

A Tale of Two Birds

An Educators' Packet



Provided by the
Tern and Plover Conservation Partnership

University of Nebraska - Lincoln

Lincoln, NE 68583

<http://ternandplover.unl.edu>

Partners: Mallard Sand and Gravel Company, Arps Gravel and Concrete, Nebraska Environmental Trust, Lyman-Richey Corporation, United States Fish and Wildlife Service, Overland Sand and Gravel, Nebraska Game and Parks Commission, Girl Scouts-Great Plains Council, Western Sand and Gravel, University of Nebraska-Lincoln

Credits

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Acknowledgements

Funding for this project was provided by the Nebraska Environmental Trust Fund, State Wildlife Grants, and the United States Fish and Wildlife Service.

We express thanks to Julie Zickefoose, (www.juliezickefoose.com) for tern and plover drawings, and NEBRASKAland for articles from the Trail Tales magazine.

Special contributors to the packet include: J. F. Marcus, North Carolina Wildlife Resources Commission, for project advice and a preliminary adaptation of *Plover Survival: A Simulation Game*; D. M. Manske, for help in developing the *Fill in the Blank* and *Word Search* worksheets; J. L. Lackey, Nebraska Game and Parks Commission, for assistance with materials; M. M. Beck, M. P. Logan, R. J. Meduna, and D. R. Moser for helpful review comments.

We are grateful for the continued support and collaboration of the participating partners, which include Arps Gravel and Concrete, Girl Scouts-Great Plains Council, Lyman-Richey Corporation, Mallard Sand and Gravel, Nebraska Environmental Trust, Nebraska Game and Parks Commission, Overland Sand and Gravel, United States Fish and Wildlife Service, University of Nebraska-Lincoln, and Western Sand and Gravel.





Dear Educator,

Thank you for your interest in the poster *A Tale of Two Birds*. The enclosed educator's packet includes a tutorial that can be used when displaying the poster. The packet includes additional information about Least Terns and Piping Plovers and activities that can be adapted to fit the needs of your classroom. Students will be introduced to Least Tern and Piping Plover habitat requirements, listed status, and causes for the decline of these species.

The Tern and Plover Conservation Partnership is a cooperative effort involving the University of Nebraska Cooperative Extension, Nebraska Game and Parks Commission, US Fish and Wildlife Service, Nebraska Environmental Trust, private groups, and corporations. The Partnership strives to conserve and protect the Interior Least Tern and Piping Plover, as well as provide educational programs about them. Education is the key to understanding and appreciating our natural world and we appreciate your help. Your participation makes a difference! Building a foundation of education increases stewardship for terns and plovers and other species and their habitats for now and the future.

At the back of the packet you will find a short survey, which should take only about ten minutes to complete. This survey (a type of research study) is completely voluntary, but your returning it would really help us improve the project. We hope you will enjoy this poster and accompanying educator's packet. Any feedback regarding content, references, and overall educational value would be greatly appreciated.

Sincerely,

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OVERVIEW OF THE POSTER

Grade Level(s): 5-8

The student will:

- Be able to identify Least Terns and Piping Plovers.
- Learn about Least Tern and Piping Plover biology.
- Explore differences in habitat throughout their breeding range.
- Increase awareness of the important role humans must play in the survival of these species.
- Be introduced to conflict resolution between industry and conservation.
- Learn about the Endangered Species Act.

OBJECTIVES

- Increase national awareness of Least Terns and Piping Plovers.
- Understand the difference between threatened, endangered, and extinct.
- Learn mechanisms used by terns and plovers (such as camouflage, mobbing, and feigning behaviors).
- Understand that individuals can make a difference in conservation.
- Gain basic knowledge of endangered species issues.

MATERIALS

- *A Tale of Two Birds* poster
- Educators' Packet
- Song *Sing Along Sandy Shores* ©Ron J. Johnson, December 4, 2003.*

NOTE: Novel words are in bold type and included in the glossary on page 51.

* Permission is granted to use *Sing Along Sandy Shores* for non-profit educational purposes. All other rights are reserved.

NATIONAL SCIENCE STANDARDS

Life Science – Content Standard C

- Reproduction and heredity
- Regulation and behavior
- Populations and ecosystems
- Diversity and adaptation of organisms

Science in Personal and Social Perspectives – Content Standard F

- Populations, resources, and environments
- Natural hazards

How to use the Poster



SUGGESTED USES BY SUBJECT

Educators will be able to make use of the poster and accompanying packet in any number of ways. Suggested uses are as follows:

- Biology/Science
 - Habitat needs
 - Habitat types
 - Environment
 - Conservation
 - Reproduction
 - Heredity
 - Behavior
 - Diversity

- Art
 - Drawing
 - Formatting
 - Cartooning
 - Photography

- Music
 - Singing
 - Instrumental
 - Recording

- Math
 - Population size
 - Reproductive success

- English
 - Composing
 - Reading

- Geography
 - Local
 - Regional
 - Nationwide

- History
 - Lewis and Clark expedition
 - Women's fashions (use of Least Tern feathers in hats)
 - Changes in rivers, lakes, and beaches

Answers to Poster Questions

Educators – There are several questions on the poster and these are listed below along with answers (for objective questions) or discussion points. Some are subjective, others objective.

Answers are in italics following the questions in this tutorial.

Bold italics indicates words defined in the glossary.

An Appealing Appearance

How well do these colors blend in with the sand and gravel habitat where they nest? *Students usually agree that terns and plovers blend in well with their nesting **habitat**. Such color patterns make them more successful nesters and less visible to **predators**. Successful nesting passes the genetic patterns on to future generations of terns and plovers. Unsuccessful nests produce no young and no traits are passed on.*

Can you find the chick in its nest in the photo?

What is the word that describes a disguise or hidden? ***Camouflage***

Why is camouflage an important feature for young chicks and eggs? *Color patterns that blend in with their surroundings make the chicks and eggs, as with adults, less visible to predators.*

Where They Live and Nest

Do you know the difference between ***threatened*** and ***endangered*** species? *A **threatened species** is experiencing a serious decline in numbers, which could lead to being endangered if the decline continues. Endangered means a species is in peril and may become **extinct** without intervention by humans. Extinct means that the species is completely gone.*

Why do some birds spend the winter in warmer climates? *Food is one reason. Some birds, like terns and plovers, depend on water for their food (plovers eat invertebrates that live in the water and at the water's edge, and terns eat fish). In colder climates, this water freezes, diminishing their food source.*

What are some benefits and risks of nesting in colonies?

Benefits: *Terns mob any intruders that they perceive as a threat to their colony. The adults sound alarm calls, dive bomb, or defecate on unwanted intruders. Terns and plovers nesting within these colonies benefit from this **behavior**.*

Plovers sound an alarm call and act as if they have a broken wing, luring a potential predator to follow them. This is beneficial for other birds nesting near the plover nest.

Risks: *When birds nest close together in groups or colonies, they can be vulnerable to a single storm event or to predators that find them and can reach them easily. If a predator is undeterred by the alarms, dive bombing, defecating, and **feigning**, the predator may destroy an entire colony.*

Additional discussion questions:

Aren't sand and gravel mines dangerous for the birds? *Yes, there are some dangers to the birds. The large deposits of sand attract terns and plovers. Unlike sandbars in the middle of the river, these deposits are **landlocked**, so predators don't have to cross water and can sneak up on them. Also, sand and gravel operations need to move equipment often, and may not see nests from their machinery. Tern and Plover Conservation Partnership biologists and many youth and adult volunteers work in cooperation with sand and gravel companies to help these birds. Biologists and volunteers install special fencing to protect colonies and mylar flagging to shift nesting from planned work areas. The outcome is greater nesting success, fewer conflicts, and enhanced community stewardship.*

Doesn't sand and gravel mining spoil the area and cause pollution? *It is true that sand and gravel mining does disrupt and change the area where they are digging. These companies are mining sand and gravel that people need and they continue to work for better approaches to protect the environment where they work. We must also keep in mind that each and every person needs something from the sand and gravel industry, be it sand, gravel, or other **aggregate**.*

Do terns eat fish whole? *Yes, but they are small fish, like minnows.*

What do adult terns feed their young? *Small fish, but they are smaller than the ones the adults can eat.*

Take a look to see if they occur in your state! What type of habitat can you find them in? *Will vary depending on your location, but typically on ocean and lake shores, and on river sand bars.*



Activities



Overview of Activities

Out of Time

Pages 13 - 17

Subject Area(s): Science in Personal and Social Perspectives
Populations, resources, and environments

Materials Needed:

Famous quotes included or a similar reference or poem;
Cards showing Abundant, Common, Threatened, Endangered, and Extinct (included with this activity); and
Flip chart, dry mark board, or chalkboard for recording students' ideas.

Duration: 30 minutes

Setting: Indoors

Skills gained: Working with teams, researching species, presentations (public speaking)

Vocabulary: Threatened, endangered, extinct, coexist

Source: C. M. Thody

Tern and Plover Year

Pages 18 - 21

Subject Area(s): Life Science – Reproduction and heredity; Regulation and behavior;
Diversity and adaptations of organisms.

Materials needed: Scissors; glue or paste; copy of sheets included in this packet; and
Flip chart, dry mark board, or chalkboard

Duration: 20-30 minutes

Setting: Indoors

Skills gained: Organizing, predicting, analyzing.

Vocabulary: Offspring, fledgling, precocial, semi-precocial, altricial

Source: C. M. Thody

Plover Survival: A Simulation Game

Pages 22 - 28

Subject Area(s): Science in Personal and Social Perspectives; populations, resources,
environments; and natural hazards

Materials Needed:

4 small bags or sacks;
1 beach ball or other similar ball;
1 rope – 16 ft. long marked at 4 ft. intervals;
5 orange cones for marking boundaries (or items such as plastic soda containers partially filled with sand for balance);
Empty cans, candy in wrappers, snacks (like chips and crackers);
1 bag of dried beans (The activity will work best if the beans blend in with the floor surface where the activity will take place);
1 large sheet of paper, dry mark board, or chalk board for recording data; and
1 large inner tube, tire, or ball.

Duration: 45 – 60 minutes

Setting: Outdoors or Indoors (with adequate space)

Skills gained: Data recording, management planning

Vocabulary: Scientific modeling, camouflage, predator, prey, foraging, feigning

Adapted from: United States Fish and Wildlife Service www.pipingplover.fws.gov.

Out of Time

Source: C. M. Thody

Overview

In this exercise, students will discuss:

1. The terms threatened, endangered, and extinct, and will learn to distinguish them, and
2. Impacts humans have had on the Earth and how we are attempting to reverse destructive impacts.

Concepts

Historical references to the decline of species.

- Included are quotes from Chief Seattle and other well-known writers.
- Other references and/or poems can be used.

The extinction of species in historic times and possible future extinctions.

- Reasons extinctions have occurred in the past.
- Ideas for preventing future extinctions.



Quotes

If all the beasts were gone, we would die from great loneliness of spirit, for whatever happens to the beast, happens to us. All things are connected, whatever befalls the Earth, befalls the children of the Earth.

- Excerpt from a speech by Chief Seattle orated in 1854

“One touch of nature makes the world kin.”

-William Shakespeare

“Nature, even when she is scant and thin outwardly, satisfies us still by the assurance of a certain generosity at the roots.”

- Henry David Thoreau

“The life of every river sings its own song, but in most the song is long marred by the discords of misuse.”

- Aldo Leopold

“To keep every cog and wheel is the first precaution of intelligent tinkering.”

- Aldo Leopold

“When one tugs at a single thing in nature, he finds it attached to the rest of the world.”

- John Muir

“Nature is not only all that is visible to the eye—it also includes inner pictures of the soul.”

- Edvard Munch

“In the end, our society will be defined not only by what we create, but by what we refuse to destroy.”

- John C. Sawhill

“Those who contemplate the beauty of the Earth find reserves of strength that will endure as long as life lasts.”

- Rachel Carson

“For if one link in nature’s chain might be lost, another might be lost, until the whole of things will vanish by piecemeal.”

- Thomas Jefferson

“There is nothing in which the birds differ more from [people] than the way in which they can build and yet leave a landscape as it was before.”

- Robert Lynd

Activity 1

Ask the students to read any one of the included quotes or another similar quote or poem related to the connection between humans, the Earth, and other species that inhabit the Earth. Henry David Thoreau, Henry Wadsworth Longfellow, and Aldo Leopold are lyricists and/or poets who wrote about nature.

Ask students to think about the meaning of the poem or quote. Using a board or flip chart, have the students write down their ideas.

Student answers may include points or concepts such as:

- If a certain species goes extinct, its extinction may have an impact on other species.
- There are some species that are “*indicator*” *species*. If something is harming the *environment* or the species’ habitat, they may start to decline, which becomes an “indicator” (early signal) that something needs attention. Examples of these indicator species include the Peregrine Falcon, Bald Eagle, Osprey, and American Robin. Each of these birds was affected by high concentrations of DDT in their prey species. Currently, the decline in frog numbers and the finding of some deformed frogs are “early signals” that are being studied. Birds such as crows that show symptoms can serve as a signal that West Nile Virus is present.
- Nature and wildlife often make us feel good and can have a calming or relaxing effect. The world would be much less fun without birds, rabbits, fish, elephants, whales and the beauty of nature’s special places.
- Wild plants and animals provide “services” such as recycling of nutrients and organic wastes, pest suppression, soil and watershed protection, and others.
- Wild plants and animals are the source of many important medicines (for fighting cancer, pain, high blood pressure, and many other diseases), repellents, pesticides, and other useful chemicals, and more are being regularly discovered (examples are often in the news media).

Activity 2

Discuss the meaning of each of the six cards included, which are *abundant*, *common*, *rare*, threatened, endangered, and extinct. Starting with the Abundant Card, hold up each of the cards and ask students what they mean. Allow the students to describe the category and then name some birds, mammals, etc., that may fall under these categories. This could include species near their home, school, or town, or may include those that they've heard about through the media or other sources. Perceptions will vary depending on where students live and what they have seen. For example, some may think American Robins are abundant whereas others may consider them to be common. Some may see white-tailed deer as common but others as rare. For local species that students might see, it is probably best to be flexible in assigning categories. One assignment might be to: 1) have students look for species (robins, squirrels, etc.) where they live and decide whether they are abundant, common, or rare, 2) talk with their parents, grandparents, or others about changes they have observed within their lifetimes, and 3) report to the class on what they learned from 1 and 2.

Abundant: Occur widespread. Examples: House Sparrows, European Starlings, American Robins, coyotes, mice, dogs/cats, mosquitoes, house flies, etc.

Common: Seen on many occasions. Examples: Northern Cardinals, squirrels, White-tailed Deer, dragonflies, etc.

Rare: Anything that is uncommon or very seldom seen around their area. Examples: some hawks or owls, some turtles and frogs, really big fish, nuthatches, etc.

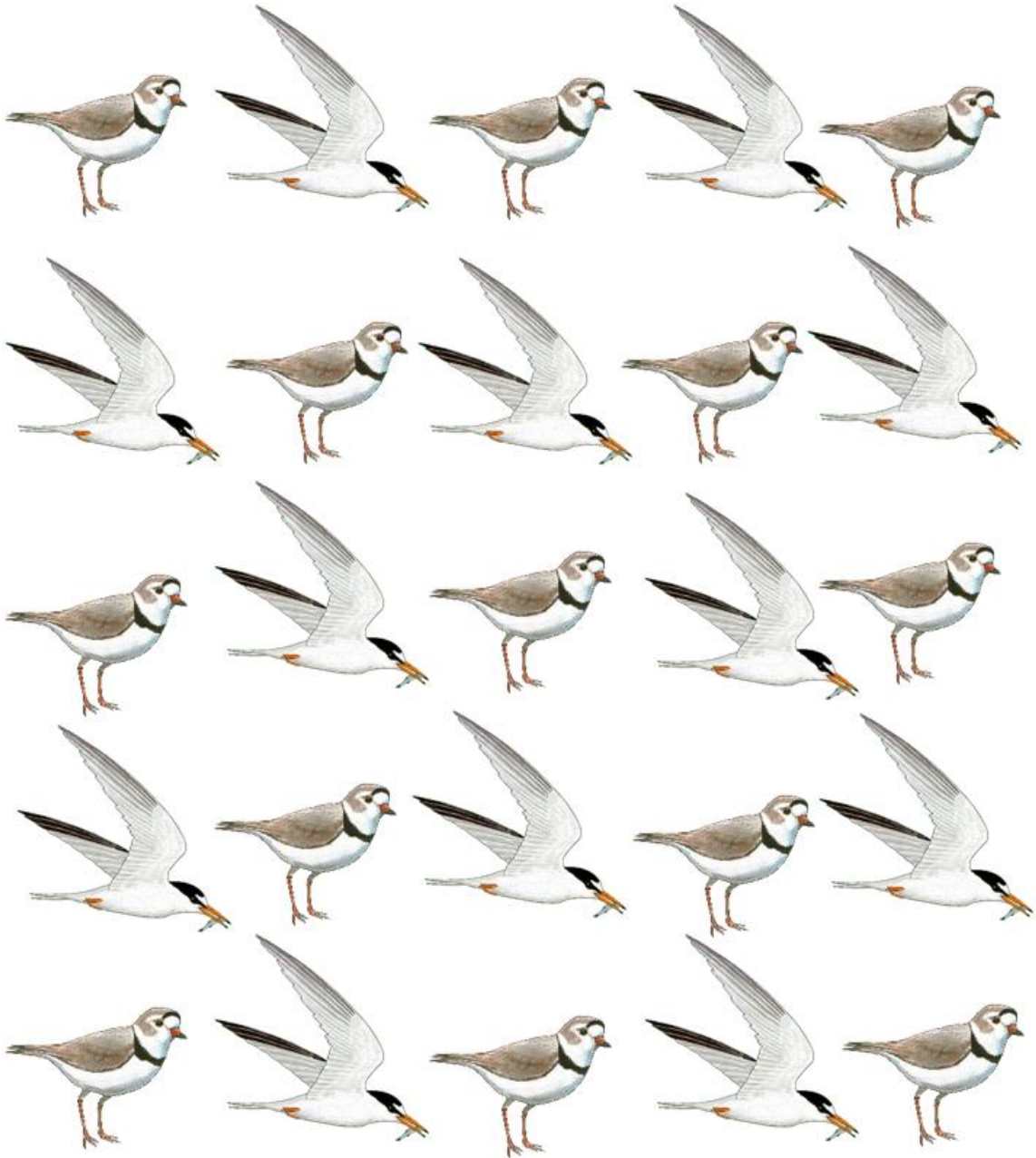
Threatened: Federally or state listed; severe declines in populations which may lead to endangered status. Examples: Piping Plover (in most of its range; however, is endangered in the Great Lakes region), Bald Eagle (in most of the lower 48 states), sea turtles, etc.

Endangered: Populations are becoming so low that they may become extinct. Examples: Least Tern, California Condor, Whooping Crane, Black-footed Ferret, Blue Whale, American Burying Beetle, etc.

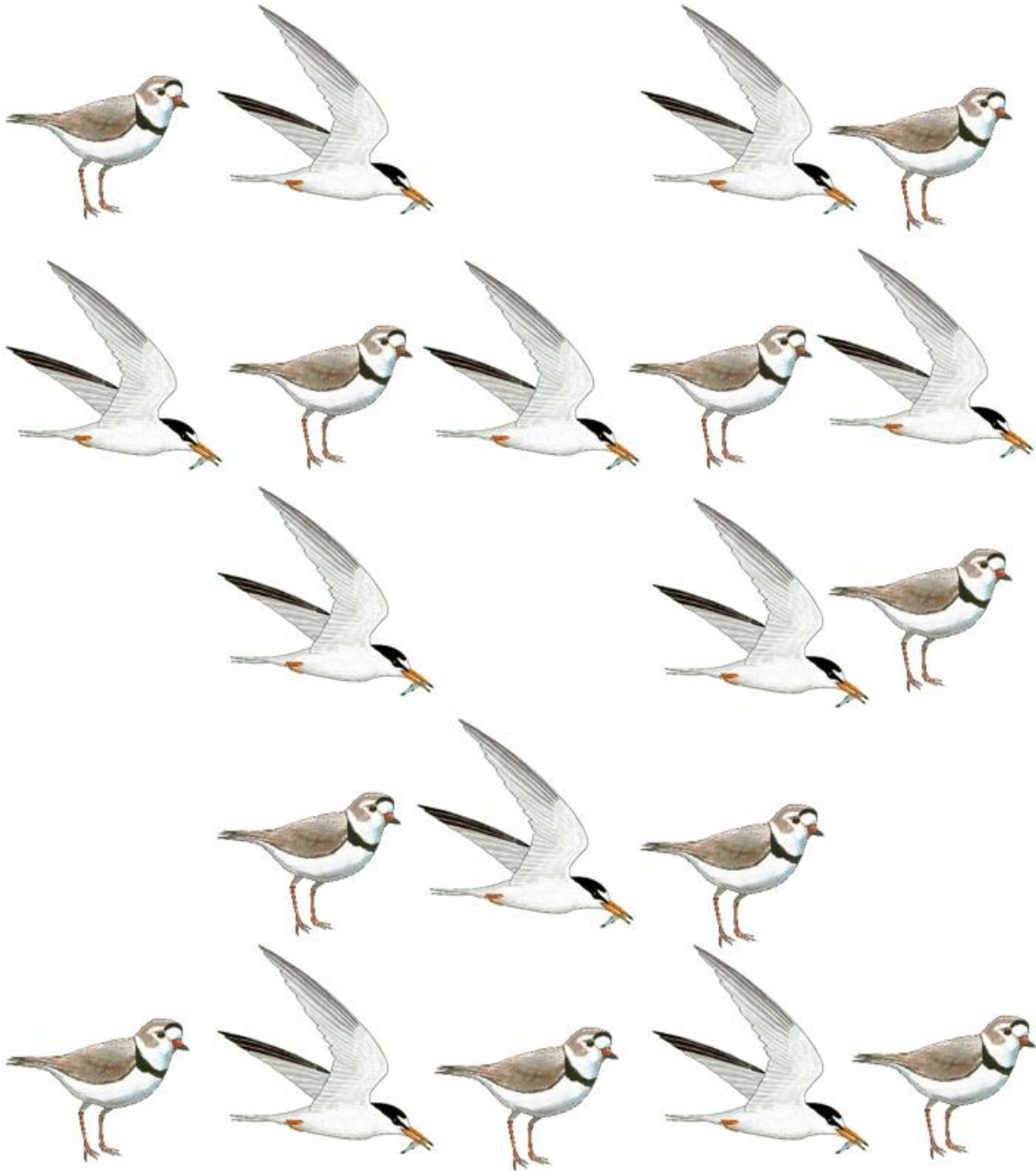
Extinct: No more of the species exists. Examples: Dodo bird, Passenger Pigeon, dinosaurs, saber tooth tiger, etc.

The terms abundant, common, and rare are not exact but are useful for describing species abundance. Wildlife biologists normally use various counting techniques to determine wildlife abundance in a specific area. And abundance categories vary by species – for example, 100 mice/acre, 5 cottontail rabbits/acre, or 40 deer/ square mile (16 acres/deer) would be considered abundant.

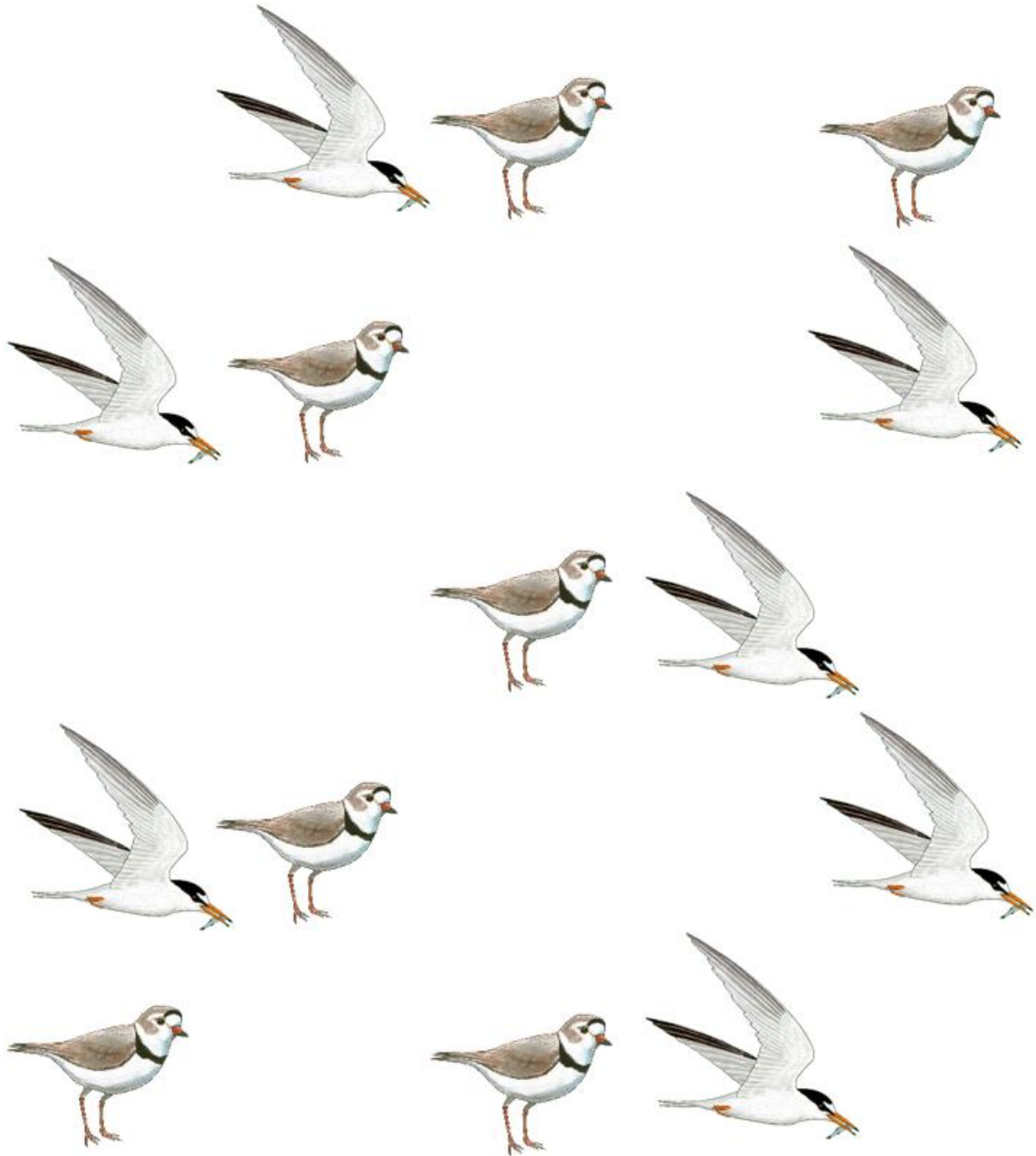
ABUNDANT



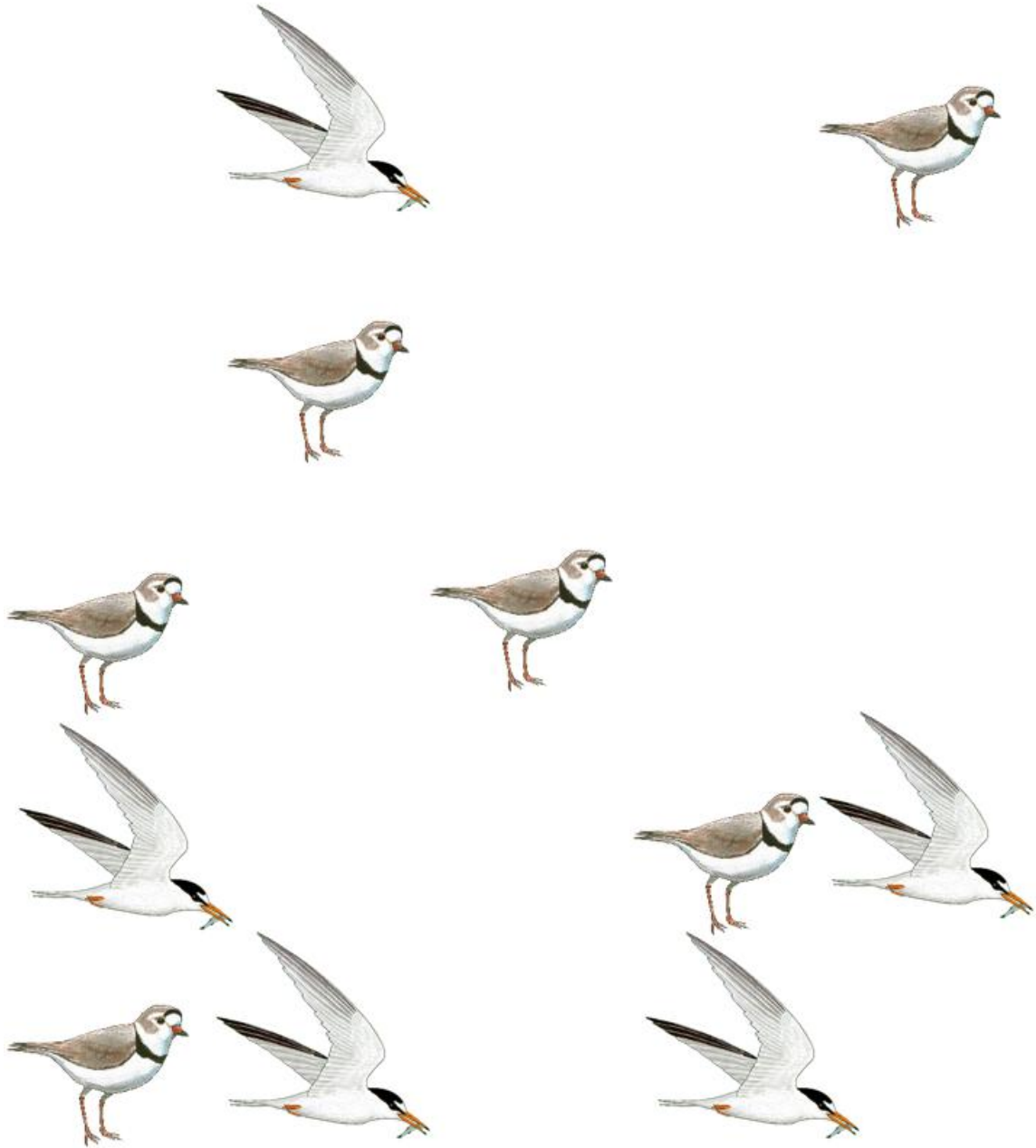
COMMON



RARE



THREATENED



ENDANGERED



EXTINCT

Activity 3

Once students have been introduced to the different terms in Activity 2, discuss why they think some species have become extinct, endangered, or threatened, while others are abundant and common. Write down their thoughts on the flip chart or board. Here are some points to consider:

- Adaptable to living near people versus don't do well near people
Example: House sparrows, American Robins, European Starlings, and Fox Squirrels do well in towns near people whereas Indigo Buntings, Northern Bobwhite, Grasshopper Sparrows, Elephants, Bald Eagles, and Grizzly Bears do not.
- Narrow versus broad diets. European Starlings eat grubs, worms, grain, nuts, fruits, food items in garbage, and any number of other things; Purple Martins and swallows depend on flying insects; pandas only eat bamboo.
- Species with special habitat needs and colonial nesters. Piping Plovers and Least Terns need open sandy areas near water; Pronghorns and prairie-chickens need large areas of grassland; bluebirds need a nesting cavity (e.g., bluebird box) and a place to forage for insects. Robins will nest in a variety of places including trees, bushes, and sometimes ledges on houses and buildings.
- Species of economic value such as Blue Whales, some spotted cats, Atlantic Salmon, and, in the late 1800's, the Passenger Pigeon (now extinct).
- Species that reproduce slowly such as some cranes, some turtles (e.g., Ornate Box Turtle), elephants, California Condor.

Tern and Plover Year

Source: C.M. Thody

Overview

This activity will show students that terns and plovers follow a predictable yearly pattern, similar to the way humans follow a calendar for particular events. It will:

- Show what type of activities the terns and plovers are engaged in during particular months, and
- Show similarities between what terns and plovers do during particular calendar months in relation to activities other wildlife and humans do in those months.

Concepts

Migration of Least Terns and Piping Plovers.

- Where they go during winter.
- When they start migration.
- When they return for nesting.

Breeding and nesting of least terns and piping plovers.

- Behaviors of terns and plovers when they return to nesting grounds.
- How they make their nests.

Tern and plover **offspring** development.

- How many eggs are typically laid by the tern and by the plover.
- How long the chicks take to develop.
- Fledgling (flying) stage.

Activity 1

Prior to constructing the calendar, the instructor should introduce the concepts listed above, but not in great detail. Details will come after the construction of the calendar. The instructor should ask questions such as:

Migration:

Why do the birds migrate south after nesting season?

- Plovers eat insects (e. g., fly larvae, beetles) and other *invertebrates* (e.g., small crustaceans, mollusks). In colder areas, such as the northern prairie states, these insects are unavailable in winter.
- Terns eat small fish, and when the rivers and lakes freeze, the fish are inaccessible.

Breeding and nesting:

What *substrate* do terns and plovers typically nest on?

- sand and gravel near water

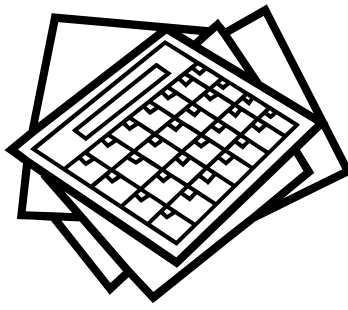
Where can sand and gravel be found?

- river sandbars
- ocean beaches
- sand and gravel piles
- lake and pond beaches
- certain rooftops

Offspring development:

Once chicks hatch, how do adults care for them?

- Plover chicks are *precocial*, meaning that soon after they hatch, they are able to walk from the nest and begin foraging. The adults show them how and where to find food. Ring-necked Pheasants, Northern Bobwhites, Mallards, and domestic chickens are other examples of precocial birds.
- Tern chicks are *semi-precocial*. Tern chicks can walk from the nest in two to three days, but the adults must feed them until they are able to fly on their own (fledge) and catch small fish, which takes about 20 days.
- Many familiar birds are *altricial*, meaning the newly-hatched young are naked, blind, and completely dependent on the parent birds until they grow. American Robins, Mourning Doves, House Wrens, Downy Woodpeckers, and Black-capped Chickadees are examples of altricial birds that feed their young in the nest for about 13-16 days until they are ready to fly.



Instructions for Calendar

1. For each student (or student pairs), copy pages 27-29 on single-sided sheets so they can be cut.
2. Cut the dotted lines around the six squares on Page 27.
3. Paste the squares in the appropriate boxes on Page 28.
4. Color pictures on Page 29.
5. On Page 29, cut completely around the month, including the light gray dotted line. Make sure NOT to cut on the dotted line between the month box and the small box above. That is the fold line, which is marked as such.
6. Using the small portion above the fold line, paste squares from Page 29 over those on Page 28, so that the flap opens to expose monthly information about terns and plovers.

September to March

Terns winter on the coasts of Central and South America. Plovers winter on the Southeast coast of the United States.

April

Plovers and terns begin arriving in nesting areas by the end of the month. The birds form pairs soon after their arrival.

May

By the middle of this month, the first eggs are laid in a small depression on open sand. Terns usually lay 2-3 eggs, and plovers usually lay 4 eggs.

June

The first chicks hatch by the middle of this month. Plover chicks are able to leave the nest in 2-3 hours and terns leave the nest in 2-3 days.

July

When plover chicks are about 28 days old, they are able to fly. Tern chicks start trying to fly at about 20 days old.

August

Tern and plover chicks continue to get stronger for their long journey to their wintering grounds. They will start their migration in mid- to late-August.

September
To
March



April



May



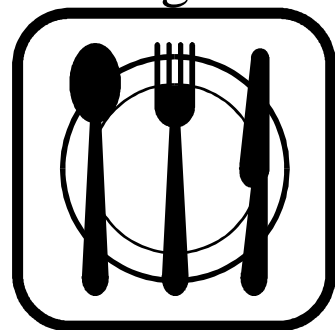
June



July



August



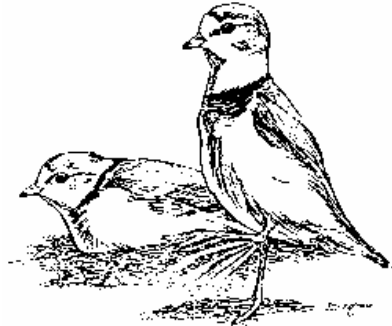
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September to March



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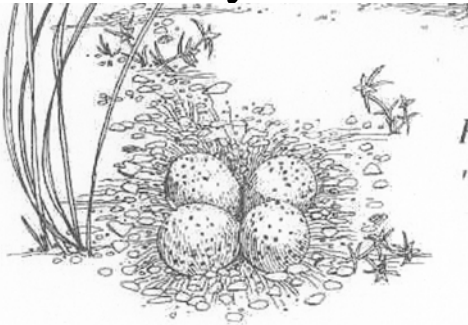
April



Piping Plovers in breeding display

↓ Fold line ↓

May



↓ Fold line ↓

June



↓ Fold line ↓

July



Photograph courtesy of US Corps of Engineers

Least tern fledglings

↓ Fold line ↓

August



Activity 2

After students complete the calendar, the instructor should ask more detailed questions about the introduced concepts. Many of the answers should be directly from the activity. Here are some examples instructors might use.

Migration:

Do terns and plovers always come back to the same area?

- Terns and plovers have been shown to have high *site fidelity*, meaning they often come back to the same area.

Where do terns and plovers spend the winter?

- Plovers winter on the Southeast coast of the United States and along the Gulf of Mexico.
- Terns winter along the Gulf of Mexico and along the coasts of Central and South America.

How do terns and plovers know when to return to nesting areas?

- Day length or photoperiod seems to be a common cue that stimulates internal changes (e.g., restless behavior, increased fat deposits) that lead to migration.
- Warming temperatures and the response of invertebrates (food) to this change may be important factors in stimulating return to nesting areas.
- Favorable winds often influence when migration begins.

Breeding and nesting:

What can happen to tern and plover nesting areas over the winter?

- Landscapes, such as sand dunes, beaches, and rivers, that are composed mainly of sand, are *ephemeral*. These areas are affected not only by weather, but also by the activities of people. Examples of changes that may occur during the winter that causes alterations in the nesting area include:
 - Low snow falls in the mountains limit the amount of water that flows down the rivers in the spring. High, dry vegetation-free sandbars are formed by high water flows that scour vegetation from the bars.
 - High snow falls in the mountains and heavy rains can cause excessive flows in the spring that inundate sandbars and prevent nesting.
- Housing can develop along beaches that have been used by terns and plovers in past years.
- Some nesting areas in the prairie couteau region can dry up some years or may be drained and plowed under over time.

- In Nebraska, many nesting areas are on sand and gravel mine spoil piles. These sand and gravel piles can change greatly during the winter months, so returning birds may need to find other nesting spots. Some examples of changes include:
 - Covering the sand with soil to prepare for home building;
 - Starting to build new sand piles in other areas; and
 - Moving the sand out of the area for construction purposes (such as making concrete).
- Another change that can occur during the winter months is construction at nesting sites at sand and gravel mines (for homes, roads, etc.). After sand and gravel removal is complete, homes are sometimes built around the lake that is formed where the gravel was.

How many eggs do terns typically lay? How about plovers?

- Terns usually lay 2-3 eggs.
- Plovers usually lay 4 eggs.

Offspring:

When do tern and plover chicks hatch?

- They start hatching late May to mid-June. However, if **renesting** occurs, they can hatch in July or even August. Renesting means that the first eggs were lost because of predation, flooding, or other factors. They will not produce two **broods** (sets of young).

How long does it take for tern and plover chicks to begin to fly?

- Terns take about 21 days (3 weeks).
- Plovers take about 28 days (4 weeks).



Plover Survival: A Simulation Game

Adapted from: United States Fish and Wildlife Service at <http://piping plover.fws.gov>.

Overview

Students engage in an activity that simulates:

- The feeding behavior of the Piping Plover, and
- Factors that disturb both feeding and nesting of this species.

This activity is designed to get students actively thinking about Piping Plovers' needs and things that are threatening survival. Students should be given some exposure to Piping Plover foraging and nesting habits before beginning this activity.

Concepts

Feeding behavior of the Piping Plover.

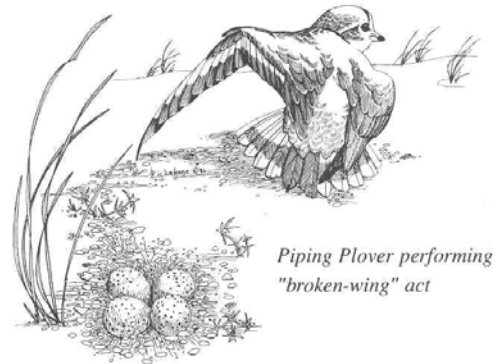
- Plovers feed on small invertebrates (insects, worms, etc.) by picking and poking their beaks into the mud and wet sand.
- Plovers move while feeding.
- Foot stamping – by stamping feet on the sand near the water, plovers cause invertebrates to come to the surface.

Human impact on feeding and Piping Plover survival.

- Humans, by their presence, prevent plovers from feeding. Feeding becomes more difficult in areas of human habitation.
- People leave trash that may attract animals that prey on plovers, chicks, and eggs.
- All-terrain vehicles directly or indirectly impact survival of chicks (by frightening adults from nests and sometimes by running over nests and chicks).

Predator impact on Piping Plover feeding and survival.

- Wild animal predators, such as coyotes, foxes, snakes, owls, and raccoons, as well as domesticated dogs and cats, prey on Piping Plovers and their nests.
- When predators come around, feeding slows down.



Feeding Habitat and Behavior

Introduction to the Piping Plover

Introduce students to the concept of threatened and endangered species. Explain that they will participate in an activity that is designed to help them understand some of the Piping Plovers' behavior and needs.

Setting up the activity

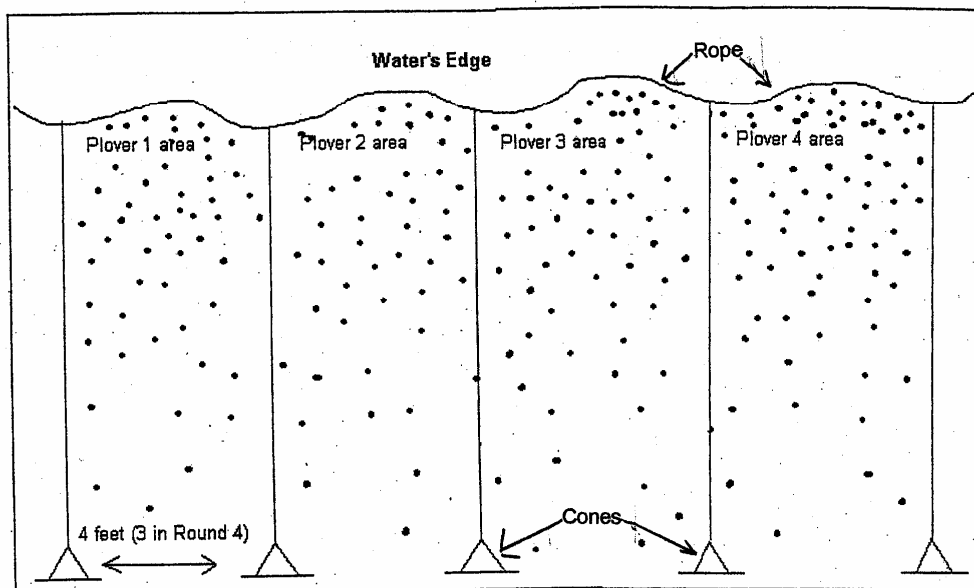
Ask students if they have ever seen small birds along the water's edge. If so, what did they observe? Were the birds feeding? How did you know? How did they move? If students have not observed these behaviors, explain that plovers peck and probe with their beaks to catch small invertebrates in the wet mud and sand, and then they rush forward and repeat the process at another spot.

Ask for four volunteers: two to model the behavior of adult Piping Plovers and two to model the behavior of chicks. Explain to the group you are modeling behavior in order to see what can actually happen in their habitat. Computer models are frequently used by scientists to determine how animals may behave in their natural habitats.

Lay out the rope and place the 5 cones in a line parallel to the rope, 10-25 feet away. Figure 1 is a diagram of how the rope, cones, and beans are placed. The cones should be spaced at least 4 feet apart. The rope represents the water's edge, where most of the feeding will occur and the line of cones represents a "safe haven" or area where the plovers can retreat to escape predators or humans. Spread the beans on the ground between the rope and cones with the main portion of them being at the "water's edge" and decreasing the density of beans the further "inland" you go. The beans represent invertebrates found in mud and sand.

Give one bag to each of the four "Piping Plovers." The bags represent the plovers' stomachs, so each bean collected will be placed in a bag. The plovers may only pick up one bean at a time.

Figure 1. Diagram of placement of rope, cones, and beans.



- Dots show the general distribution pattern for beans, where there are more beans near the water's edge.

Figure 2. Example of a chart that can be used for Plover Survival: A Simulation Game

	Round One – Normal Activity	Round Two – Human Disturbance	Round Three – Predator Invasion	Round Four – Shrinking Habitat
Plover 1	47	25	30	10
Plover 2	60	36	25	7
Plover 3	80	50	42	22
Plover 4	40	18	15	7
Range in number of beans	40-80	18-50	15-30	7-22

The range of beans (from Round One) necessary for a healthy diet is: 40-80
 Divide the number in Round One by two. The range of beans for an unhealthy diet is: 20-40
 Divide the number in Round One by four. The range beans that leads to starvation is: 10-20

Round 1: Establishing Standards for a Healthy Diet

Background Information

It is important that students understand immediately that plovers need a certain amount of food to survive. The necessary amount of food is determined in this round. Explain to the students that each plover will have a corridor (space between cones and rope) in which to feed and move. He or she must stay within his or her corridor. If a human or predator intruder is in a plover's corridor, that plover has to be in the "safe haven" (area behind the cones). The plovers must anticipate the approach of a human and run to this area before the person is in their corridor. In nature, the plovers will freeze (use camouflage) and then they will move to safety.

Have the 4 students move within their corridor and perform this feeding behavior for 30 seconds, then count the beans each student has.

On a large sheet of paper or board, record the number of beans that each bird obtained (Figure 2 is a sample record).

- The range of beans collected during this round will be the standard for a healthy diet.
- If in subsequent rounds only half of this number is collected, the plover will survive, but be unhealthy.
- If only one-fourth is collected, the plover will die of starvation.



Round 2

Add six more students to the four already in the game. The six new students will become pairs of human intruders and the four will continue to be plovers. Two of the students will be pedestrians, two will be playing with a ball or Frisbee™, and two will be picnickers.

Have the original four “plovers” resume feeding. Send the two pedestrians into the game to walk along the “water’s edge” at a normal pace. They will only walk from one end to the other.

Next, send the two ball/Frisbee™ players into the game. Have them move slowly through the area, just like they would play on a beach.

Finally, send the two picnickers into the game. They will be carrying soda cans, bags of chips, and other snacks throughout the area and should drop some of these items as they move through.

Count and record the beans collected by each plover at the end of this round. Compare this round with the first. Bear in mind that more time was spent on this round.

Discuss the number of beans collected. Will these be healthy plovers? Will they even survive on the beach? Ask the plovers how they might feel physically if they were real plovers. Would real plovers be tired or hungry? What would it be like to run after food but not get to eat? Given that plovers will actually be running further than the 10-25 feet established in this game, what has the class learned about how much energy the birds must expend to obtain food? The point is that the plovers must expend more energy for less food when there are other activities in their feeding zone.

Round 3 - Predation and Survival

Background information

Ask the students if the trash left by the pedestrians will affect the plovers' ability to feed. Explain to the students that when people leave trash in an area, it may attract other kinds of animals that could be predators. When a predator approaches an adult plover or pair of plovers with their young, both chicks and adults respond to the intrusion and stop feeding. The adult will move away feigning injury (pretending to have a broken wing) with the intent to lure the predator away from the chicks, while the chicks squat and remain motionless. The chicks are unable to fly, so they can easily be captured by predators.

Ask for a volunteer to be a predator. He or she will move quickly (and safely) through the beach area. If during this time the predator can tag a chick while it is moving, this will constitute an attack and the chick dies. Be sure to replenish the beans.

Plover adults and chicks should resume feeding. Allow the predator to enter the area for 30 seconds. The predator may not stay in any particular corridor for more than 5 seconds. Count and record the number of beans collected and number of plovers still alive. Discuss the impact of a predator in the area on the ability of a plover to feed and survive.

Round 4 – Shrinking Habitat

Background information

Explain to the students that when Piping Plover habitat shrinks or disappears there will be less room for the plovers to seek shelter areas. They may even try to nest in unsafe/unsuitable areas.

Play one more round as before with the predator present. This time make the corridors narrower by placing the cones only 3 feet apart, and designate the area behind only one cone as a "safe haven". Replenish the beans. There will be the same number of birds (4) trying to survive on less food in a smaller space. Shrinking habitat means less food is available in each corridor and the plovers are more vulnerable to predators, leading to fewer numbers of birds.

Evaluation

Ask the students to summarize what has happened to the plovers' ability to obtain food based on the number of beans recorded at the end of each round. Ask the plovers how they felt during the rounds. Ask the students to translate emotional frustration into physical stress on the birds as they try to meet their biological needs. They may respond by saying they felt frustrated. Then ask them how this interference might affect the plovers' ability to feed.

Ask the students to summarize what has happened to the size of the Piping Plover population on the beach. What is the population now compared to how many started? Will the plovers continue to nest here? If not, where will they go? What if the same problems occur in other areas? What does this mean for the survival of Piping Plovers? How does it help when we avoid disturbances to nesting or feeding plovers?

Resolutions

Piping Plovers need space and so do people. Ask the class what can be done so that the needs of both plovers and people might be met. Listen to all of their ideas and try to get the class to agree on one plan. Have the class come up with any reasons why this plan might not work.

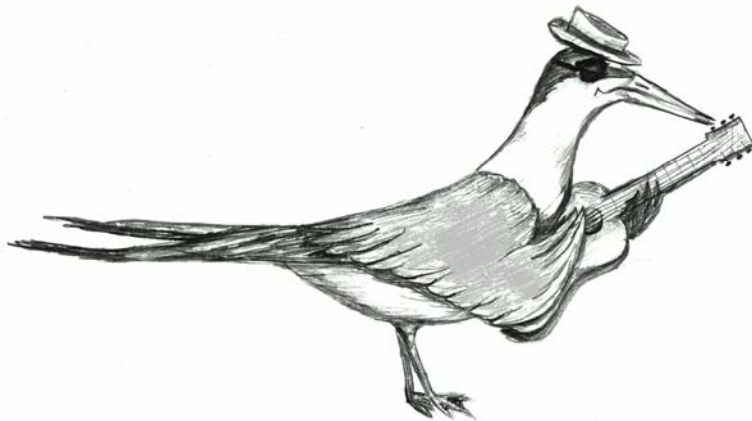
What happens if people don't want to follow this plan or other plans to help plovers? *Students may respond by saying Piping Plovers will decline, will become endangered, will become extinct, etc.*

What kinds of things can students do to help? *Students may respond by saying they will pitch in to help by not littering, not disturbing the birds, telling other people about the birds, and being careful around beaches, sandbars, etc.*

Explain to the students that wildlife managers are implementing management plans where Piping Plovers nest so that the plovers have better nesting success and survival.

Rotate students into the roles of Piping Plovers, humans, and the predator for additional rounds if you haven't already done so.

Song
Sing Along Sandy
Shores



Featuring P.P. Tern

Sing Along Sandy Shores

©Ron J. Johnson (P. P. Tern), December 4, 2003

Arr. Steve Hanson

G C D G
Sing, sing, sing-sing along, sing along sandy shores
G Am D G
Terns and plovers are you out there, sing-sing along with me

G C
Terns and plovers, Least and Piping
G D
nest on sandy shores
G C
About three eggs has a tern nest,
D G
the plover usually four

Chorus G C D G
So sing, sing, sing-sing along, sing along sandy shores
G Am D G
Terns and plovers are you out there, sing-sing along with me
G C D G
Sing, sing, sing-sing along, sing along sandy shores
G Am D G
Terns and plovers I can see you, sing-sing along with me

Em Am
Endangered, threatened, habitat slipping
Em B7
predators are more
G C
Just lend a hand where you can,
D G
and sing along sandy shores

Chorus

Sing Along Sandy Shores was produced by Steve Hanson; Ron Johnson, lead vocal and guitar; Steve Hanson, harmony vocal, guitar, and bass; and Renae Held, harmony vocal. Permission is granted to use *Sing Along Sandy Shores* for non-profit educational purposes. All other rights are reserved.

Additional Worksheets and Information



Fill in the Blanks!

Source: *D. M. Manske and C. M. Thody*

Piping Plovers are federally _____ and Interior Least Terns are federally _____ species of birds.

_____ fly north from the Gulf of Mexico, whereas _____ fly north from as far as South America to come to North America for the summer!

Least Terns are the _____ of the terns. The Least Tern is _____ - _____ in shape with a distinct black _____ and a white _____.

Piping Plovers have a single _____ that distinguishes them from killdeer, which have two.

Both birds are adapted to life on the sand. They both build their _____ on the sand.

Piping Plovers often line their nests with small _____, whereas Least Terns often place their nests near _____.

Least Terns are _____ - _____ nesters, meaning they build their nests near each other.

Piping Plovers usually lay about _____ eggs per nest, and Least Terns usually lay about _____ eggs per nest.

Both parents take turns _____, or keeping the eggs warm.

WORDS TO USE

threatened

smallest

Least Terns

black breast band

swallow-like

pieces of driftwood

forehead

semi-colonial

three

pebbles

incubating

nests

Piping Plovers

cap

endangered

four

ANSWERS

Piping Plovers are federally **threatened** and Interior Least Terns are federally **endangered** species of birds.

Piping Plovers fly north from the Gulf of Mexico, whereas **Least Terns** fly north from as far as South America to come to North America for the summer!

Least Terns are the **smallest** of the terns. The Least Tern is **swallow-like** in shape with a distinct black **cap** and a white **forehead**.

Piping Plovers have a single **black breast band** that distinguishes them from the killdeer, which have two.

Both birds are adapted to life on the sand. They both build their **nests** on the sand.

Piping Plovers often line their nests with small **pebbles**, whereas Least Terns often place their nests near **pieces of driftwood**.

Least Terns are **semi-colonial** nesters, meaning they build their nests near each other.

Piping Plovers usually lay about **four** eggs per nest, and Least Terns usually lay about **three** eggs per nest.

Both parents take turns **incubating**, or keeping the eggs warm.

PIPING PLOVER AND LEAST TERN WORD SEARCH

K Z R L C H T B Y R O M E W L H J I L
Y E W P R O D M A E B T R A S H S E M
Q N R V T S M I U V T A N Y K L A X U
I D U P R E D A T O R B M X C S W C V
N A J V X Z G H E L K T M U T G E L N
Y N D N A W C D T P B O L T E R T O T
J G R F E N C E N G A T E X G B C S D
N E C B J G N R A N U R O Y G S N U K
F R I E F B M I R I N G U C S H E R I
V E K R E V I R P P E L N O P N M E T
M D L K A J D F G I Z M A V B T A I A
C B X N Z M Y T U P E I W T O Q N P T
D I S T U R B A N C E J Q Z V W A S I
A F R K P L M O T K N B R C D E G X B
L M P I J N U S A N D B A R Y H E B A
G T V B F R E C D E X S W Z Q L M T H
B Y H A U N C A M O U F L A G E E J M
Q A W H Z S I X D R C F T P L O N K I
T G S B Y H N D E N E T A E R H T T H
U I Y P L C O L O N I E S O K I M J Y
F B G T R F V E D L A V I V R U S W S

PIPING PLOVER
EXCLOSURE
LEAST TERN
SANDBAR
DISTURBANCE
SURVIVAL
EGGS
RIVER
FISH
FENCE

PREDATOR
MANAGEMENT
NEST
ENDANGERED
HABITAT
ATV
TRASH
CAMOUFLAGE
COLONIES
THREATENED



TERN AND PLOVER CONSERVATION PARTNERSHIP
UNIVERSITY OF NEBRASKA
313 BIOCHEMISTRY HALL
LINCOLN, NE 68583-0785
(402) 472-8878 OR (402) 472-8741
<http://ternandplover.unl.edu>

PIPING PLOVER AND LEAST TERN WORD SEARCH



PIPING PLOVER
 EXCLOSURE
 LEAST TERN
 SANDBAR
 DISTURBANCE
 SURVIVAL
 EGGS
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A PEEP ABOUT PLOVERS

BY JEANINE DINAN



Pretending to have a broken wing, a plover parent tries to lure an intruder away from its nest. Photo by Eric Fowler

Have you ever heard the “peep-lo, peep-lo” of a piping plover? You’re very lucky if you have. Few of these rare and vanishing shorebirds are left and because they are so well camouflaged (which means they blend into their habitat), they are hard to see. Piping plovers arrive in Nebraska in mid-April

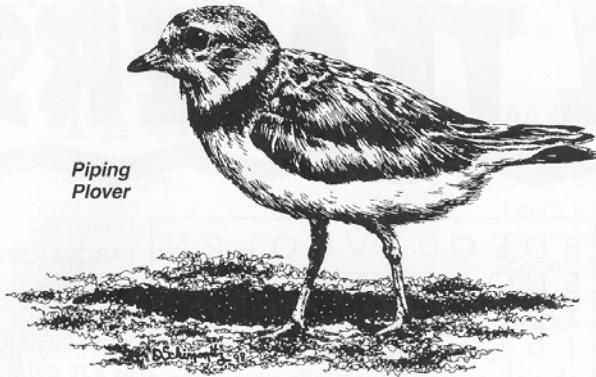
and nest on bare sandbars in the state’s major rivers, such as the Platte and Niobrara. They also use flat sand piles at some sand and gravel pits along the rivers. Piping plovers are a threatened species, which means their numbers are seriously falling.

These birds are sand-colored with a single

black band across their chest, and they run very fast. Sometimes people confuse piping plovers, which are a bit smaller than a robin, with killdeer, a very common shorebird that is larger, darker, and has two bands across its chest.

Piping plovers lay eggs in a small sand depression lined with small pebbles. The

Piping Plover



eggs and the chicks are camouflaged to look just like the sand. When the chicks hatch, they are able to leave the nest right away, although they will not be able to fly for another three or four weeks.

Adults and young scurry along shorelines eating small insects and other invertebrates. When a predator threatens the eggs or chicks, the adults pretend to have a broken wing and try to lure the predator away. Piping plovers come to Nebraska during the summer and migrate to the Gulf of Mexico and the southeastern coast in the winter.

These birds nest on sandbars in the middle of large rivers because

the water helps keep predators away. But Nebraska's rivers have been changed and sandbars have become scarce. In addition, people playing with pets and riding machines

for recreation often disturb the sandbars that remain. It's hard for plovers to find safe places to raise their young.

Wildlife biologists, landowners, volunteers and businesses are trying to help the piping plover. They are checking the population, protecting eggs and chicks from predators and human disturbance, and educating people about the needs of the piping plover. For more information about these birds or to find out what you can do, visit <http://ternandplover.unl.edu>. 🐾



Photo by Jon Farrar

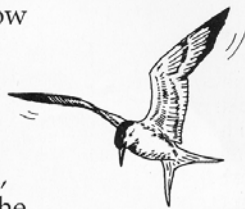
Piping plover eggs lie in a small depression. The eggs are camouflaged to blend into the sand, as are the chicks when they hatch.

What is black and white and flies all over?

By Jeff Marcus



The least tern is a small, swallow-like bird with a white body and black cap on its head. Terns use their long, orange bills to catch small minnows in shallow water. They hover like a helicopter when they are searching for food, then plunge into the water headfirst to snatch up a fish.



The least tern is an endangered species because many of the large rivers in the central United States no longer have the sandbars terns need for nesting. At the remaining nesting sites, predators often destroy the nest, eggs or chicks, and people playing with pets and riding machines for fun disturb them.

In Nebraska, you can find least terns nesting on bare sandbars in big rivers like the Platte and Niobrara. They also use big, flat piles of sand at gravel pits along rivers.

Least terns nest close together in a group called a colony. When a predator

A least tern!

Reprinted by permission of NEBRASKAland Magazine's Trail Tails

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enters the colony, all the birds gang up to try to drive the intruder away. If you ever see least terns swooping at you and squawking loudly, that is their way of saying "Back Off!" and you should make a hasty retreat.

Least terns lay well-camouflaged eggs on the bare sand. They often nest near a stick or other small object, but scientists don't know why. Can you guess?

The parents take turns sitting on the nest, keeping the eggs warm at

night and cool during the day. The tiny, sand-colored chicks are fed fish by their parents until they are able to fly and catch fish for themselves.

When least terns leave Nebraska at the end of summer, they travel all the way to Central and South America! How many miles is that? When they come back next summer will they find a safe place to nest?

Find out what you can do to help these birds by visiting:

<http://ternandplover.unl.edu> 🐾



Photo by Jon Farrar

A female least tern stands by her eggs. Terns nest in shallow scrapes on open gravelly or sandy areas.

4 • Trail Tales



Girl Scouts at Camp Maha used spotting scopes and binoculars to watch tern and plover nesting and feeding sites. A tern nest on a Platte River sandbar (below) holds two eggs and one chick.

Girl Scouts Help Study Terns

Girl Scouts attending Camp Maha last summer learned about piping plovers, a threatened bird species, and least terns, an endangered bird species, while taking part in conservation efforts to help them.

The birds had been spotted the previous summer nesting and feeding on the Platte River next to the Girl Scout camp. The Great Plains Council of the Girl Scouts contacted Jeff Marcus of the Tern and Plover Conservation Partnership and a research and education program was started.

The Girl Scout volunteers helped watch and protect the feeding and nesting sites and made important observations using binoculars and spotting scopes. The Tern and Plover Conservation Partnership will use this information in future tern and plover research.

The girls attending Camp Maha also learned about plover and tern conservation by playing games such as "Plover Survival" and "Shrinking

Habitat," and by building copies of tern nests with sand and gravel. All activities were focused on teaching about these birds and the importance of preserving their habitat.



Photos by Mark Diaz

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Glossary

A

Abundant – There are many of a particular species in an area.

Aggregate – Pieces of gravel of varying sizes.

Altricial – Chicks, when newly hatched, are naked, blind, and helpless. Examples include American Robins, sparrows, blackbirds, and Northern Cardinals.

B

Behavior – Action of a species or how it responds to sights, sounds, foods, and other things in its environments.

Brood – A group of young birds hatched from one nest.

C

Camouflage – To disguise or conceal; blending in with the environment.

Coexist - To live together at the same time or in the same place peacefully.

Common – A species that is numerous and widespread.

Conservation – Wise use and management of natural resources, including wildlife species.

Corridor – A pathway or strip of habitat leading from one area to another.

E

Endangered – A species of animal or plant in danger of becoming extinct.

Environment – A species surroundings; all the living and non-living components where a species lives.

Ephemeral – Transitory; rarely staying the same for extended periods of time.

Extinct – A species no longer in existence.

F

Feigning – Pretending, such as a plover feigning an injury (pretending to be injured).

Fledgling – A young bird just able to fly.

Foraging – Searching for food.

H

Habitat – The area where an animal lives. Includes water, food, shelter, and space.

I

Indicator species – Those species first affected by an environmental change.

Invertebrates – Species that have no backbone. Examples include insects, worms, and crustaceans.

L

Landlocked – Enclosed or nearly enclosed by land.

M

Migration – To move between places with the change in seasons.

Mobbing – To crowd around or attack and generally annoy.

O

Offspring – The young that adults produce.

P

Precocial – Bird species in which newly-hatched chicks leave the nest immediately. They are able to feed themselves. Examples include ducks, chickens, Piping Plovers, and quail.

Predator – A species that eats other animals.

Prey – An animal hunted as food by another animal.

R

Rare – Not usually encountered; scarce.

Renesting – Making a new nest and laying new eggs after a first nesting attempt fails.

S

Semi-precocial – Bird species in which newly-hatched chicks can leave the nest soon after hatching, but need to be fed by the adults. An example is Least Terns.

Site fidelity – The tendency of some birds to return to the same nesting area each year.

Species – A distinct kind of organism. Members of a species breed together and produce viable offspring. Generally, one species cannot successfully breed with another.

Substrate – The surface material on the ground in a particular area.

T

Threatened – A species at risk of becoming endangered. If conservation actions are not taken, the species may become endangered.

Suggested Resources

For further information on Least Terns and Piping Plovers, contact the Tern and Plover Conservation Partnership at (402) 472-8878 or <http://ternandplover.unl.edu>.

Other resources are as follows:

Haig, Susan. 1992. *Piping Plover*. In *The Birds of North America*, No. 2 (A. Poole, P. Stettenheim, and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, DC: The American Ornithologists' Union.

Thompson, Bruce C., J. A. Jackson, J. Burger, L. A. Hill, E. M. Kirsch, and J. L. Atwood. 1997. *Least Tern*. In *The Birds of North America*, No. 290 (A. Poole and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, DC: The American Ornithologists' Union.

Children's books about piping plovers and least terns:

McMillan, Bruce. 1993. *A Beach for the Birds*. Houghton Mifflin Company, New York.

Domm, Kristin Bieber. 2000. *Ahmed and the Nest of Sand*. Nimbus Publishing Limited, Halifax, Nova Scotia:

Websites:

Nebraska Game and Parks Commission – <http://www.ngpc.state.ne.us>

United States Fish and Wildlife Service – <http://www.fws.gov>

Cornell Lab of Ornithology – <http://birds.cornell.edu>

Tern and Plover Conservation Partnership – <http://ternandplover.unl.edu>

Also check with local Wildlife Conservation Agencies.

Dear Educator,

Now that you've had a chance to use the poster and educators' packet, we ask that you take a few moments to complete an evaluation of the poster and packet. Filling out the evaluation is voluntary.

It will take approximately 10-15 minutes to finish, and the person completing the evaluation must be 19 years or older. Your responses will help us evaluate how effective the poster and packet were in helping students learn about Least Terns and Piping Plovers. This information will be compiled for use in EARS (Extension Accomplishment Reporting System) reports, with the possibility of being used in professional journal publications.

The instructions for completing and sending the survey are as follows:

1. Fill out the evaluation.
2. Fold in half widthwise so the size of the paper is 8 ½ inches by 11 inches.
3. Fold in thirds lengthwise, being sure that our address is facing outward.
4. Tape or staple to hold the evaluation in thirds.
5. Place a stamp on the evaluation and drop it in the mail.

Participant identities will be kept confidential. You are free to decide not to participate in this study or to withdraw at any time without adversely affecting your relationship with the investigators or the University of Nebraska-Lincoln. Your decision will not result in any loss of benefits to which you are otherwise entitled. There are no known risks involved in completing this survey.

Please contact us if you have any questions or concerns. Chris Thody is at (402) 472-8741 or email at cthody2@unl.edu; and Renae Held is at (402) 472-8878, email at rheld3@unl.edu.

Additionally, if you have any questions about your rights as a research participant that have not been answered by the investigator or to report any concerns about the study, you may contact the University of Nebraska-Lincoln Institutional Review Board, telephone (402) 472-6965.

Sincerely,

Chris Thody

A Tale of Two Birds Poster and Educator's Packet Evaluation

Poster Questions

How many students studied/observed the poster? _____

What percentage of those students knew about Interior least terns and/or piping plovers...
before seeing the poster? _____
after seeing the poster? _____

How much did students learn from the poster presentation?

A huge amount A lot Some A little None

Would you recommend this poster to other educators? **Yes** **No**

Was the poster useful to you as an educator?

A huge amount A lot Some A little None

Comments:

Would you use the poster again next year?

Very likely Somewhat likely Maybe Somewhat unlikely Very unlikely

Educator's Packet Questions

Which activity or activities did you use in your classroom? (Circle all that apply)

**Tern and Plover Year Out of Time Plover Survival – A Simulation Game
Word Search Fill in the Blank**

For each activity that was used, please tell us our opinions below.

Tern and Plover Year	Low	Average	High		
Clarity of the instructions	1	2	3	4	5
Students' understanding of the activity	1	2	3	4	5
Fit with classroom goals	1	2	3	4	5
Usefulness	1	2	3	4	5
Educational	1	2	3	4	5
Will you use this activity in the future?	1	2	3	4	5

Comments/Suggestions:

Out of Time	Low		Average		High	
Clarity of the instructions	1	2	3	4	5	
Students' understanding of the activity	1	2	3	4	5	
Fit with classroom goals	1	2	3	4	5	
Usefulness	1	2	3	4	5	
Educational	1	2	3	4	5	
Will you use this activity in the future?	1	2	3	4	5	

Comments/Suggestions:

Plover Survival – A Simulation Game	Low		Average		High	
Clarity of the instructions	1	2	3	4	5	
Students' understanding of the activity	1	2	3	4	5	
Fit with classroom goals	1	2	3	4	5	
Usefulness	1	2	3	4	5	
Educational	1	2	3	4	5	
Will you use this activity in the future?	1	2	3	4	5	

Comments/Suggestions:

Word Search	Low		Average		High	
Clarity of the instructions	1	2	3	4	5	
Students' understanding of the activity	1	2	3	4	5	
Fit with classroom goals	1	2	3	4	5	
Usefulness	1	2	3	4	5	
Educational	1	2	3	4	5	
Will you use this activity in the future?	1	2	3	4	5	

Comments/Suggestions:

Fill in the Blank	Low	Average	High		
Clarity of the instructions	1	2	3	4	5
Students' understanding of the activity	1	2	3	4	5
Fit with classroom goals	1	2	3	4	5
Usefulness	1	2	3	4	5
Educational	1	2	3	4	5
Will you use this activity in the future?	1	2	3	4	5

Comments/Suggestions:

General Questions

Please circle the response that best matches your opinion.

How did you learn about the poster? **Website** **Newsletter** **Colleague**
Cooperative Extension

If other source, please specify. _____

At what grade level did you present the poster? **5** **6** **7** **8** **Other**

If other, please specify. _____

Have you used bird and/or wildlife examples in your curriculum previously?

Yes **No**

Did you use the educator's packet along with the poster? **Yes** **No**

What subject area(s) did the poster/packet supplement? (Circle all that apply)

Math **Science** **English** **Biology** **Music** **Geography**

Other _____

Overall, did the packet help with the presentation of the poster?

A huge amount **A lot** **Some** **A little** **None**

Additional comments and/or suggestions.

Please fold the survey into thirds, with the Tern and Plover Conservation Partnership address on the outside. Use tape or staple the bottom to hold the survey in place.

Return Address

Tern and Plover Conservation Partnership

**313 Biochemistry Hall
University of Nebraska
Lincoln, NE 68583-0758**

Attn: Chris Thody