



# Passive Defense in Prey Species

**Grade Level:**

6-8

**Subject:**

Life Science

**Duration:**

45 minutes for lesson, 30 minutes for activity, 1+ class periods for presentations

**Setting:**

Classroom

**Skills:**

Text

**Vocabulary:**

aposematism, predator, prey, predation, toxin

**Lesson By:**

Jeff Hankey

**Summary:**

Students learn about passive modes of defense of prey species. Passive modes include protective shells turtles, camouflage, and aposematic coloring. Some harmless species (Northern Red Salamander) may mimic truly hazardous species (E. Spotted Newt eft) to help in their own defense. Students can design their own species which uses passive defense and present their species to the class. To be used in conjunction with lesson on active modes of defense in prey species.

**Objective:**

- Students will be able to list three methods of passive defense in prey species
- Students will understand the role of passive defense in predatory species (species which may also be prey to larger species – box turtles for example)
- Students will be able to differentiate between active and passive modes of defense in prey species (if lesson is taught after the lesson on active modes of defense)

**Materials:**

- Photos or specimens of Eastern Spotted Newt, Northern Red Salamander, Green Salamander, and Eastern Box Turtle (any turtle will do)
- Photos of species who may prey upon the above species
- Scissors, colored paper, markers, tape, etc.

**Background:**

The Eastern Spotted Newt, as a juvenile (eft), is a slow moving and seemingly harmless amphibian that secretes a mild toxin that is lethal to reptiles, other amphibians, and small mammals that may prey upon the

newt. This toxin is actually very similar to some of the toxins secreted by the poison arrow frogs of South America. Because it produces poison, the newt is defenseless right up until the point where it is actually eaten by a predator. For the whole species, this defense is beneficial because predators usually associate this species as a non-prey item. For the individual newt, however, this does no good because the newt itself must be consumed for the poison to take effect. To avoid this, the newt uses aposematic coloration to persuade predators to leave it alone. Aposematic coloring is usually the result of bright color or bold patterns on the skin, fur, or feathers of the individual. These bright colors, also used by poison dart frogs, is usually enough of a deterrent to potential predators that the prey species is left alone. Other, harmless, species that live in the same geographic area may take advantage of similar coloration. For example, the Red Salamander is found in the same geographic area as the newt mentioned above. The salamander displays a bright red coloration and bold black dots throughout its entire life (whereas the newt loses its brightest coloration as it turns into a harmless, aquatic adult). This may be an evolutionary advantage to the red salamander, because as a result of its coloration, the red salamander isn't as frequently preyed upon as its less brightly colored neighbors.

Other forms of passive defense are probably already known by the students. Students should be able to identify the purpose of a turtle's shell, for example, or the role of camouflage in certain species. An example of a lesser-known Pennsylvania amphibian that displays excellent camouflage is the Green Salamander. Its green speckled pattern highly resembles the lichen that grows in the rocky areas it inhabits.

One potential problem with aposematic coloring is that the bright colors can do more harm than good because it makes the animal stand out more than it otherwise would. This can make the animal more apparent to predators that may be either too big to be affected by the toxin or immune to the effects of the toxin. Another, more common occurrence in the case of the Eastern Newt is that the newt's coloration makes it more visible and desirable to young children who may pick it up and take it home. More often than not, this results in the death of the newt due to improper care or introduced disease.

**Preparation:**

Once materials are gathered, preparation is minimal as long as the content is understood.

**Conclusion:**

**Assessments**

Standard test can apply here, but students can also be graded on their creativity and presentation of data about their fictional animal that they create.

**Resources:**

"Reptiles and Amphibians of Pennsylvania and the Northeast" by Hulse, et. al

**Notes:**