

3rd Grade: Don't Forget a Towel

Course Description: For any particular environment, some organisms survive well, some survive less well, and some cannot survive at all. Some plants and animal species have been around for a long time and have adaptations that have helped them to survive many harsh environments or time periods. We will discuss the importance of variation and inheritance in the adaptive evolution that occurred in many species. We will discuss some of the interesting survival techniques that are exhibited by both plants and animals for survival.



Day 1: For the first day we will introduce students to the idea of adaptation and how both plants and animals have adapted different ways to survive life in a myriad of harsh environments. We will start by talking about how some animals have evolved seasonal behaviors to help them survive. The ability for an animal to hibernate or to migrate are amazing adaptations that have allowed animals to survive a winter season or a dry season where they might have otherwise died. We will talk about some of the amazing migrations exhibited by butterflies and dragonflies during winter and some of the animals that hibernate or enter a state of diapause during seasons with inclement weather. There

are even physiological and anatomical adaptations such as the development of a waxy coating on an insect to survive arid conditions. Plants have also adapted to different environments, for example there are many trees that lose all of their leaves over the winters as a means of conserving energy during a time when there is very little sunlight.

Demonstration: *To demonstrate how these sorts of behavioral adaptations can help an organism survive harsh conditions we will have students play a game where they must build a den in which an animal could live. Students will be assigned a particular animal and a harsh environment that they must survive and they will have to design a den for the animal and explain why they designed it the way that they did.*

Day 2: Last week we talked about adaptations and how plants and animals change to survive in an environment. This week we are going to talk about some of the criteria for the adaptations to occur. We will begin by talking about the existence of variation on which a particular selection pressure would be working. If all animals were completely identical then there would be no way for some to be more successful than others and no way for them to adapt. Luckily it is very unusual for all of the individuals in a species to be completely identical. In addition to variation, the particular trait that makes an individual successfully able to survive hard environments is only useful to the species if that trait can be inherited by the next generation. In the absence of heritable traits then the trait, no matter how useful, would never become affixed in a population.

Demonstration: *In order to stress the importance of variation and inheritance we will have students play the Beetle Game. In the Beetle Game the students will be given different backgrounds upon which to strew small colorful beetles. Students will then play the role of*



predator and select different beetles to 'eat' based on their color. Over the course of several rounds the students will observe that the beetle with the best camouflage (coloration that best blends in with their environment) will be the most likely to survive. To show what happens in the absence of variation the same game will be played, but this time each group will receive beetles in only one color. No matter how many rounds the students play there will never be any evolution, as there can never be a change. After playing the game in this way we will play it in such a way as to show the importance of inheritance – where the lack of heritability also fails to result in any sort of adaptive evolution.