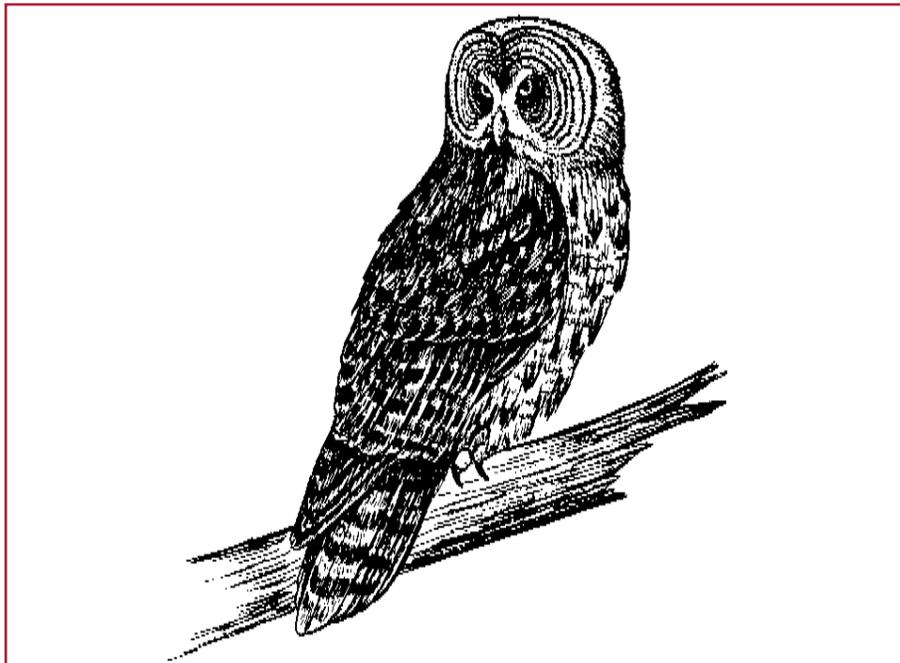


Follow a Food Chain

2 EXTENSIONS **ALERT: ALASKA ECOLOGY CARDS OPTIONAL**



Section 2 ECOLOGY ACTIVITIES

Grade level: K - 12

State Standard: S A-14
NGSS: K-LS-1,-LS2-1,MS-LS2-1,
MS-LS2-2,HS-LS2-4.

Subjects: Science, language arts,
math

Skills: Dissecting, observing,
inferring, listening, measuring,
puzzle-building

Duration: 50 minutes

Group Size: Any

Setting: Inside

Vocabulary: Carnivore, detritivore,
food chain, herbivore, owl
pellets, predator, prey, producer

Objectives:

1. Students observe one link in a food chain by examining owl pellets. They use this evidence to infer other links in the chain.
2. Students will work in cooperative groups to make observations and collect data and draw conclusions.

Teaching Strategy:

Students dissect owl pellets, put together a skeleton of owl prey, and identify prey animals.

Complementary Activities:

“Investigating Birds” and “Investigating Mammals” in Section 3. Also “Create and Destroy” and “Spinning a Yarn about Ecosystems” in Section 4.

Materials:

One owl pellet (*see note at end of activity) per pair of students, dissecting tools (or toothpicks), diagrams of small animal skeletons and skulls. Glue for mounting, sample data sheet (following). Guided Imagery (following).
OPTIONAL: Poster board, *Alaska Ecology Cards*.

Background:

See **INSIGHTS Section 2, Ecosystems – Community Connections** and the “*Owl Food Web*” fact sheet.

Natural History Tips:

Owls usually eat all of their **prey**. Often they swallow small prey whole – feathers or fur and all. What they cannot digest, the owl spits up or “casts” in a pellet 12-16 hours after each meal. These “packages” contain remnants of the birds, small mammals, and insects the owl ate. Pellets reveal the secrets of the owls’ diets.

Scientists (*and students*) can learn about owls and their prey by examining and classifying the contents of pellets. The remains of animals found in pellets tell researchers what animals are found in an owl’s hunting territory.

Pellets also give clues about growth and decline of rodent populations. For example, if a vole population changes from abundant to scarce, over time fewer vole bones would be found in owl pellets in the area.



Constructing **food chains** based on animals found in an owl's pellet can lead backward to green plants eaten by a vole. Predators on owls include ravens that eat owl eggs and other owls. **Detritivores** always are the last link in the chain.

Procedure:

1. Read the guided imagery. Ask students to predict what they will find in their owl pellets. Write these predictions on the board.

2. Students work in pairs or small groups with specific roles such as chief investigator, supply manager, skeleton construction expert. Remind students that they are to use proper laboratory procedures, which include not eating or drinking while working, and washing hands before and after examining the owl pellet.

3. Distribute one data sheet per group. Ask students to collect some data before dissecting the pellet. Compare each group's observations of pellet length, circumference, shape, texture, and color.

4. Ask students to separate fur or feathers from the bones. Every member of each group should participate in bone classification. Try to identify the teeth and/or skulls of the animal meal. The skulls and teeth will give clues about the owner's identity and its eating habits. Provide posters of rodent, shrew, and bird skeletons as references to aid in identification. A bone-sorting chart is available from Pellets, Inc. (*see Teacher Resources in the Appendix*).

Feathers give clues about the size of the bird eaten by the owl. Pellets that have feathers in them may also have bird bones. The longer, larger bird bones can be distinguished from mammal bones because they are hollow and light.

6. Check to see whether there are remains of more than one animal in each pellet. Try to figure out how many of each type of animal is present.

7. Try to set out the bones to form a skeleton of the prey animal. Glue the bones to poster board, if desired.

8. Have groups compare the number and type of different skulls found in each pellet. Results can be compared on a chart or graph.

9. Review each group's data and hold a class discussion. What causes the differences in the appearance and content of the pellets? Why are different animals and different numbers of each type of animal found in each pellet?

10. Focus the class discussion on food chains. What evidence of a food chain is found in an owl pellet? What do owls' prey eat? Extend the discussion of the food chain until students include sun, plants, and **detritivores**.

11. Ask students to draw a food chain based on the evidence they found in their owl pellets. What happens to owl pellets in the wild?

Evaluation:

1. Students draw a food chain to show the owl, what it ate and what the prey ate. Compare chains made by other students in the class.

2. Give students a list of 5-10 things an owl eats. Students build at least two food chains using paper and pencil or 3-dimensional construction showing the missing links in the chain.

EXTENSION:

A. **Study owl pellets as a scientist.** *For older students:* Students design an in-depth study of owl pellets using the scientific method. The question for analysis might be "What are the most common prey of owls?" The study design should include a sample size (*number of pellets analyzed*), methods section, results and discussion, conclusion, and literature cited.

B. **Analyze the results mathematically.** Prey remains can be sorted into large categories such as mice, birds, and shrews. If a biologist or expert is available, the remains may be analyzed to determine species. Can students determine the mean number of prey per pellet? What is the mean ratio of bone weight to total pellet weight?

Credits:

Adapted with permission from "Owl Pellets," Project WILD, Western Regional Environmental Education Council, 1992. Shaw, Donna Gail, "Sample Lesson Plan – Owl Pellets," Associate Professor, School of Education, University of Alaska, Anchorage, 1992.



Curriculum Connections:

(See appendix for full citations)

Books:

All about Owls (Arnosky) (Gr. K-3)

Book of North American Owls (Sattler)

Guide to the Birds of Alaska (Armstrong)

Owl (Steffof)

Owl Moon (Yolen)

Owls: A Wildlife Handbook (Long)

What are Food Chains and Webs? (Kalman)

Teacher Resources:

(See appendix)

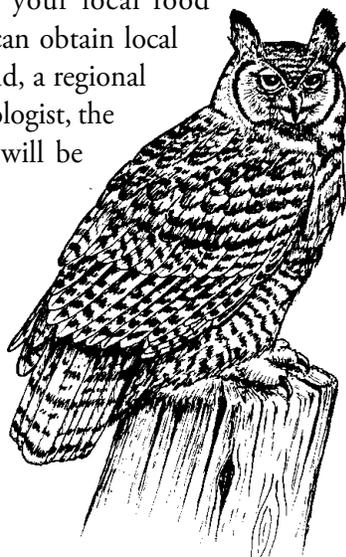
NOTES ON PELLETS

Where to obtain pellets

Pellets can be collected below roosting sites (*tall rocks or tundra tussocks, trees, or cliff edges*), from a raptor rehabilitation center, or from a scientific supply house (*see appendix for Teacher Resources*).

Non-local diets from commercial sources

Pellets from commercial sources may include small mammals that do not live in your area. This may make inferring about your local food chain difficult. If you can obtain local owl pellets from the wild, a regional raptor center, or area biologist, the impact of your lesson will be more direct.



*****IMPORTANT SAFETY NOTE*****

Any commercial owl pellet supplier should guarantee that their pellets have been sterilized. If you collect owl pellets on your own, sterilize them to kill bacteria that can be passed on to anyone who handles the pellets. Microwave on “high” for 20 seconds for about five pellets. Or place on a cookie sheet in a 350-degree oven for 20 minutes. Don’t overcook.

To ensure the safety of students (*especially when using pellets from the wild*), also have students soak the pellets in a water/chlorine solution which prevents dust. Students then strain the solution so they can pick through the remaining wet hair and bones.



Guided Imagery: An Owl

Adapted from "Flight of Fancy" by Donna Gail Shaw and reprinted with permission from Ranger Rick's NatureScope, "Birds, Birds, Birds!"

Close your eyes. You are going to make a flight to a fantasy world. Before you go, though, your body must change because you are much too heavy to fly.

Let's start the change with your feet. Think about your feet and notice how they feel. Wiggle your toes and bend your ankles. Now imagine that each foot is being squeezed together and stretched until it is long and skinny and extends upward like a leg. Your ankle looks like a knee, but it bends the wrong way. You must stand and walk on your toes, but there are only four of them. One has disappeared. You have unusual control of the four that remain. Three face forward and one sticks out the back, but you can move the outer toe on the front so that it sticks out the back, too. A sharp, curved toenail or talon grows from the end of each toe. The skin on your feet and ankles changes from smooth skin to rough, bumpy scales.

Now your legs become shorter and your knees pull up close to your body. You feel your body grow shorter and your insides shrink.

Suddenly your hands and arms start to change. Your fingers must dissolve and your hands grow until they are long, flat and wide. Your hands and arms have become wings. Flap them a few times and feel how they move.

Now your head begins to change. Your teeth disappear and your nose and mouth grow together to form a hard, strong, sharp, hook-like beak. Your eyes become more difficult to turn in their sockets. You must turn your head to look around. Now your chin disappears and your outer ears fall off. Nevertheless, you're able to hear quite well.

More changes happen very quickly now. Each lung changes and air sacs appear in many places in your body. They are like balloons connected to your lungs. Your bones grow hollow to make them much lighter than they were. The small hairs all over your body begin to change into feathers. Soft downy feathers grow close

to your body, and longer, wider feathers cover them. Larger feathers give shape to your wings.

Your body change is complete and you hop to the nearest open door. As you face outside, the wind calls to you and you jump, flapping your wings quickly with great force but hardly any sound.

As evening approaches, you feel extremely hungry. For some reason a mouse sounds like it might taste good. Funny, you've never wanted to eat a rodent before. In the gathering darkness, you hear a soft rustle of the leaves and you spot a mouse. You swoop down, grab it, and fly to a nearby tree to find out you've forgotten all your manners – you swallow the mouse whole! You think to yourself – I can't believe I ate the whole thing – hair, bones, and all! You find that you're still hungry and you're not satisfied until you eat two more small mammals and a bird.

You tire and fly back to your house to rest. Several hours later something begins to happen. You cough hard and, suddenly, you realize what you have become – you're an owl and you have just coughed up your first owl pellet. You wonder to yourself, what would I find inside the pellet if I were to examine it?

Think.

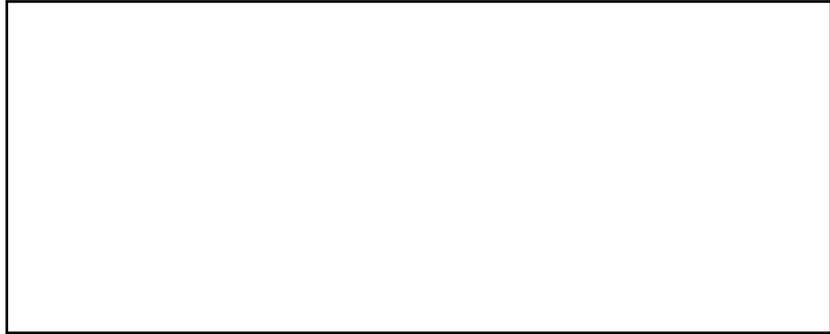
Slowly return to yourself and open your eyes. Today we are going to examine owl pellets (*write owl pellets on the board*). What do you think we will find?



Data Sheet: Owl Pellets

Before dissecting the pellet.

1. Length of pellet: _____
2. Circumference of pellet (use string): _____
3. Draw the shape of the pellet:



4. Colors(s) of pellet: _____
5. Texture of pellet: _____

Begin dissecting a pellet.

6. Number of skulls found in pellet: _____
7. Describe the kinds of animals found:

8. Describe things other than bones or fur found in or on the pellet:

