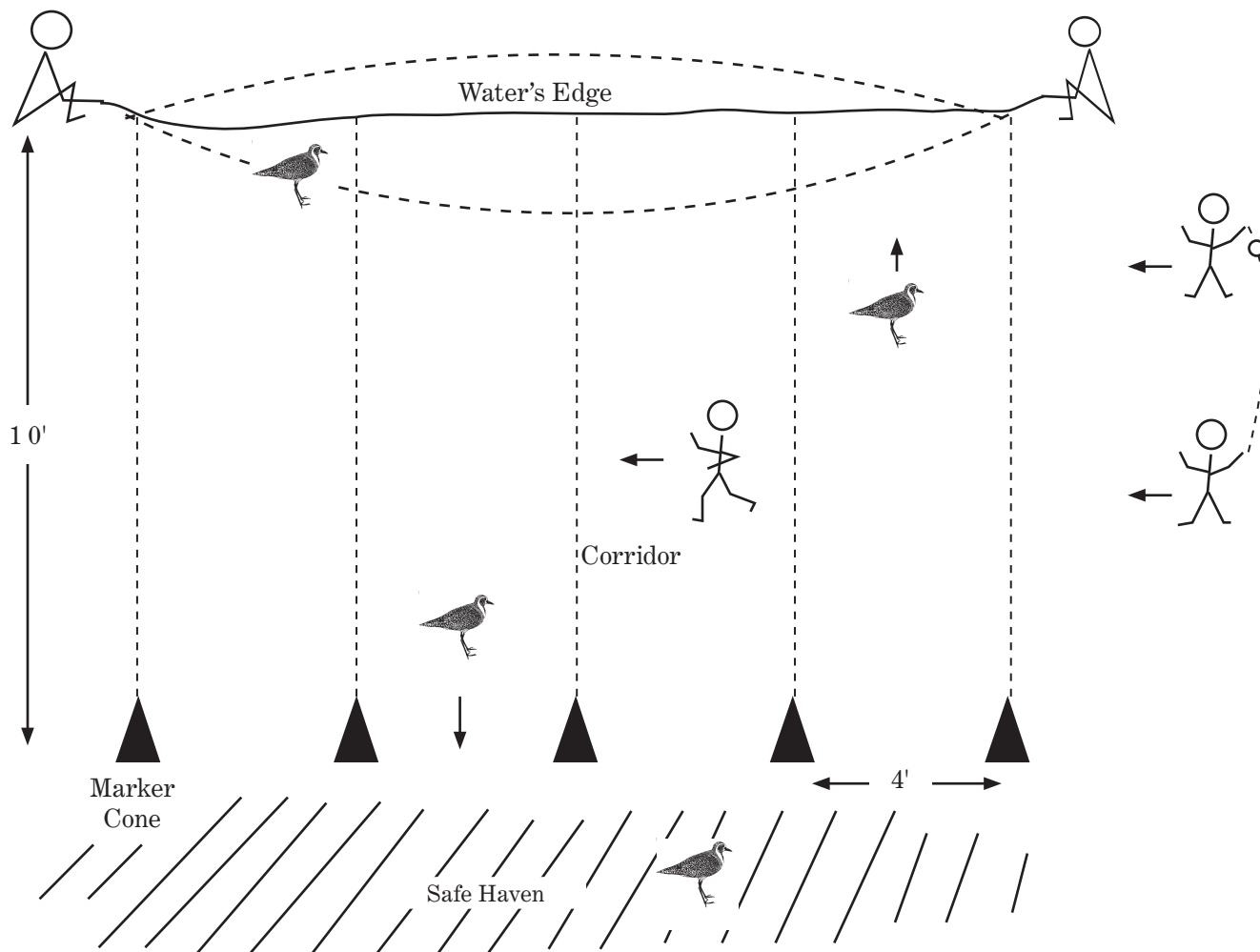
the game—this time playing ball or Frisbee for a few minutes. When they leave the area, send in another two students carrying soda cans, bags of chips, and other trash into the shorebird area. They should walk along, dropping some of their trash. Allow variable amounts of time between each pair of students to allow the plovers to attempt to return and feed.

12. Count and record the beans collected by the shorebirds in this round. Compare the results with those of the first round. Discuss the number of beans collected. Remind the class that more time was spent on this round but the birds still caught less food! Will these be healthy shorebirds? Will they even survive in this area? Ask the shorebirds how they feel physically. Are they tired? Given that real shorebirds will actually be running farther than the ten feet established in this game, what has the class learned about how much energy shorebirds use to get food? (Point out to students that with human interference, the shorebirds are using more energy to obtain less food.)

Add Predators to the Game

13. Ask students if the trash left by people in the last round affected the birds’ ability to feed. Explain to the students that when people leave trash in an area, it attracts other kinds of animals like dogs, cats, raccoons, skunks, foxes, and gulls.

Note: Gulls are fast-moving birds that prey on shorebird eggs and chicks. When a gull or other predator approaches a shorebird with its young, both the chicks and adult respond. The adult will move away, faking an injury like a broken wing in an attempt to lead the predator away from the



chicks. If both adults are present, the second parent will lead the chicks to safety. Because they are unable to fly, chicks are easy prey for predators.

14. In this round, instruct the chicks to squat on the ground and the adults to remain standing while they feed. Select a volunteer to be a gull or other predator. If the predator can tag a shorebird chick, this constitutes an attack—and the shorebird dies. The adult plover can fake an injury and/or lead the chick away to safety. Allow the predator to enter the area for 30 seconds.

15. Count and record the beans and living shorebirds at the end of the round. Discuss the impact this predator had on the shorebirds' ability to feed and survive.

16. **OPTIONAL:** Play additional rounds, rotating students into the roles of shorebirds. Add a round to introduce recreational disturbances with simulations like kite-flying, playing Frisbee, riding Off-road vehicles (ORVs) on the beach, or walking an unleashed dog. See options below to do these rounds.

Kite-flying: Kites look like large predatory birds to plovers. In

fact, plovers have been known to respond to the presence of a kite that was over 100 meters (109 feet) away!

- Ask two students to fly a kite. By running around, the students can keep the kite in the air for brief periods of time, assuming there is a little wind.
- Every time the plovers see the kite in the air, they must stop feeding and go to the "safe haven."
- Have the plovers feed and then let the students fly the kite for 30 to 60 seconds, depending on their success at getting it in the air.
- Count and record the beans the plovers picked up.



Off-road vehicles (ORVs): These vehicles include trucks, four-wheelers, dune buggies, etc. The deep tracks these vehicles create generally run parallel to the water's edge. The shorebird chicks sometimes get stuck in them and cannot feed. In addition, they frequently get run over because they are stuck in the track or their instincts cause them to freeze.

- Have two students "drive" the ORV which can be a large tire, inner tube, or ball. To "drive" it, the students must keep the ORV in between them with their hands on it at all times.
- The chicks should squat and not move in this round. If the tire touches the plover, it dies. However, all plovers should feed.
- Count beans when the round is over.

Discuss the following questions:

- What happened to the shorebird's ability to obtain food based on the number of beans recorded at the end of each round? How did they feel as it got harder and harder to feed? How might feeling tired or frustrated with the interference affect a shorebird's ability to feed?
- What happened to the size of the shorebird population on this beach? Will the plovers continue to nest here? If not, where will they go? What if the same problems occur on other beaches? What does this mean for the survival of this shorebird species?

Discuss Solutions

Plovers need space and so do people. Ask the class what can be done so that both the plovers' and people's needs can be met. Listen to all of their ideas and try to get the class to agree on one. This idea should involve some sort of beach management. Have the class think of what could prevent their idea from working. What happens if people do not want to go along with the management plan? What kinds of things can be done about this? You may want to do one more round, implementing their idea. Explain to students that people are implementing beach management programs to help protect the plovers. Their programs may be similar to the idea of the class.

Additional Activities



Cultural Connection

Students work in teams of two representing the following groups: generation of shorebirds that lived through the spill, generation of shorebirds after the spill, Alaska natives, the oil company, Prince William Sound fisherman, Coast Guard, local chamber of commerce, and U.S. Fish and Wildlife Service. Each team is to research how its group was impacted by the Exxon Valdez oil spill. All the groups then gather to outline what they learned from the oil spill and what they recommend should be done to protect their groups.

Arctic Breeding Challenges and Threats

Because of the relative remoteness and wilderness quality of the high Arctic, loss of habitat is generally not considered to be a major threat. However, other threats exist, including predators and potential over-harvesting by local peoples. Have students research what the threats are in the Arctic.

Develop a Shorebird Management Plan

Ask the class to brainstorm what might be done to meet the needs of shorebirds and people on the beach. Make a list of their ideas. Divide the class into teams. Ask each team to pick one of the management options and develop a management plan. Their plans should consider what might prevent success, including public opposition. Have each team present its plan to the entire class. Take a class vote on which plan to implement or give them the option of putting together a new class plan, selecting the best components of each team's ideas.

Research a Current Shorebird Management Plan

Select a shorebird in your area that is considered in need of special consideration. Have your class research what is being done for this bird. Is it working? Can they think of other ways to help?



It's A Tough Life

Record of Feeding and Survival

| | Adult Plover #1 | | Adult Plover #2 | | Plover #1 Chick | | Plover #2 Chick | |
|-------------------------------------|-----------------|---------|-----------------|---------|-----------------|---------|-----------------|---------|
| | # of beans | health | # of beans | health | # of beans | health | # of beans | health |
| Round 1 (undisturbed) | | healthy | | healthy | | healthy | | healthy |
| Round 2 (pedestrian disturbance) | | | | | | | | |
| Round 3 (predator disturbance) | | | | | | | | |
| Round 4 (kite disturbance) | | | | | | | | |
| Round 5 (ORV disturbance) | | | | | | | | |

Dietary Standards (To be determined after Round 1)

Healthy Range: _____ beans

Unhealthy Range: _____ beans

Dangerous Range: _____ beans
(may result in death)



