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# On the Defensive

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## Purpose:

Students will learn that different species have different adaptations that help them defend against predators.

## Objectives:

Students will identify specific defenses in which reptiles and amphibians have developed to escape predation.

**Time Required:** 30-45 minutes

**Appropriate grades:** 3rd-5th

**NGSS and Common Core Standards:**

4-LS1-1; 3-LS4-4; 3-LS4-3

## Materials:

- Laminated pictures of various native herps (15) with yarn necklace
- Laminated words of different defenses (15)
- Turtle shell and other examples of defenses

## Background Information:

Reptiles and amphibians (“herptiles” or “herps”) escape predation through various mechanisms. There are defenses that are visible on the surface, such as aposematic coloring, and defenses that aren’t necessarily visible, such as toxins.

First, many herptiles have very distinct coloring. There are 2 categories in this activity that coloring is classified in: cryptic and aposematic. Cryptic coloring encompasses concealing coloration **camouflage** and disruptive coloring. If a herptile has concealing coloring, it is most likely *a gray, green, or brown color* to help it blend in with its surroundings. Counter-shading also helps species that spend time in the water. By having a light underside, predators below will think it is the sky. By having a darker backside, predators from above will not see it in the water. **Disruptive coloration** is any kind of spot, stripe, blotch, spike, etc. that helps to *break up the outline* of the species’ body against its environment. For example, the “X” shape on the spring peeper’s back helps to disguise the frog. Some species’ coloring provides a warning sign to their predators, which we call **aposematic coloring**. *Bright colors* signal that the particular species is poisonous.

Another defense mechanism is toxins. In herptiles, this comes in two products, venom and poison. **Venom** is a *toxic substance that is injected*, while **poison** is *toxic when touched or eaten*. Snakes

inject venom (only 450 species are venomous!) through enlarged teeth, fangs, via special glands.

Poisonous species have glands on their bodies that secrete toxic substances.

Along the same lines, there are many nontoxic species that will use **mimicry** to *look like toxic relatives*. These species will avoid predation by association. The predator will see similar colors, patterns, spots, etc. in the nontoxic species and avoid eating it based on previous knowledge.

Some species have innate threatening **behaviors** to help protect them from predation. Rattlesnakes are great example of this. This species will shake the rattle at the end of their body as a warning to any species around them when threatened. If you ever hear this, RUN! Also, snapping turtles are aggressive & will snap their jaws when threatened.

A **modified body structure** is another way that herptiles defend themselves against predators. A classic example is the turtle shell. The shell provides protection to the animal through its hardness and the facility for the species to escape a predator by pulling its appendages inside. Another example is the horned lizard, which is covered in horns. This not only protects the reptile by puncturing the predator, but it also helps in camouflage. Additionally, some lizard species are able to detach their tail to escape from a predator. Eventually, the lizard is able to regenerate a new tail (though it is not the same as the original). Although it is taxing on the lizard, it is better than the alternative! There is even one species of lizard that will squirt “foul tasting” blood at its predator. The Texas Horned Lizard “spits” its blood from a gland behind its eye at its predator in hopes of causing distraction.

## Activity:

<b>Introduction</b>	<ol style="list-style-type: none"><li>1. At the start of class show the students examples of herptiles with adaptations for defense. Show pictures/ examples that are different from the pictures in the game, such as the turtle shell (located in the kit).</li><li>2. Ask students, “What types of defenses do reptiles and amphibians have?” As the students come up with examples, keep a list on the board.</li><li>3. Once they have listed them all (or run out of defenses), introduce the ones that will be addressed in this activity that are outlined in the background information (camouflage, aposematic coloring, mimicry, etc.).</li></ol>
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	<p>4. Show them the turtle shell as an example of defense. Discuss how this modified body structure helps to protect the turtle that hides inside. Take a look at the Turtle Shell facts to explain more cool things about turtles and their shells.</p>
<b>Body</b>	<ol style="list-style-type: none"> <li>1. Hand out name tags, one per student. Make sure half of the students have species and half of the students have defensives.</li> <li>2. Give the students 5- 10 minutes to find their match. Students will have to try to match up with another student who has the corresponding defense for their species or vice versa</li> <li>3. Students will present to the class what species they are and what defense matched up with their species</li> <li>4. Pairs of students will have to act out what their defense would look like as the teacher, who is acting as the predator, comes up to them.</li> <li>5. Continue presenting until all partners of students have a chance to act out what their defense is.</li> </ol>
<b>Closure</b>	<ol style="list-style-type: none"> <li>1. Come back as a class to discuss what students saw. Did any animals have the same or very similar defenses? How did these similar defenses help different animals survive? Could an animal have 2 types of defenses?</li> </ol>

## Modifications:

- **Elementary:** Use the “On the Defensive” Worksheet Assignment in the teacher binder as a quick way to discuss defensive adaptations. Students can also create skits to present one of the specific defense mechanisms to the rest of the class.
- **Middle School/High School:** Students can perform this same activity, and with groups will choose one specific herptile that they will be making a proposal to protect, which will include sharing about its unique defenses and adaptations for survival, importance within the ecosystem, current challenges to survival, and a proposed management plan. The class will at the end vote which species that they will protect.



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