

EarthWorks Orchard Curriculum

Insects: Pollinator, Predator, Pest and Parasite

Grade(s): 2-5	Topics: Insects, Flowers, Pollination, Plant Life Cycle, Hands-On Stewardship	Seasons: Late Spring or Early Fall when there are flowers outside
Timing: 50 minutes, including 5 minute RPK, 10 minute insect introduction, 15 minute indoor insect skit, 15 minute outdoor insect observation, and 5 minute conclusion		
Objectives: <ul style="list-style-type: none">• Students are able to identify the three segments of insect bodies: the head, thorax, and abdomen. They are able to list and recognize other defining characteristics• Students further develop an understanding of the interdependence of insects and orchard trees and plants, learning about four roles insects play in the orchard: Pollinator, Pest, Predator and Parasite.• Students can explain that many insects play more than one role at different points in their life cycles. For example, a caterpillar is a pest, but a butterfly is a pollinator.• Students become familiar with the idea of multiple living things work together to maintain a balance that keeps ecosystems healthy.		
Materials: <ul style="list-style-type: none">• Poster or diagram of an insect with body parts labeled• Words written down to insect song• Pictures of insects• Signs for students to wear showing skit roles, preferably with string to go over their heads (students can work on signs and props beforehand if desired – see below for roles)• Field guide to common insects (optional)• Magnifying glasses and/or boxes for outdoor observation		
Prep Needed: <ul style="list-style-type: none">• Prepare signs for each character in 4Ps skit – one tree, one ladybug (predator), one parasite (wasp), two pests (aphid), and at least one pollinator (butterfly). Also make a couple of large eggs for the parasitic wasp to “lay”• Look for aphids or other pests on outdoor plants, ladybugs, pollinators, and wasps or other parasites in order to guide students to best sections of the orchard for observation.		
Degree of need for extra teacher or parent helper? Medium		
Journal Prompt: Do you think insects are good, bad, or that it depends? Use examples of specific insects you know to support your answer.		
Lesson Sequence: Reactive Prior Knowledge (5 minutes) Pass around a leaf with aphids on it or other damage from a garden pest. Ask students what they think might have happened to the leaf and who the culprit might have been. Was the insect eating the leaf bad? According to whom? Introduction to Insects and the Insect Song (10 minutes) Draw or hang up a diagram of an insect. Make sure you go over all of the body parts in the insect song (below). Show your students some pictures of insects. Some key points: <ul style="list-style-type: none">• All insects have 6 legs.• Insects can have 0, 2, or 4 wings.• All have a head, thorax, abdomen, antennae, and eyes.• All have an exoskeleton.		

Ask your students if they know the song “Head, Shoulders, Knees and Toes.” See if they can sing it quickly once. Tell them that they are going to sing the song as if they were an insect. Let them spend a second imagining what body parts they have. Encourage them to look at the diagram. Put up the diagram with the lyrics and sing the song once for them slowly. Ask them to join in and sing it once. Add hand motions (point to your head and waist, and then shake your hips for “ab-do-men” – they love this!) and see how fast they can do it.

Words for the Insect Song (sang to “Head, Shoulders, Knees, and Toes”):

“Head thorax abdomen - abdomen.

Head thorax abdomen - abdomen.

Eyes, antennae, exoskeleton, (6 legs!)

Head thorax abdomen – abdomen!”

Have all the children sing along. Sing the song 2 or 3 times.

4 Ps Introduction and Skit (20 minutes)

Introduction to the 4Ps:

Now that the students know what more about insects, explain that there are 4 types of insects in the school orchard: predators, parasites, prey, and pollinators. Spend a moment explaining what each one does (see if students know the roles), and explain that as a class they are going to act out what these different insects do.

Pests are animals that can harm the tree. Can the children think of things that insects could do to hurt a tree? Examples – eat leaves, burrow into bark. There is one kind of pest we often see in the garden. Aphids. Aphids are similar to vampires, in that they suck out the fluid from plants. “If aphids suck out the water from a tree’s leaves, what do you think could happen to the tree?” It would take a lot of pests to kill a tree, but it can happen. (Talk kids through the possibility that if a plant is already weak from a few aphids, it possible for the aphids to reproduce more easily and take more and more from the tree)

Animals that hunt and eat other animals are called *predators*. In the orchard, insect predators eat many insect pests. They can also eat pollinators and other insects. One predator we see often in the orchard is the ladybug. Ladybugs eat aphids and other pests. One ladybug may eat up to 100 aphids in a day. Other examples: Praying mantis, green lacewing.

Parasites are insects that lay their eggs on/in the bodies of other insects. When the eggs hatch, the larvae (baby insects) eat the host insect. Show the class the parasitic wasp inserting its egg into the aphid on another leaf. Explain how parasites feed off of hosts. In this case, the wasp immobilizes the host-aphid by stinging it (but not killing it). Then it inserts its egg into the belly of the aphid. As the baby wasp egg grows into its larval stage, it will feed off of the aphid’s insides until the larva grows so big it bursts open the aphid’s guts, and emerges into the outside world (obviously killing the aphid once and for all).

Pollinators are insects that visit flowers to get food. What food do insects get from flowers? Nectar! Pollinators absolutely need this food. When the insects go to flower to flower they also carry pollen, which helps the flowers make seeds.

Skit:

Pick six students to play a part in the skit and explain that everyone will be a part of the skit by making it melodramatic and cheering, booing, etc. One child will play the part of the tree and the others will play the roles of the insects. Give each student their sign/costume and briefly describe to them their roles. Students act out (w/ costume): parasite (wasp), predator (lady bug), pollinator (bee or butterfly), and 2 pests (aphids).

Narration:

“Here is a fruit tree growing in the _____ school orchard. It’s healthy and has big beautiful leaves. (Audience: ooh, aaah.) The leaves are so big and green that 2 aphids see it and come over. Aphids are pests, they eat plants. They suck the juices out of the leaf (like vampires). (Aphids make slurping noises, tree sags. Audience boos.) A parasite flies over. Parasites feed off other live insects. This parasite, a wasp, lays an egg on the pest. (Audience says: “uh oh.” Parasite sticks egg onto 1 aphid.) The egg hatches and the baby wasp begins to eat the aphid. The pest dies. Only one pest is left. A predator (ladybug) flies over, sees the aphid, and eats it. (Audience cheers.) Now the tree feels better; its leaves aren’t being eaten by pests. Pollinators fly over and pollinate the flowers on the tree, and the tree begins to grow beautiful fruit.” (audience cheers)

Outdoor Observation of the 4Ps (15 minutes)

Once you take your class outside, look for signs of pest predation on orchard trees and plants. Once aphids have started infesting a plant, the leaves take on a limp, sticky appearance. You will see clumps of hundreds of the tiny aphids. Look in a field guide for photos of aphids so you can identify them more easily. If you find infested leaves, have each student pick off one leaf for observation. They can draw and label the leaf and any aphids and other signs of insect life. Your students might find tiny orange dots near the aphids. Those dots are actually ladybug eggs! Adult ladybugs intentionally lay their eggs near aphids, so that when the eggs hatch into larvae, then the larvae will have their food source (aphids) right next to them!

Also look for other pests, predators, pollinators, and parasites in the garden. For any insect they find, encourage students to observe them closely and possibly trap them in magnifying boxes, drawing the different body parts they learned in the song and labeling them.

Conclusion (5 minutes):

Review what the class has learned about insects, the 4Ps, and why plants and insects are interdependent.

Vocabulary:

Abdomen
Antennae
Larvae
Parasite
Pest
Pollinator
Predator
Thorax

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Vocabulario

Abdomen
Antenas
Depredador
Larvas
Nocivo
Parasito
Polinizador
Tórax

Extensions / Homework Ideas:

Hands-On Stewardship: Planting Insectary Plants or Setting Ladybugs Free in the Orchard

Using the attached chart, select some plants for the class to plant near the orchard trees that attract beneficial insects, or set free ladybugs or another beneficial insect to help deal with pests you observed at the schoolyard.

Worm vs. Insect Venn Diagram Activity

Review the characteristics of a worm briefly. Show students an insect poster or diagram, pointing out the body parts. With each body part, ask if a worm has one. Draw a Venn diagram and write "Worms" in the left circle, "Insects" in the right, and "Both" in the overlapping section. Ask them how a worm is different from an insect. How are they similar? (This is a great idea if the students also have a classroom worm bin and have done the worms lesson.)

Do the 4Ps skit again

Elaborate on the characters, the costumes, the script, etc. Or have the class write their own skit involving the specific plants and animals they actually saw in the garden.

Bad Bug Discussion

Ask, "What if somebody tried to pass a law that all insects should be killed because sometimes people get stung by them or they eat plants. Would you vote for that law? (Kids can give a "thumbs up" signifying a "yes" vote, "thumbs down" for a "no" vote, wavering thumbs for "not sure"). Make a graph of student opinions and allow them to defend their views. Listen to children's views then say, "Why do we need bugs, even bad bugs?" Review insects' roles in the orchard and garden. Remind students that they can thank them for many of the fruits, vegetables, flowers and other plants that they either eat or get to enjoy.