Creepy Crawly Creatures
Post Lesson

Audubon Center of the North Woods

Purpose: Why are amphibians and reptiles important for a balanced ecosystem? What is happening to these animals that is causing serious population decline? In this lesson, students will discuss the current status of amphibians and reptiles on our planet and understand why their population is decreasing.

Concepts:

- Amphibians and reptiles are well adapted to their habitat.
- Many amphibian and reptile populations are experiencing drastic declines.

Learning Outcomes: Students will be able to:

- Recognize the natural habitat of these animals.
- Develop environment awareness about endangered species.

Minnesota Academic Standards:

Science:

5.4.1.1.1 Describe how plant and animal structures and their functions provide an advantage for survival in a given natural system.

7.4.2.1.1 Identify a variety of populations and communities in an ecosystem and describe the relationships among the populations and communities in a stable ecosystem.

7.4.3.2.4 Recognize that extinction is a common event and it can occur when the environment changes and a population's ability to adapt is insufficient to allow its survival.

For Background Information see end of lesson

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CLASS LENGTH: 45-50 MIN

AGES: 4-8TH

SEASON: S, SP, SU

GROUP SIZE: 15-20

SAFETY: Students will use craft materials, so give clear guidelines about use of scissors. There is a game played outside, make sure you give them boundaries.

MATERIALS:

Salamander game**:** ropes or cones (or any material to mark boundaries) and chips (pinecones or anything that could be used as an analogy to food).

PRE-CLASS PREP: The teachers should draw a big diagram on the board (as shown in the end of the lesson) and have the two sets of cards organized.

CLASS OUTLINE:

I. Introduction: 5 min.
II. Class experience: 30 min.
III. Closing activity: 5 min.

I. Introduction (5-10 min.)

Lesson Preview – There is going to be an introduction, and then students will play a game outside. The wrap up is a discussion about how we can help to protect our amphibians and reptiles wildlife.

Grabber – Where can you find amphibians and reptiles? Introduction starts reviewing some main points about habitats and endangered species of amphibians and reptiles.

II. Class Experiences (30 min.)

A. Life of the Spotted Salamander (Vernal Pools file)

1. Now that the students know amphibians and reptiles need habitats to survive, tell them that they will be learning about the Spotted Salamander and their habitat.
2. Discuss the life of a Spotted Salamander with the class: They start off as eggs in the water. During the aquatic stage they have external gills. The gills shrink as they are metamorphosing into adults. When they are adults they leave the wetlands where they are born and go into the dark, dank forests to live under rocks and dead trees. The interesting fact about salamanders is that they return to the same wetland where they originated from to mate and lay their eggs. In the spring time usually late at night in the rain you will see them returning back into the wetlands to spawn and the salamander cycle of life continues.
3. Review with the students the life cycle and their habitats. Then, tell the students that they will be playing a game to show the life of the Salamander.

B. Salamander Crossing

1. Introduce the game Salamander Crossing that describes what Salamanders overcome during their lives and is about how they migrate to their breeding grounds. The kids have to overcome obstacles like cars and predators as they make their way to the vernal pools. The point of the game is to talk about life cycle of salamanders, but also the role of humans in the life cycle/ecology of salamanders.
2. Explain the rules: To play the game, kids will line up on one side of a field and mark it off with a rope. This is the "vernal pool" where they are spawning. They need to make it to the forest (the other side of the field marked off with a rope), grab a food chip and come back to the vernal pool to complete their life cycle. But, life is not that simple! They should run away from obstacles. First round should have only the road (two kids in the middle acting like cars who can tag people).
3. After playing one round, the teacher should ask for two volunteers to be "predators" of the salamanders (snakes, birds, raccoons...) and they tag the salamanders 'out' during their migration. Have the kids take notice of how many made it to the forest to get food and back to the vernal pool to spawn.
4. Play as many rounds as you want and add new factors like a "residential area", like removing part of the forest, restaurant that had a toxic spillage that ends up near the wetland and can tag out people. This way each round, it's harder for the salamanders to complete their life cycle and the students can see that animals have to not only compete against other wildlife to survive but they also have to struggle with us sometimes in order to survive.

III. Conclusion (15 min.)

Discuss how to save endangered amphibians and reptiles, building a list of ideas how to preserve wildlife. The list should include: habitat destruction (the biggest cause by far), water quality, pollution, and agricultural practice/pesticide use, introduction of exotic species, pathogens, and global environmental changes, among others.

IV. Authentic Assessment

Students will be evaluated through their participation in class. Did everybody play the game? How was student's behavior during the game? Let them share something that they learn with the game.

V. Extensions/Variations

1. Have students do research on one of the many herp species found in Minnesota. Are they endangered or threatened? If so, research why.
2. Create a brochure with the ideas created during the wrap up. An idea is to combine this activity with Arts class or Computer Lab time.

VI. Background Information

Spotted salamander (*Ambystoma maculatum)*

What do they look like?
Adult spotted salamanders are 15-25 cm in total length, and females tend to be larger than males. Compared to other salamanders, the body is stout with a broadly rounded snout. The sides of the head are often swollen at the back of the jaw. The legs are large and strong with four to five toes.
When they leave their ponds, spotted salamanders are black, dark brown, or dark grey on their backs, and the belly of these salamanders is a pale greyish-blue. The common name comes from two rows of yellow or orange spots which run from the head to the end of the tail. Spotted salamanders with no spots are sometimes found, but are very rare.
Spotted salamanders have poison glands in their skin, mostly on their backs and tails. These glands release a sticky white toxic liquid when the animal is threatened.
When baby spotted salamanders hatch, they have front legs (unlike frog tadpoles), frilly red gills on the sides of their neck, and their bodies are dull green on top and very pale, almost white, underneath. Their tail are green too, and have little dark specks or blotches on them.

What kind of habitat do they need?
Adult spotted salamanders live in forests, near ponds where they can lay their eggs. They are not often seen, because they spend most of their time hiding in dead leaves, under logs, or in tunnels under ground.
Spotted salamanders need to lay their eggs in freshwater ponds that don't have fish in them. Often these are small ponds that form when snow melts in the Spring but dry up in Autumn.
Aquatic Biomes: lakes and ponds; temporary pools.

How do they grow?
Spotted salamanders go through several stages over their lifetime. Female salamanders lay their eggs under water, and the larvae that hatch from the eggs are aquatic, with gills for taking oxygen from the water, weak legs and a broad tail for swimming. Larvae feed and grow in the water, and then metamorphose into an juvenile form with lungs and strong legs. Juveniles live on land, and after 2-3 years they mature into adults that can reproduce.
This species has relatively long incubation time in comparison to other salamanders. It takes 4-7 weeks for the eggs to hatch, depending both the temperature of the water they are in, and whether the eggs are laid in shady or sunny areas.
Spotted salamander larvae are 12-13 mm long when they hatch, with feathery gills and only their front legs present
Larvae grow quickly and transform within 2 to 4 months after hatching. Average size after metamorphosis ranges between 27 and 60 mm, depending on the conditions in the pond. The yellow and orange spots are usually acquired within a week following transformation.

How do they reproduce?
Spotted salamanders begin migration to breeding ponds at night, during the first rain following the thaw of snow. Males respond more quickly to the rain and move faster than do the females, therefore they arrive to the pool first. They also stay longer in the ponds than females do, probably to increase their chances of fertilizing more eggs each year. The number of males present in the breeding pools is greater than the number of females, so when the females arrive the males swim about vigorously, rubbing and nosing each other. Males produced blobs of sperm called spermatophores (up to 80 per male), and the females take these spermatophores into their bodies to fertilize their eggs. Each male may fertilize several females, and each female may take up spermatophores from several males.
Male spotted salamanders may compete with other males for the chance to fertilize females. They push other males away from females, produce as many spermatophores as they can, and sometimes cover other males' spermatophores with their own.

How often does reproduction occur?
Spotted salamanders breed once yearly. Females lay compact egg masses that are attached to submerged objects. The egg mass is covered with thick, clear or milky-white jelly. Each female lays approximately 100-300 or more eggs per year, in several separate masses.

Vernal pools: (vernal means spring) play a key but little understood role in our ecosystems. A vernal pool is a small seasonal body of water, sort of a temporary wetland. In our area, vernal pools typically form in depressions during the winter and spring and disappear by summer. They are usually fed by stormwater runoff or ground water and contain no fish. Vernal pools can be found in many locations such as woodlands, floodplains, and meadows.

Vernal pools are important because they provide a unique habitat for many species of amphibians, invertebrates and turtles. They typically dry up in the summer, so fish cannot live in these bodies of water. Without fish feeding on them,

many species can breed safely in these pools. Some species are called "obligates", which means they depend on the vernal pools for at least part of their life.

But these valuable, little understood bodies of water are vulnerable. Like wetlands, vernal pools are being threatened by development. Also, like swamps and bogs, vernal pools are viewed by many people as nuisances, areas that need to be "improved" and the depressions are frequently filled in or leveled out. Even if the vernal pools themselves are not disturbed, removing nearby trees or developing upland areas will impact vernal pools. That's no puddle - that's a valuable ecological habitat! Vernal pools can be found in many natural landscapes, not just in officially designated parks. Please educate your neighbors and protect the vernal pools in our neighborhoods.

Amphibians and reptiles from Minnesota

Salamanders of MN
Eastern Newt - *Notophthalmus viridescens*
Mudpuppy - *Necturus maculosus*
Redback Salamander - *Plethodon cinereus*
Four-toed Salamander - *Hemidactylium scutatum*
Tiger Salamander - *Ambystoma tigrinum*
Spotted Salamander - *Ambystoma maculatum*
Blue-spotted Salamander - *Ambystoma laterale*

Frogs, toads and treefrogs of MN
Spring Peeper - *Pseudacris crucifer*
Boreal Chorus Frog - *Pseudacris maculata*
Eastern Gray Treefrog - *Hyla versicolor*
Cope's Gray Treefrog - *Hyla chrysoscelis*
Northern Cricket Frog - *Acris crepitans*
Canadian Toad - *Bufo hemiophrys*
Great Plains Toad- *Bufo cognatus*
American Toad - *Bufo americanus*
Wood Frog - *Rana sylvatica*
Mink Frog - *Rana septentrionalis*
Northern Leopard Frog - *Rana pipiens*
Pickerel Frog - *Rana palustris*
Green Frog - *Rana clamitans*
Bullfrog - *Rana catesbeiana*

Turtles of MN
False Map Turtle - *Graptemys pseudogeographica*
Ouachita Map Turtle - *Graptemys ouachitensis*
Common Map Turtle - *Graptemys geographica*
Wood Turtle - *Glyptemys insculpta*
Blanding's Turtle - *Emydoidea blandingii*
Painted Turtle - *Chrysemys picta*
Spiny Softshell Turtle - *Apalone spinifera*
Smooth Softshell Turtle - *Apalone mutica*
Snapping Turtle - *Chelydra serpentina*

Lizards of MN
Prairie Skink - *Eumeces septentrionalis*
Five-lined Skink - *Eumeces fasciatus*
Six-lined Racerunner - *Cnemidophorus sexlineatus*

Snakes of MN
Massasauga - *Sistrurus catenatus* (Venomous)
Timber Rattlesnake - *Crotalus horridus* (Venomous)
Lined Snake - *Tropidoclonion lineatum*
Eastern Garter Snake - *Thamnophis sirtalis*
Plains Garter Snake - *Thamnophis radix*
Redbelly Snake - *Storeria occipitomaculata*
Brown Snake - *Storeria dekayi*

Gopher Snake (Bullsnake) - *Pituophis catenifer*
Western Fox Snake - *Elaphe vulpina*
Rat Snake - *Elaphe obsoleta*
Smooth Green Snake - *Opheodrys vernalis*
Northern Water Snake - *Nerodia sipedon*
Milk Snake - *Lampropeltis triangulum*
Eastern Hognose Snake - *Heterodon platirhinos*
Western Hognose Snake - *Heterodon nasicus*
Ringneck Snake - *Diadophis punctatus*
Racer - *Coluber constrictor*

References

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