

Mississippi River Nightlife



National Mississippi River Museum and Aquarium Conservation Education Curriculum

Target Grades: Pre-K - 3rd grade

Key Words: Nocturnal, diurnal, crepuscular,
niche

Subject Areas: science, biology

Duration: 30 minutes

Time can be extended by request

Title: *Mississippi River Nightlife*

Program presented on site at Museum.

Summary:

After you go to bed at night, the river comes alive with animals that are just waking up. These animals are called nocturnal because they sleep during the day and are active at night. Come prepared to use your “night vision” to learn about these fascinating animals. Learn what makes these animals well suited for the dangerous night life.

Objectives:

Students will be able to:

1. define Nocturnal
2. determine the features nocturnal animals need to survive
3. define Niche

Group Size:

60 students maximum

Background for Educators:

Definitions:

Nocturnal: one that sleeps during the day and is active at night; usually having highly developed senses of hearing and smell and specially adapted eyesight.

Diurnal: one that sleeps at night and is active during the day

Crepuscular: one that is active in the twilight hours and sleep during the height of day and the deep of night

Retina: The sensitive membrane of the eye which receives the image formed by the lens and is connected to the brain by optic nerve.

Rhodopsin: A chemical found in the rod cells that is sensitive to light, it breaks down in strong light and must be manufactured each time the animals goes into darkness.

Rod Cells: The light sensing cells located on the retina of the eye. The eyes of many nocturnal animals have a large number of rod cells to help them see at night.

Cone Cells: The color sensing cells located on the retina of the eye.

Tapetum: The reflective layer of tissue at the back of the eye, behind the light sensing cells of the retina, which sends light back over those cells to increase the eye's efficiency in low light levels.

Niche: The role of an organism in an ecological community; its unique way of life and its relationship to other living and nonliving factors.

How do animals see in the dark?

Night vision: The eyes' retina is lined with two types of cells- rods and cones. Most nocturnal animals have eyes packed with rods, but few cones, allowing them to see fairly well at night. People can see fairly well at night it just takes a little time for our eyes to adjust from bright light to dim light. People's eyes can manufacture Rhodopsin by spending time in the darkness.

Because nocturnal animals have many rods and few cones, their color vision is poor. Deer hunters take advantage of this by wearing blaze orange while hunting. The color is very visible to other hunters for safety, but not to the deer.

Nocturnal animals can't see red well. To find nocturnal animals at night without disturbing them, cover a flashlight with red cellophane. The red beam will make the animals visible to you, but you won't stress or bother them.

How do I know an animal is nocturnal if I don't see it out at night?

That is what we are here to attempt to answer.

*One clue is the size of the eyes (or the ocular orbits in the skull). Nocturnal animals typically have very large eyes with a larger pupil, larger lens and more retinal surface than diurnal animals. What does this all mean? This means it can collect more ambient light. The vision of these animals is not, however, very clear. They often have fuzzy vision.

*Another good clue is pupil shape; some nocturnal animals have slit pupils, this allows them to close efficiently for protection during the day. Also open very large at night to allow more ambient light in.

*Size of an animal's ears can also be looked at. Nocturnal animals have excellent hearing and tend to have larger ears.

*Something that helps an animal be nocturnal, but can't really be seen is the animal's sense of smell. Most nocturnal animals have a highly sensitive nose. For example, a coyote's sense of smell is 100 times greater than our own. This is a hunting tool for them. There are folds of skin inside the nose; this increases the area for scent receptors.

*The air has more moisture in it at night. Moist air tends to transmit sounds and smells better than drier air during the day.

Why be nocturnal?

Nocturnal animals can fill the same niche as those active during the day, by living in the same habitat and eating the same food as their diurnal counterparts. Being active at night, when it is cooler, keeps some animals from overheating (certain reptiles and amphibians). Some come out at night because they are small and feel safer being active at night. Some are nocturnal because the animals they like to eat are.

Cool facts about common nocturnal animals of this area:

1. Beaver

- Excellent hearing, repairs dams at night by the sound of trickling water.
2. Coyote
 - Excellent hearing and smell, they can smell 100 times better than a person.
 3. Opossum
 - Has a very good sense of smell, but sight is poor. They are great climbers and when frightened play dead (actually faint from shock, but recover quickly).
 4. Striped Skunk
 - Excellent sense of smell. Have the ability to spray in defense. Always warn by stamping feet and only spray as last resort.
 5. Owl
 - Excellent hearing and sight. Their eyes are so large that they don't have room in sockets for muscles to allow them to move. One ear is lower than the other so they can hear how high or low a sound is, but also if it is off to the right or left. They can pinpoint a mouse digging under snow just by listening. They have silent flight because of soft feathers with fringe along front edge.
 6. Mosquitoes
 - The female mosquito is the one who sucks your blood; she does this to get protein for her developing eggs. The male drinks nectar from plants.
 7. Bullfrogs
 - Large eyes with excellent sight. It sometimes takes a bullfrog tadpole 2 years to develop into a frog.
 9. Badger
 - Great sense of smell and hearing. They are one of the fastest digging animals in the world; they can disappear underground in about 1 minute.
 10. Bat
 - There are many species of bats around Iowa. The bats are all insectivores, catching insects on the wing in the darkness. They use echolocation to find their prey; they emit a high frequency sound and listen to the echoes as the calls bounce off objects in the dark. A bat can differentiate between objects to avoid like trees and objects to eat like insects.
 11. Red Fox
 - Great sense of smell, hearing and sight. Red fox are omnivores. In periods of abundance, foxes will cache excess food against starvation at other times. They typically store the food in shallow holes, scattering them across their territories rather than storing their food in a single central location. They use their sense of smell to locate their food. This is thought to prevent the loss of the fox's entire food supply in the event that another animal finds a store.

Materials Needed:

1. identifier with owl and frog cards (borrow from fur trunk)
2. Pictures of 11 animals listed above (in nocturnal animal tote)
3. bat, owl, mosquito and frog puppets (wetlab)
4. furs: badger, beaver, deer, red fox, opossum and skunk (fur trunk)
5. skulls: a couple nocturnal animal skulls (skull tote)
6. Owl wing (fur trunk)
7. something to smell (scent disks) (nocturnal animal tote)
8. Large cardboard owl eyes (nocturnal animal tote)
9. Large nocturnal ear cutout (nocturnal animal tote)
10. book: Stellularuna or other nocturnal animal book (wetlab)

Procedure:

Introduce the program and the terms; diurnal, crepuscular, and nocturnal. Have students determine why animals might choose different times of day to be active (see background information).

Use the furs, pictures and puppets to talk about the cool facts of each animal listed above and to show the camouflage coloration of the nocturnal animals. Flap the owl wing to show how the silent wing keeps it from being detected by their prey.

Use the skulls of the animals to discuss what helps these animals survive in the dark. The big eye sockets of nocturnal animals mean they have big eyes and better nocturnal eyesight. Use the giant owl eyes. Talk about how some nocturnal animals have eyes so large they have no muscles to move them, like owls.

Discuss how hearing is important for many nocturnal animals. For hearing, use the identifier and the large nocturnal ear cut outs so they can hear the sounds of the night. Or do “deer ears” have them listen to the calls normally, then cup their hands behind their ears and listen again. Their hands act like large ears (which many animals have) to help catch sound.

For sense of smell, bring the scent disks. Have the students smell the disk with a dry nose. Then have them wet down the end of their nose and smell again. Discuss that dogs have wet noses and this wetness helps them have a better sense of smell. Also consider that the air holds more moisture at night. See if they can tell the difference in smell intensity.

For younger students: Read a book about nocturnal animals and wrap up the program.

Evaluation:

Students will be evaluated on the discussion during the program.

Additional resources:

Extensions:

Related programs available at the National Mississippi River Museum & Aquarium:

Mississippi River Life

On the Right Track

Mammals of the Mississippi

Credits:

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