Lesson 3
Life Cycles of Insects
Hi, boys and girls. It’s time to meet one of the most fascinating insects on the planet. That’s me. I’m a praying mantis, named for the way I hold my two front legs together as though I am praying. I might look like I am praying, but my incredibly fast front legs are designed to grab my food in the blink of an eye!
I’m here to talk to you about the life stages of insects—how insects develop from birth to adult. Many insects undergo a complete change in shape and appearance. I’m sure that you are already familiar with how a caterpillar changes into a butterfly. The name of the process in which a caterpillar changes, or morphs, into a butterfly is called metamorphosis.
Insects like the butterfly pass through four stages in their life cycles: egg, larva [LAR-vah], pupa, and adult. Each stage looks completely different from the next. The young never resemble, or look like, their parents and almost always eat something entirely different.
The female insect lays her eggs on a host plant. When the eggs hatch, the larvae [LAR-vee] that emerge look like worms. Different names are given to different insects in this worm-like stage, and for the butterfly, the larva state is called a caterpillar.
Fly larvae are called maggots; beetle larvae are called grubs; and the larvae of butterflies and moths, as you just heard, are called caterpillars. Larvae feed and grow as quickly as they can.
Insect larvae: maggot, grub and caterpillar

They also molt, or shed their hard exoskeletons, many times as they grow, because the exoskeletons don’t grow with them. In this way, insect larvae grow larger each time they molt, until they are ready to change into adult insects.
Once the larvae have eaten all that they can eat, they take a break. Sometimes people call this next stage a resting stage, but the larvae are hardly resting. A larva often spins a cocoon to protect itself during the pupa stage when it will remain quite still for several weeks.
Inside this shell-like covering, the pupa transforms, or changes, into something that looks altogether different than before. Some insects have a soft cocoon for the pupa stage, and some, like the butterfly, have a harder case called a chrysalis.
If you have ever seen a butterfly emerge from its chrysalis, you know how extraordinary it is to watch the first flutter of its fully developed butterfly wings. Its wings were completely invisible before it disappeared into its seemingly magic chrysalis.
It looks nothing like it did at any of its earlier stages. Scientists call this progression, through four separate stages, a complete metamorphosis. I can't argue with that, can you? The change is indeed complete. Butterflies, moths, beetles, and flies all undergo a complete metamorphosis.
Life cycle of praying mantis: egg case, nymphs emerging, older nymph, adult 3A-6

Not all insects change so completely. Some insects' young, like mine, are miniature, or very small, models of their parents after hatching. They do change, so they do experience a metamorphosis, but because it is not a complete change, scientists call it an incomplete metamorphosis.
Life cycle of praying mantis: egg case, nymphs emerging, older nymph, adult 3A-6

Just like you, the young start off as a smaller version of what they will end up being. Just as you started off as a baby person and are slowly growing into an adult person, some young insects slowly grow and change into an adult.
A praying mantis goes through three life stages: egg, nymph, and adult. In the autumn, the female mantis lays as many as 400 eggs inside an egg case, attached to a plant. In spring, the eggs hatch. The tiny praying mantis babies emerge from the egg case. These brand-new hatchlings, or nymphs, don’t quite look like me, do they? A little later, the nymph resembles me more—the only thing it is missing is its wings. Even though you can’t see them yet, there are tiny developing wing buds. These nymphs eat the same sorts of food as I do as an adult praying mantis—flies, aphids, moths, and other insects—just smaller.

Let’s take a close look at one of these nymphs.
Can you tell at this stage that it is an insect? Can you find its head? How many legs are on its thorax? Can you see how many pairs of wings it has? Is there a third section as well? What’s that called?
What is the outside skeleton of an insect called? Right—an exoskeleton. The baby insect, or nymph, is born with an exoskeleton, but these hard, nonliving coverings do not grow with the growing praying mantis nymph. As a nymph grows, its exoskeleton splits open.
The nymph wriggles out to reveal softer skin that can stretch and expand before it hardens. It molts its exoskeleton again and again, growing a new one as many as ten times before it reaches adulthood. The nymph stage often lasts all summer long. After its final molt, each surviving praying mantis has a fully developed exoskeleton and full-grown wings like mine. Grasshoppers, crickets, and cockroaches belong to the group of insects that experience an incomplete metamorphosis similar to this one.
An insect’s life cycle is quite short compared to yours. In some cases, it takes only a few weeks. Scientists believe that this is one reason there are so many insects on the planet. They are forever breeding and need to reproduce rapidly because they have so many enemies.

Not all insects, however, have short life cycles.
The cicada looks a little like a grasshopper and is thought to have the longest life cycle of any insect, ranging from two to seventeen years. The adult cicada lays her eggs on twigs. When the eggs hatch, the nymphs fall to the ground and burrow into the soil, searching for tree roots. They feed on the tree's sweet root sap. Cicadas undergo incomplete metamorphosis, so there is no pupal stage.
The nymphs remain hidden beneath the ground, continuing to shed their exoskeletons. Once they are fully grown, they make their way to the surface again, shed their skin one last time, and emerge as winged adults. For some reason, all of the cicadas in an area emerge at once either every thirteen years or every seventeen years.
When the cicadas all emerge, they fly everywhere, and their calls are very loud. When hundreds of flying insects swarm through the air, their loud buzzing noises and the snapping of their wings make quite a loud noise!
Next time, you will meet some other flying insects that may also travel in swarms. Can anyone guess what insects they might be? I’ll give you a clue: Bzzzzzzzz....