

Owl Pellet Dissection Activity:

Background:

Owl pellets are neat little packages of fur, bones, and other indigestible stuff that are regurgitated (spit up) sometime after an owl has finished digesting several meals. You can find owl pellets on the ground under trees where owls like to roost or nest.

All owls cough up pellets as a part of how they digest their food. Most of the time, they swallow their prey whole without chewing or tearing the flesh apart. This means that owls naturally have a lot more bones, feathers, and fur in their diet. Owls can digest only the soft muscles and organs of their prey. The bones, teeth, fur, feathers, scales, or insect skeletons are too dense and cannot be converted into energy. The harder parts may also puncture an owl's soft, curved intestines if passed through its digestive tract. Instead, the waste material is formed into a pellet in the gizzard, a muscular pouch in the owl's digestive system. The gizzard operates like a trash compactor, pressing all the bones, fur, feathers, or other indigestible stuff into a firm, oval-shaped ball. When the pellet gets big enough, it is passed back up the esophagus to be cast out (thrown up) about twelve hours after eating.

Although other birds, like eagles and hawks, also regurgitate pellets, owls are more efficient at it and they regurgitate more frequently. Owls swallow their prey whole, ingesting the entire skeleton. Other raptors selectively tear at their prey, eating only the soft digestible parts and leaving the indigestible bones. Also, unlike other birds, owls do not have a crop, which is an organ that holds food until the stomach is ready to receive it. Other species of raptors do not need to regurgitate pellets as frequently as owls because some of the food remains in the crop, preventing food from passing up through the mouth for several hours.

Although pellets are waste material, they provide food and shelter for other organisms. Pellets sometimes provide homes for clothes moths, carpet beetles, and fungi. You may find droppings, cocoons, or exoskeletons from these animals in the pellets.

Owls in the wild eat whatever is on the local menu. In other words, owls living where there are lots of mice will eat (you guessed it!) mice. They also eat other things depending on what's available, including insects, frogs, mice, weasels, small birds, even larger prey like porcupines. As you might expect, larger owls like larger prey, and smaller owl species eat smaller prey. The smallest owls, such as the Northern Saw-Whet and Boreal Owl, depend on insects, small birds, frogs, and mice. The Great Horned Owl and Great Gray Owl, Canada's largest owls, eat a great variety of things including ducks, porcupines, squirrels, grouse, along with its staple food of mice.

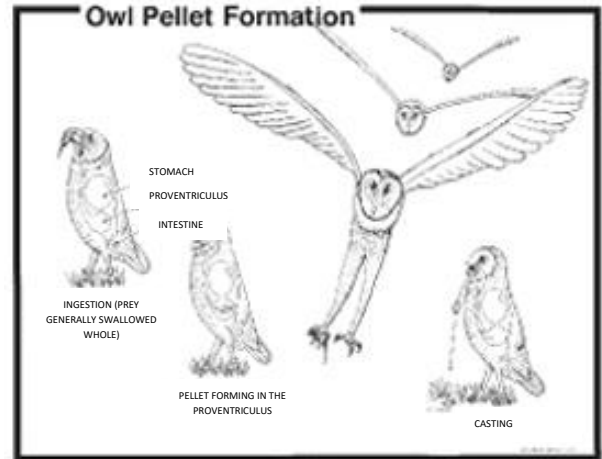
Owl pellets provide important information to ornithologists about owl adaptations and habits. Scientists can determine what owls are eating at various times and places by finding and dissecting owl pellets. Owl pellets also provide information about the approximate numbers of prey animals in the owl's feeding area, which is valuable information to scientists studying animal populations. Pellets are often found at the base of a perching tree.

The owl pellets you'll be dissecting today are totally sanitary. They have been sterilized using an auto-clave to kill any bacteria or parasites that might have been present in the pellets when they are fresh. Owls have powerful stomach acids that usually kill all the bacteria in the pellets. Sterilizing the pellets before packaging them is an added precaution. These owl pellets are from Barn Owls. These owls are commonly found in barns (hence the name!) where they feast on the rodents and birds who also make the barn their home.

(The only problem students may have is if they have an allergy to dust. The pellets are very dusty, but if it is bothering the kids, wet the owl pellets with a fine spray of water or damp cloth.)



Barn Owl



Use this picture to help explain owl pellet formation



Northern Saw-whet Owl



Boreal Owl



Great Gray Owl



Great-horned Owl

Materials:

- Newspaper or large sheets of paper (to lay down on table and dissect upon; makes for easier cleanup)
- Plastic Forceps
- Wooden Probes
- Dissecting chart (see attached)
- Card stock (or index cards, for gluing bones onto to take home)
- White glue

Activity:

Explain to the students what owl pellets are and where they come from. With older students you can go into detail about owl adaptations. Lay newspaper down on table. Set up a station for each student with the following items: forceps, probe, dissecting chart, cardstock and glue bottle. Give each student an owl pellet and help them to unwrap the foil and break their pellets in half (this will make it easier for them to dissect; the first break into the pellet can be hard for small fingers).

Guide them through the dissection by talking about the types of bones they might find. Have them try to match up the bones they find with the dissecting chart to figure out what kinds of animals the owl was eating. Get them to glue their bones onto the cardstock to take home.

Discard the fur/feathers. Make sure the camp participants keep all of the fur/feathers on the newspaper and when it is time to clean up you can just gather up the paper and throw it out.

Extra Resources:

Older students can use the following key to discover the types of mammals in their owl pellet.

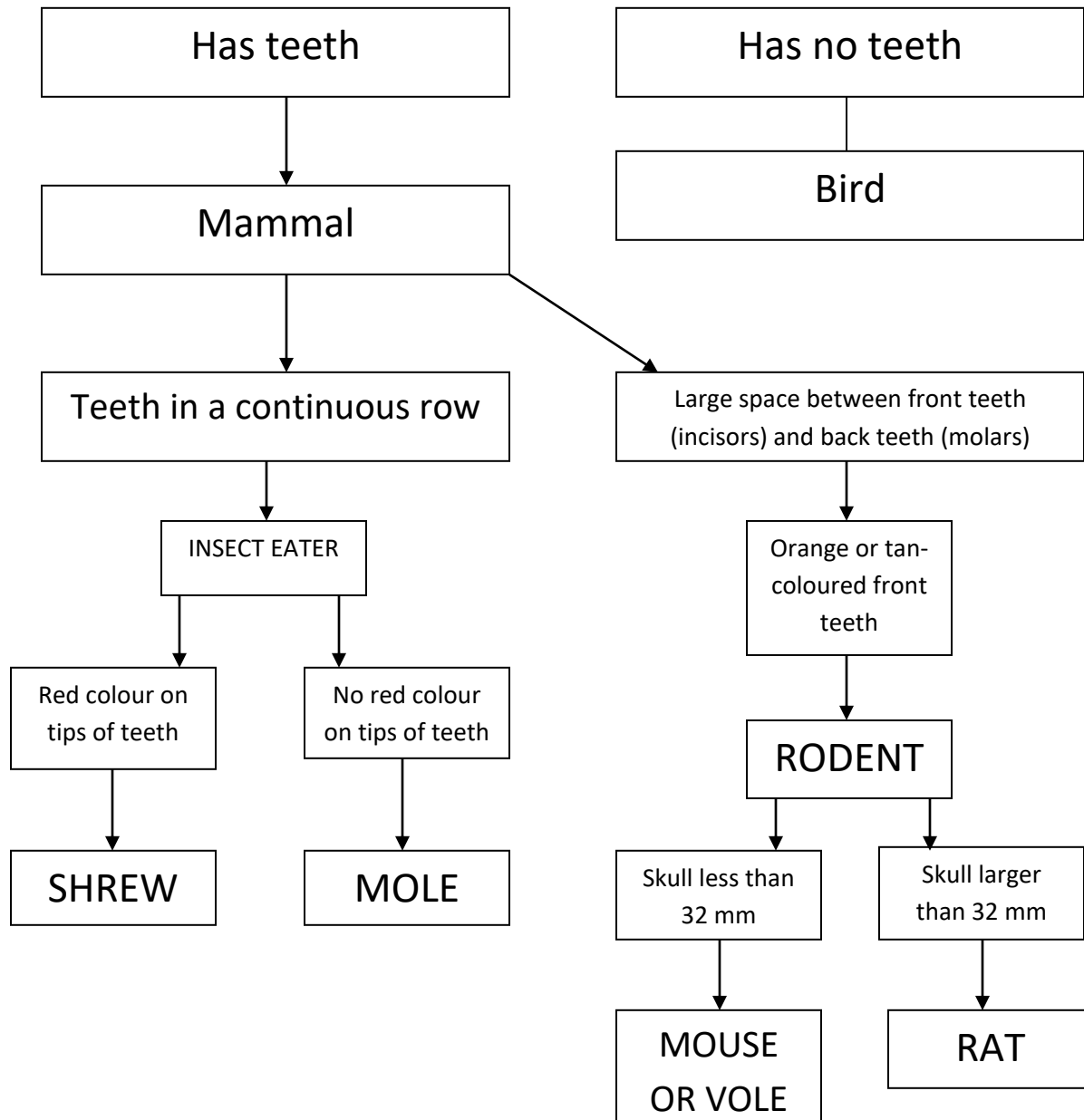
If your animal has...

- 3 or fewer teeth on each side of its upper jaw?
 - At least 9 teeth on each side of its upper jaw?
- 2 biting teeth on its upper jaw?
 - 4 biting teeth on its upper jaw?
- A skull length of 23 mm or less and brown teeth?
 - A skull length of more than 23 mm and 44 teeth?
- The roof of its mouth extending past the last molar?
 - The roof of its mouth not extending past the last molar?
- A skull length of 22 mm or less?
 - A skull length of more than 22 mm?
- Flat molars (back teeth)?
 - Rounded molars (back teeth)?

Then...

- go to 2.
go to 3.
- go to 4.
the skull is from a rabbit.
- the skull is from a shrew.
the skull is from a mole.
- go to 5.
go to 6.
- the skull is from a mouse.
the skull is from a rat.
- the skull is from a meadow vole.
the skull is from a deer mouse.

Younger students can use this more simplified key:



Owl Adaptations

Owls are a type of carnivorous bird called raptors. Other raptors include hawks, eagles, falcons, and ospreys. Most raptors hunt small mammals, birds, amphibians, reptiles, and larger invertebrates. All raptors possess similar adaptations that allow them to hunt: they are strong and agile fliers, they have keen eyesight to locate prey, strong legs and talons for capturing prey, and hooked bills to tear flesh. Although owls share these characteristics, they have adapted to their nocturnal lifestyle. Other species of raptors are active primarily during the day so they have not evolved these specialized adaptations to be active at night.

1. Eyesight. The size and structure of owls' eyes allow for amazing visual ability. Owls' eyes are so large that there is little room for muscles inside their eye sockets needed to move their eyes. To compensate,

owls are able to turn their heads 270 degrees. Larger eyes allow for more light to enter the pupil, which is the round center of the eye. The owl "sees" when light contacts rod and cone cells at the back of the eye. Rod cells gather light and are needed when trying to see in low light conditions, but they do not distinguish color. Cone cells allow for color vision. Since most owls hunt at night, their eyes contain mostly rod cells; therefore, they can only see in black and white.

Owls focus on prey with binocular (two-eyed) vision, which means that each eye sees an object from a slightly different angle. The two views overlap, triangulating the object in the owl's sight, and allowing them to judge exact distance. Their sight is so focused that an owl could read a newspaper a mile away by the light of a candle (if it could only read). Although owls can see distant objects clearly, they can not see close objects well. Owls will bob and turn their heads to change their viewpoint when focusing on close objects. This behaviour makes near objects stand out from the background so they can judge the object's location more accurately.

2. Hearing. Owls have large, oval-shaped ear openings bordered in the front with a fleshy, raised flap called an operculum. This is similar in function to a hand cupped over the front of a person's ear to capture and amplify sounds from the rear. Many owls, such as the Barn Owl, have facial feathers shaped similar to a satellite dish that collect and direct even the lowest intensity sound waves down the ear channel into the ear. The unusual positioning of owls' ears also allows them to locate sounds. One ear is higher and points slightly more forward than the other. This asymmetrical positioning of the ears produces a difference in the time that it takes for a sound to reach each ear. Owls can detect the exact distance and location of sounds by analyzing the time difference between sounds. For example, if a sound arrives to the higher ear first, the owl knows that it came from above.

3. Silent Flight. Not only can owls see and hear their prey, their prey cannot hear them coming. The owl has a lightweight body and a large wing area, which allows it to fly using a slow, controlled wing-beat. Soft, comb-like serrations on the wing feathers and frayed edges on the tips of the tail feathers break up the air flow and muffle sound, enabling nearly silent flight. Most other bird species have a smooth, knifelike edge on their wings, which creates noisy friction as they cut through the air. Many owl species also have feathers extending down their legs, which muffle sound during flight.

4. Talons and Beak. Talons are used for capturing and grasping prey. The toes of an owl extend to the sides to prevent small mammals from moving sideways and escaping. Many owl species have feathers extending down their legs, which insulate their feet during winter. A strong, sharp, curved beak allows owls to tear up prey if it is too large to swallow. Owls normally kill their prey by grasping it with their talons and then biting its neck.

5. Behavior. Most owl species will migrate if the winter is harsh enough, but they will continually return to the same area. Owls develop an intimate knowledge of their territory and hunting ground through their methodical behavior. They will use the same trees as lookout perches to search for and ambush prey.

Owl Pellet - Bone ID Sheet



Birds



Moles



Rodents



Shrews

