



## 3rd Grade: The Circle of Life

**Course Description:** In this module we will learn about how arthropods all have an exoskeleton that they must molt in order to grow, how to identify whether an animal is an insect, the different kinds of insect life cycles, and we will look at the importance of biodiversity.

**Day 1:** Arthropods are a group of animals that have a hard external exoskeleton instead of an internal bone skeleton like humans. We will look at the four main groups of arthropods this week and compare and contrast the similarities and differences we see between the groups. All arthropods have something else in common – they all must go through the process of molting several times in their lives, as it is the only way that they are able to grow. To molt the arthropod splits open and crawls out of the exoskeleton. Slowly a new exoskeleton that was forming beneath the old one will harden but not before the arthropod is able to increase in size first.

**Demonstration:** We will look at some representative arthropods from each of the four main groups – the Hexapoda, Myriapoda, Chelicerata, and Crustacea. We will compare the numbers of body parts and legs they all have. We will also observe some molts from other arthropods that have already molted, so that we can allow the students to see what the exoskeleton looks like from the inside. Lastly, we will play a short molting activity to give students a better idea of what it looks like when an arthropod goes through this process.

**Day 2:** We will have a discussion about the insect body plan and how the different parts (the head, thorax, and abdomen) perform vastly different functions. We will observe representative insects as well as demonstrative arthropods from the three other extant arthropod subphyla, so that students can learn to differentiate between members of each subphylum. We will look at insects that live on land and insects that live in the water and discuss differences between the two groups.

**Demonstration:** Students will have the opportunity to create a bug out of playdoh that has all of the criteria that are required to be an insect. We will talk about the environment in which an animal can be found and give students the opportunity to build their insect so that it will survive well in the assigned environment. They will then be assigned new environments and the student will have to tell us if their insect would fare as well in the new environment as the original one.

**Day 3:** This week we will start with the first of two classes looking at metamorphosis. Metamorphosis literally means to change form and there are two different types that insects exhibit. This week we will look at the first type of metamorphosis – incomplete metamorphosis. In contrast to how a butterfly goes through huge changes in how they look as they go through metamorphosis, insects that go through incomplete metamorphosis make many small changes and only ever look a bit different from the previous stage. The insect hatches from an egg and looks like a tiny adult immediately and then will grow and grow and grow until it reaches adulthood.

**Demonstration:** We will look at some examples of insects that go through incomplete metamorphosis and discuss whether students know of any additional animals that go through this particular type. Students will play the Miracle Grow Game to develop an understanding of



*incomplete metamorphosis – the student who goes through all of their juvenile / nymph stages the fastest and gets to their adult stage the fastest will win.*

**Day 4:** This week we will look at the second type of metamorphosis – complete metamorphosis. Last week we started to learn about a process called metamorphosis. Specifically, we talked about incomplete metamorphosis. Now that we have an understanding of it, we are going to move forward and start talking about the other type of metamorphosis. Complete metamorphosis is a type of insect development that is more complex than incomplete metamorphosis. During complete metamorphosis there are more stages in the life cycle which include drastic changes in appearance before reaching the adult stage. The stages are the egg, larva, pupa, and the adult stage. Butterflies are not the only insects that go through complete metamorphosis – so do flies, beetles, bees, ants, mosquitoes, and more.

**Demonstration:** *We will look at some examples of insects that go through complete metamorphosis and discuss whether students know of any additional animals that go through this particular type. We will bring in all life stages for a species of butterfly so that the students can see it in real life. Lastly, we will play a Life Stage Matchup game to see how well they can guess what the larval stage of several different insect species looks like.*

**Day 5:** This week we will talk to students about biodiversity. There are more insects than all other animal groups combined living on the planet. Although they do make a majority of animals, there are also lots of other organisms as well as a lot of plants, fungi, and microorganisms that share the planet. All of these organisms live together and interact with each other in different ways and play different roles in their environment. Discuss how they can fit together in complicated food webs with different organisms filling the role of producer, herbivore, carnivore, omnivore, and decomposer.

**Demonstration:** *We will bring in an assortment of living insects, plants, and fungi and then tell the students about the diet of each of these organisms. The students will work together to determine the most likely food web that would exist for that particular group. Then we will remove one of the animals that is critical to the food web and discuss how the relationship between the animals will be affected and how an increase in biodiversity, where there is more than one species filling a niche, makes for a stronger, and more resilient ecosystem.*

**Day 6:** On our last day of class, we will look at different environments and which species live within those habitats. For example, many desert species have adapted well to the hot dry conditions due to their rough dry skin. They have also adapted to not need water as frequently and to survive well in their environment. We will discuss different environments – rainforest, desert, arctic, ocean, arboreal, fresh water, mountains, forest, and wetland, and give examples of the types of adaptations that are present in animals in each of those habitats.

**Demonstration:** *We will bring in an assortment of animals so that students are able to observe some of the adaptations for specific habitats. They will have to determine the habitat from which those critters came based on how they look. The students are then going to create their own original animal to fit into an assigned habitat – rainforest, desert, arctic, ocean, arboreal, freshwater, mountains, forest, and wetlands. Students will also be assigned additional characteristics that must be considered when designing the animal, like if it is a predator, if it is*



nocturnal, if it is an herbivore. Students should consider what sorts of adaptations their imaginary animal might need to survive in that particular environment and why. They will form small groups that were assigned the same environment and compare and contrast the similarities and differences between the critters they created.