Lesson Title and Summary

**It’s a Bug’s Life**

Review and learn basic insect anatomy and life cycles

**Learning Goals**

To learn about metamorphosis by understanding the life cycles of 3 insects and their food source: Ladybug, Bumblebee and Praying Mantis.

**Grade Level**

Second and third grade students

**Lesson Time Needed**

40 minutes. Encourage students to share as time allows.

**Supplies, Space, Personnel**

3 laminated posters with corresponding laminated life cycle cards for ladybug, bumblebee and praying mantis life cycles (provided in kit). Set up 3 posters with only the Adult laminated velcro card on each corresponding poster ahead of time. Have the other cards grouped by insect. Multi-colored chenille stems for “create and name your own insect” activity (3 per student). “Are you a ladybug?” by Judy Allen (read book or watch video on Youtube).

Lesson can be taught indoors or outdoors.

**Vocabulary**

<table>
<thead>
<tr>
<th>Insect</th>
<th>Egg</th>
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<tbody>
<tr>
<td>Head</td>
<td>Larvae</td>
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<tr>
<td>Thorax</td>
<td>Pupa</td>
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<tr>
<td>Abdomen</td>
<td>Adult</td>
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<tr>
<td>Exoskeleton</td>
<td>Molts</td>
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<tr>
<td>Metamorphosis</td>
<td>Beneficial</td>
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</tbody>
</table>

**Lesson**

1. **Engage the Students** (time) 5 minutes.
   - Does anyone like insects?
   - Does anyone here have a favorite insect? (students can share)
   - What makes an insect an insect? An insect has a body with 3 parts (head, thorax and abdomen), 6 legs, 1 pair of antennae, usually has wings and they also hatch from eggs.
   - Who knows what metamorphosis means? Let’s talk about it. (encourage students to share) It’s the process of change from an immature form to an adult in 2 or more distinct stages.

2. **Lesson** (time) 20 minutes.
* (Have ready the 3 laminated poster boards with only the adult cycle card attached to each poster. ladybug, bumble bee, praying mantis)
* There is a well known insect that is a favorite of gardeners and farmers. It is called the Ladybug. (show adult ladybug on poster)
* Why do you think it’s a favorite in the garden? It loves to eat soft bodied insects such as aphids, white flies, spider mites and scale insects that damages our gardens and food crops. We want to see ladybugs in our gardens because they help our gardens stay healthy and productive.

* (Show the egg stage life cycle cards and ask the class to select which card is the egg photo of the ladybug. Help the class if needed and ask a volunteer to take the card and place it on the ladybug poster.) The adult ladybug will lay masses of eggs on a leaf (tiny, yellow and elongated). The eggs hatch in 3-7 days. The egg hatches into the larvae.

  (Ask the class and a volunteer to select and place the card for ladybug larvae). The 6-legged larvae eats and molts (sheds it’s skin) many times as it grows over 2-4 weeks. The larvae attaches itself to a leaf and splits open with the pupa inside.

  (Ask the class and a volunteer to select and place the pupa card on the poster.) It is wrapped up, protecting the ladybug as it changes to the adult stage.
* (Show the adult card) The adult ladybug emerges from the pupa, the female lays it’s eggs and the cycle begins again.

*Fun Ladybug facts*- ladybug spots fade as they age.
*There are about 5,000 species of ladybugs in the world.
*The wings are covered by a pair of modified wings called elytra that open up when they fly.
*They have an exoskeleton made of chitin which is a protein similar to hair and nails.

* Our second insect is an excellent pollinator called the Bumblebee. (Show adult photo on poster). They are hairy and robust winged insects, yellow and black in color with a distinct buzz. Does anyone know what makes the buzzing sound? The wings move rapidly at 130-240 beats per second and the buzzing sound is made from the wings flapping together. Bumblebees have a tongue used to suck up nectar that gives them energy to fly. The female bumblebee has combs and brushes on its legs to help them collect pollen from flowering plants.

* (Show the bumblebee poster with the adult card on it.) The queen is twice as large as female workers and male drones. An overwintered queen emerges in May from hibernation under loose bark or other protected places. The busy queen is seen feeding on spring flowers establishing the colony nest site and makes “bee bread” (pollen moistened with nectar). She collects pollen and forms it into a small lump. She lays 6-8 worker eggs on it.
* (Ask the class and a volunteer to place egg card on bumblebee poster.) After 4-5 days the eggs hatch into larvae which feed on the pollen.
* (Have another volunteer place larvae card on poster.) It takes about 21 days to develop from egg to adult.
* (Show adult card) The female workers take over the colony duties except egg laying. They defend the colony, collect pollen and nectar and feed new larvae. The colony produces new queens and males in late summer as the mated queens prepare to hibernate in the winter and emerge in the spring to begin a new colony. Colonies last one summer as the remaining bumblebees die over the winter.

* **Fun Bumblebee Facts**
  * A bumblebee has 4 wings, the 2 two rear wings are attached by a row of hooks called harmful.
  * Only queens and female workers have stingers and they can sting more than once.

* Our third insect is the sit and wait hunter called the **Praying Mantis**.
* (Show adult photo on poster) Have you ever seen one? (Encourage sharing)
* The praying mantis is one of the hardest insects to find in the garden. Does anyone know why? Because they have excellent camouflage resembling sticks and leaves and are green to brown in color.
* Does anyone know why they are called praying mantis? They hold their front legs together as if in prayer while looking for a potential meal.
* Does anyone know what they eat? They eat beetles, flies, grasshoppers and caterpillars. They eat spiders and bees and also each other because they are cannibalistic. The good news is they don’t bite humans!

* Praying mantis have a triangular head with large eyes, long, slender bodies and arms modified to tightly grasp prey. Adults have wings are between 2 to 4 inches long and eat with strong, chewing mandibles.

* (Ask volunteer to place egg photo on poster) The female deposits their eggs in a mass of foam in the Fall that hardens into a egg case, called an Ootheca that contains up to 400 eggs. They have one generation per year and hatch in the Spring as nymphs without wings and molt several times before reaching adulthood with wings
* (Volunteer can place nymph card on poster).

* **Fun Praying Mantis Facts**
  * Praying mantis can look over their shoulder and turn it’s head more than 180 degrees.
  * There are 2000 species in the world in various colors and interesting bodies.
  * They can see movement up to 60 feet away.

** Read the book “Are you a Ladybug?” by Judy Allen
• **Benefical insects vs. pests** - All of the insects that we discussed today, the Ladybug, Bumblebee and Praying Mantis, are helpful in the garden. 98 of every 100 insects are beneficial in our gardens and in growing food crops. Only 1 or 2 insects in 100 insects are pests, they eat our food crops.

**So when you see an insect, what should you do?** Leave it alone so it can do its job!

3. **Review** (time) 5 minutes.

*What do all 3 insects have in common?*

*What are differences in our 3 insects?*

*Why is it important to know an insects life cycle? If we know an insects life cycle, we can protect them and they will help our gardens be healthy and productive.*

Let the children know that their family can rent a garden raised bed for growing their own produce.

4. **Activity** (time) 10 minutes. Pass out 3 chenille stems for each student to “create and name own insect” Have discussion with students during activity about design and reviewing insect body parts. Extra time- Students can share their insect with class. (If chenille stems are not available, children can draw a picture of their insect. Instruct them to draw a big insect, fill the entire page.)

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**Adaptations for other ages/grade levels**

Other lessons developed for the Garden Discovery program are for grades K-1 and 4-5.

**Follow-up Activities (optional)**

Lesson developed by WSU Clark County Master Gardeners  
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