

Discovering Owl Pellets

Essential Question:

Do all animals digest their food in the same way?

At a Glance:

Learners will dissect an owl pellet and interpret clues to owl eating and digestion habits. Next they will identify small mammal skulls and bones using a bone identification chart.

Background:

More than 300 species of birds in several different orders are known to regurgitate pellets of indigestible material including all owl species. Owl pellets are very useful in understanding owls' feeding habits.

Owls, like other birds, cannot chew their food. Small prey is swallowed whole, skull intact. Larger prey, like a skunk eaten by a Great Horned owl, may be torn into smaller pieces before being eaten.

Unlike most other birds, owls have no crop, and the food passes straight into the foregut (they do not possess a true stomach). The acid in the owls gut is rather weak with a pH of 2.2 - 2.5 which is the same as vinegar. This compares to diurnal birds of prey which have a pH of 1.3 - 1.8, which is approaching the pH of concentrated hydrochloric acid. This means that only the soft tissues are digested; the bones and even fur and feathers remain virtually intact.



Owl Pellet

The hindgut is the gizzard which compacts the remains into an oval pellet. This is then actively regurgitated back up through the esophagus. Pellets therefore contain bones including intact skulls, fur, feathers, the chitinous exoskeletons of insects and even the chaetae (bristles) from earthworms. Hence, discovering what owls have been eating is quite straight forward.

Regurgitating a pellet is a voluntary act on the owl's part, and in the wild most birds will produce one prior to leaving the roost for hunting, often another smaller pellet will be produced during the night before the second main period of hunting around dawn. The size, shape and appearance of the pellet is normally characteristic of the owl species.

Location: Indoors

Objectives: Learners will

- 1) dissect an owl pellet and interpret clues to owl eating and digestion habits.
- 2) identify small mammal skulls and bones using a bone identification chart.

Skills: communication, observation, data collection, listening, analysis

Supplies:

- owl pellets (*easy to locate sources on internet*)
- dissecting tools (toothpicks, tweezers)
- paper plates
- owl pellet bone ID sheet
- Discovering Owl Pellets Worksheet
- Pencils
- gloves

Subjects: science

Time: 40 minutes

Getting Ready:

Gather supplies. Make sure you are aware of any learners with asthma or fur allergies that may have a reaction to the fur. You may print out the worksheet with the Small Mammal Review on the other side to give the learners more information.

Procedure:

1. Discuss with the learners adaptations and characteristics of owls.
2. Split the learners into groups and hand out supplies.
3. Have the learners follow the 'Discovering Owl Pellets' Worksheet

Discussion/Assessment:

What do we know about the digestive system of an owl based upon the pellets? Other birds form pellets. What would you expect to find in the pellet of a seagull? Construct a diagram of a food web with an owl at the uppermost trophic level.



Rocky Branch Elementary

Discovering Owl Pellets - Worksheet

1. Measure the length and width of your owl pellets.

Length of your owl pellet _____

Width of your owl pellet _____

Mass of your owl pellet _____

2. Carefully examine the exterior of the pellet.

Do you see any signs of fur? _____

Do you see any signs of feathers? _____

3. Carefully use a toothpick to break apart the owl pellet and observe what is within. Use a toothpick to expose all bones for identification. Use the bone diagram to identify the bones and complete the 'Owl Pellet Results Table'.

Owl Pellet Results Table

Bone	Type	Number
Skull		
Jaw		
Scapula		
Forelimb		
Hindlimb		
Pelvic Bone		
Rib		
Vertebrae		

Notes:

Small Mammal Review For Owl Pellet Dissection

Owls eat many small mammals. Here are some facts about the prey that your owl may have eaten.

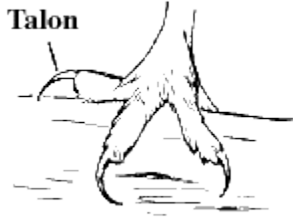
- 1. Deer Mouse:** The deer mouse, the only native mouse that commonly enters homes, has cheek pouches and is very social. They will feed on various foods, including seeds and nuts, small fruits and berries, insects, centipedes, and the subterranean fungus, Endogone.
- 2. Meadow Jumping Mouse:** Can jump 6 feet. If it were the size of a human, it could jump 150 feet! The long tail is used for balance while jumping. It feeds on invertebrates, especially caterpillars and beetles, and grass seeds.
- 3. Woodland Jumping Mouse:** Burrows more than the meadow jumping mouse. It hibernates about one half of its life.
- 4. Red Backed Vole:** It is very nervous mammal and may faint or die if handled excessively.
- 5. Meadow Vole:** Uses communal toilets, extensive runways, and can have 17 litters per year in captivity. This widespread vole is the mainstay diet of many carnivores, such as foxes, coyotes, snakes, hawks, and owls.
- 6. Short tailed Shrew:** Only poisonous mammal in the world. It possesses a neurotoxin similar to cobras. Its bite is deadly to its prey, usually snails, earthworms, centipedes, beetles, and occasionally mice and smaller shrews. The shrew's neurotoxin is not lethal to humans but its bite will hurt for several days.
- 7. Northern Water Shrew:** It uses stiff hairs on its hind feet for propulsion through water. It is never found further than 30 feet from the water.
- 8. Pigmy Shrew:** This mammal weighs no more than a dime and is thought to be one of the rarest North American mammals. It has such a high metabolism that it cannot sleep for any length of time or it will starve. It has a heart rate of 782 beats per minute and breathes 300 breaths per minute.

Owl Facts

- There are nearly 150 species of owls worldwide.
- Nineteen species of owls are found in North America, north of Mexico.
- Owls live everywhere except Antarctica and a few remote islands.
- The Elf Owl of the southwestern desert is the smallest owl, standing only 6 inches tall and weighing two ounces.
- Snowy Owls can stand about 2 feet tall and have a wingspan of over 5 feet.
- Although most owls only eat small mammals and birds, the Great Horned Owl will eat skunks, groundhogs, and porcupines.
- A single owl may catch up to 2000 rodents a year. That's 5 or 6 a night.
- Pellets are not exclusive to owls. Kites, hawks, falcons, eagles, harriers, and even some robins also regurgitate undigested remains.
- A captive Common Barn Owl has lived up to 51 years.

<http://mdc.mo.gov/nathis/birds/owls/owlfact.htm>

How are owls related to other birds?



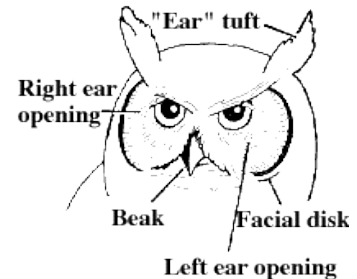
Birds of prey, owls along with hawks, eagles and falcons, constitute a group called "raptors" whose members are distinguished because they have talons (sharp claws) on their feet for catching prey and hooked beaks for tearing it apart. Owls, however, are only distantly related to their daytime counterparts. They are more closely related to other night time (nocturnal) birds like whip-poor-wills.

Why are owls nocturnal?

The predator life style requires very special refinements, and owls display a variety of fascinating features and behaviors. Their nighttime existence, for example, makes it easier for them to hunt the mice and other small mammals that are also active at that time.

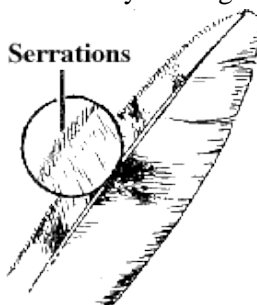
How do owls see?

An owl's eyes are very large so that they can gather more light, thus providing them excellent night vision. In fact, a Great Horned Owl's eyes are nearly as large as a human's. Unlike other birds, owl eyes look forward and therefore each eye sees the same object from two different angles. This produces three-dimensional perception, similar to humans, making it easier to detect the distance of prey as well as perches and branches as they fly about in the dark. Unlike a human, an owl's eyes are fixed in their sockets and cannot turn. To focus on another object, an owl must swivel its head. It can do this with amazing quickness.



How do owls hear?

The ear openings are also directed forward and are shielded beneath downy feathers within the owl's familiar facial disk. (The ear tufts of some owls have nothing to do with hearing.) The facial disk itself serves to focus sound waves into the ears. Strangely, the ear opening on the right is higher than the one on the left. Each ear therefore receives a sound from a slightly different angle. This provides owls 3-D hearing in addition to 3-D seeing, thus doing us humans one better. Experiments have shown this sense to be so effective that Barn Owls can locate prey in total darkness by hearing alone.



How do owls hunt?

To aid in nighttime hunting, owls are gifted with silent flight. This results from tiny serrations along the leading edge of flight feathers that reduce the sound of flowing air. Coupled with this, owls use a surprise attack. Having located their game while on the wing or from a perch, they fly in quickly, feet first. Killing is rapid and the victim is usually carried in the feet or beak to a perch or nest where it is devoured.



How do owls eat?

Large items are torn apart with talons and beak. Small morsels, such as mice, are swallowed whole. Hours later indigestible bones, fur, and feather are coughed up in firm, cylindrical one-to-two-inch pellets. Sometimes many of these pellets can be found under a favorite perch or nest. By identifying the remains in the pellets, the owl's food habits can be studied.