



Build a Nocturnal Animal

Teacher Lesson Plan

Nocturnal Animals Post-Visit Lesson

Duration: 40-60 minutes

**Minnesota State
Science Standard**

Correlations:

3.4.1.1.1.

**Wisconsin State
Science Standard**

Correlations:

B 4.6, C 4.1, C 4.2

Supplies:

- 1) Smart Board or Dry Erase Board and Markers
- 2) List of Nocturnal Animal Adaptations
- 3) Pictures of Bird Feathers (found in this lesson plan)
- 4) Construction Paper
- 5) Scissors
- 6) Glue
- 7) Crayons/Markers/Colored Pencils

Overview

Students will use their knowledge of nocturnal animal adaptations to build their own unique nocturnal animal.

Objectives

- 1) Students will be able to explain the necessary adaptations of nocturnal animals.
- 2) Students will display an understanding of nocturnal adaptations by building their own animals.

Background

Nocturnal animals have special adaptations that allow them to survive at night. Not all nocturnal animals have the exact same adaptations but many share similar traits. Some nocturnal animals have large eyes to take in more light; some have large ears to take in more sound. Insect-eating bats use echolocation to "see" with their ears, while owls have special fringes on their feathers so they can fly without making any sound.

Build a Nocturnal Animal

Procedure

- 1) Begin by reviewing what a nocturnal animal is. Ask the students if they can name ways animals have adapted to living at night. Ask them not to focus on one specific animal, but general adaptations that most nocturnal animals have in common.
- 2) Write on the board the different adaptations nocturnal animals use to survive (see below). You can show the students pictures of the owl and red-tailed hawk feathers to further clarify silent flight.
- 3) Explain to the students that they will be creating and naming their own unique nocturnal animal.
- 4) Pass the materials out and have each student create their own unique nocturnal animal that displays many of the characteristics of a nocturnal animal. They can draw their animal or cut out pieces of construction paper and use the pieces to form their animal.
- 5) When complete, have the students explain to the class what makes their animal the master of the night.

Assessment

- 1) What is a nocturnal animal? *An animal that is most active at night.*
- 2) Why do nocturnal animals have large ears and eyes? *To take in more sound and light.*
- 3) Name one adaptation of a nocturnal animal and which animals use that adaptation? *Silent flight (owls), echolocation (bats), strong sense of smell (fox, snakes), whiskers (chinchilla, ferret, bobcat).*

Nocturnal Animal Adaptations

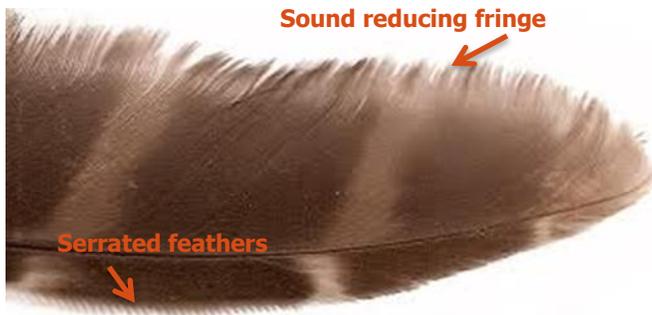
Vision Adaptations: Many nocturnal animals have really large eyes that help them to capture more light – some animals, like owls, have such large eyes they can't move their eyes in their sockets. They can also have a high concentration of rod cells in their eyes to help them create a visual image in low light. Many nocturnal animals have a tapetum lucidum – a layer of reflective cells just behind the retina. This layer helps reflect light that was not initially captured by the rods and cones, therefore directing more light into the eye.

Hearing Adaptations: Some nocturnal animals have large, moveable ears that help to catch more sound and pinpoint where the sound is coming from (e.g. foxes, hedgehogs, chinchillas, bats). Nocturnal animals can also have offset ears (i.e. asymmetrical ears) that are very good at determining exact locations of predators or prey (e.g. owls). Many nocturnal animals will also use sound to communicate with other members of their species (e.g. frogs, owls, bats).

Echolocation: Mammals and some birds use echolocation as a way to navigate and find food in the dark or low-lit environments. They emit sounds such as squeaks and clicks that are too high-pitched for humans to hear. Once the sound waves hit an object, they bounce back to the animal and the animal can use the time it takes the sound to bounce back to figure out their distance from an object. Bats are most known for echolocation, but it is also used by whales, dolphins, flying squirrels, and many other small nocturnal mammals.

Silent Movement: Some nocturnal animals, such as owls, have adaptations to help them move silently. The trailing end of an owl's primary feathers are frayed to allow for air to pass through the wings without making any sound while they flap.

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Barred Owl Feather



Red-Tailed Hawk Feather

Smelling Adaptations: Many nocturnal animals have highly-developed olfactory systems. Many animals have a Jacobson's organ in the roof of their mouth. This helps to improve their sense of smell. When a snake flicks its tongue, it collects chemical odors in the air. The forked tongue fits perfectly into two holes in the Jacobson's organ and the scent particles are transferred to receptors that send the messages to the brain.

Tactile/Touching Adaptations: There are some nocturnal animals with vibrissae (whiskers or feathers) with sensory receptors that aid in navigation and finding food. The whiskers themselves do not have sensors or nerves; rather they are attached to sensors at the base. They can use these vibrissae to sense objects as well as water and air currents (e.g. owls, chinchilla, hedgehogs, ferrets).

Important Terms

Adaptation - Changes made by living things in response to their environment (where they live).

Amphibian - A cold-blooded (ectotherm), vertebrate animal that lays many soft, jelly-like eggs which allow for water and air to enter. Young are born with gills and metamorphose into adult animals that breathe through their skin. This group includes frogs, toads, salamanders and newts.

Bird - A warm-blooded (endotherm), vertebrate animal that lays hard-shelled eggs, is covered in feathers, has wings, and breathes through lungs. This group includes raptors, penguins, water fowl and songbirds.

Cones - Cells in the retina of the eye which are responsible for color vision as well as eye color sensitivity; they function best in bright light, as opposed to rod cells that work better in dim light.

Crepuscular - Most active at dawn and dusk.

Diurnal - Most active during the day.

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Echolocation - Locating objects by reflecting sound.

Ectotherm (cold-blooded) - Animals that rely on outside temperature for their body heat. They may raise their body temperature by moving to a sunny spot or lower their body temperature by moving to a cool spot.

Endotherm (warm-blooded) - Animals that generate their own body heat. They are able to raise their body temperature by shivering or eating to increase energy, or lower their body temperature by sweating or panting.

Fish - A cold-blooded (ectotherm), aquatic, vertebrate animal that lays many soft-sided, jelly-like eggs which allow water to enter. They are covered in scales, breathe through gills and have fins. This group includes sturgeon, lamprey, and carp.

Insect - An invertebrate animal with 6 legs and an exoskeleton. They breathe through holes in their exoskeleton and reproduce by laying eggs which then undergo either complete or incomplete metamorphosis until they reach adulthood.

Invertebrate - An animal without a backbone.

Mammal - A warm-blooded (endotherm), vertebrate animal with fur/hair that gives birth to live young, feeds its young milk, and breathes through lungs. This group includes dogs, cats, bears and cows.

Nocturnal - Most active at night.

Reptile - A cold-blooded (ectotherm), vertebrate animal that is covered in scales, lays soft shelled eggs, and breathes through lungs. This group includes turtles, snakes, lizards and crocodilians.

Retina - The light sensing part of the eye that also holds the rods (vision at low light levels) and cones (vision at high light levels, color vision).

Rods - Cells in the retina of the eye that work better in dim light.

Tapetum Lucidum - A layer of reflective cells in the eye just behind the retina, present in many nocturnal and crepuscular animals. This is what causes "eyeshine" at night.

Tactile - Sensing with touch.

Vertebrate - An animal with a backbone.

Vibrissae - Hardened hairs or feathers connected to nerves for tactile sensing.