



# INSECT STRUCTURES

Garden

EST. TIME 45 minutes SEASON spring 

GRADE 2 | LESSON #17

## ? ESSENTIAL QUESTION(S)

- What body parts do insects have to help them live, thrive, and contribute to the garden?

## MATERIALS

- Handout: *Tracking Garden Changes - Insect Count Data Sheet*
- Chart Paper, Easel, Markers
- Magnifying bug boxes (1 per 2 students)
- Journals (1 per student)
- Clipboards (1 per student)
- Pencils, Colored Pencils, Handheld Sharpeners (enough for all students)

## Abc VOCABULARY

- Insects
- Magnifying glass
- Head, thorax, abdomen

## ASSESSMENT

- Observational checklist
- Tracking Garden Changes Data Sheet

## PREPARATION (15 MINUTES)

To prepare for this lesson, gather materials and check garden for insects to point students to during their exploration.

## TEACHER BACKGROUND

The word “bug” is commonly used in the garden to describe any invertebrate. In this lesson, however, we are specifically focusing on insects. In the animal kingdom, insects are found in the phylum arthropoda (a separate phylum from earthworms in phylum annelida). Within that phylum there are 3 subphylum: subphylum chelicerata (2 body parts, no antenna; including spiders), subphylum crustacea (3 body parts, thorax in eight sections; including shrimp, crab, lobsters), subphylum uniramia (3 body parts, thorax in 3 sections; including insects, centipedes, millipedes). Insects are then a class of subphylum uniramia that specifically is defined as an air breathing animal with a hard jointed exoskeleton, and, in the adult, a body divided into 3 parts; the head with a pair of antennae, the thorax which carries 3 pairs of legs and usually 2 pairs of wings, and the abdomen which contains the guts and reproductive organs.

## LESSON DESCRIPTION

In this lesson, students will recall what they learned about plant parts and functions. They will compare that to insect parts and what functions they serve. Students will collect insects from the garden in magnifying bug boxes to observe and create a scientific drawing that labels all of the parts that they learn. Students will record the number of insects they found before returning the insects to the garden.

## LEARNING OBJECTIVES

### Content Learning Objectives

**GFS.2.2** Describe structure and function of insect parts.

### Life Skills Learning Objectives

**PLS.2** Students are able to express empathy and caring for themselves, others, and the environment.

**CLS.4** Students appreciate and are respectful of differences and diversity in their communities.

Create Your Own!

Use the lesson template to create your own and share with us!

## ACADEMIC STANDARD CONNECTIONS

**NGSS Crosscutting Concept: Structure and Function** The shape and stability of natural and designed objects are related to their function(s).

**VA.Cr.2.1.2a.** Experiment with various materials and tools to explore personal interests.

CULTIVATE CURIOSITY (5 MINUTES) *engage*

1. Lead students to a comfortable sitting position in a central gathering area in the outdoor classroom space (in a circle, if possible).
2. Welcome students to the garden and provide them with a few minutes to silently observe from their seated position (using only their eyes and ears), what has stayed the same from their last visit and has changed since their last visit. After a few moments, share observations.
3. Challenge students to consider what plants they see growing, and review with students what parts those plants have to help them live, thrive, and contribute to the garden.
4. Explain to students that today we are going to build on what we have learned about what **insects** do, to understand what parts they have to help them live, thrive, and contribute to the garden.

ROOT AROUND (5 MINUTES) *explore*

1. Introduce the magnifying bug box to students, explaining that it works as a **magnifying glass** on top but contains the insect for us to view.
2. Demonstrate how students will retrieve their bug box from their storage place, how to move through the garden with it, and how to carefully and gently lift an insect into the bug box. Discuss how to do this without harming the insects. Review with students where the best places are to look for insects in the garden.

**Caution:**

If there are any insects you would rather students not collect, such as spiders or bees, let students know that before they go.

3. Divide students into teams of 2, instructing a student in each group to retrieve the bug box as demonstrated and a student to choose a place for their group to search for insects. Instruct students to find their insects and then return to the whole group gathering area so you know they are ready for their next steps. Transition students from the whole group gathering space.



See "Teaching Strategies" in Appendix section for information on transitioning between whole and small groups effectively.

GROW UNDERSTANDING (10 MINUTES) *explain*


1. Provide students with a few minutes to observe their insects with their partners and to view other groups' insects.
2. When students return to their comfortable seated positions, ask students to share what body parts they see and how they think they help the insect live, thrive, and contribute to the garden (for example: eyes help them see). Write their observations on a piece of chart paper. Challenge students to consider what other body parts they think may not be able to be seen that help the insect live and thrive as well (perhaps comparing to the human body).
3. When many parts have been observed and described, explain to students that something special about insects is that they have a segmented body with 3 parts—**head**, **thorax**, and **abdomen**. Then assist students with categorizing the parts of the insect that they listed into these 3 parts.

HEAD	THORAX	ABDOMEN
<ul style="list-style-type: none"> <li>• eyes (compound, made of several smaller eyes working together)</li> <li>• mouth parts (to guide food into mouth and to bite)</li> <li>• antennae (to smell, taste, touch, and hear)</li> </ul>	<ul style="list-style-type: none"> <li>• wings (if it can fly, usually 2 pairs)</li> <li>• legs (3 sets)</li> <li>• muscles (to operate wings and legs)</li> <li>• feet (with sticky pads, hooks, suckers)</li> </ul>	<ul style="list-style-type: none"> <li>• stores digestive system and reproductive organs</li> <li>• may hold sting organs</li> </ul>

OBSERVE THE FRUITS (20 MINUTES) *elaborate*

1. Model for students on chart paper how to create a scientific drawing of an insect. Using the ABCDE's of drawing model:
  - A - accurate
  - B - big (and to scale)
  - C - colorful
  - D - detailed
  - E - explained (labeled)
2. Instruct students on how to retrieve their materials (clipboards, paper, handouts, or science journals, pencils and colored pencils) and then how to create their own scientific drawing of their insect. Transition students from the whole group gathering space to gather their materials and get started.

**Note:** Similar to the reflection prompts at the end of most lessons, this scientific illustration can be used to assess student understanding of content learning objectives.

-  3. As students work, acknowledge observed behaviors that align with the life skills learning objectives, such as appreciating the diversity in the insects. Also, use the observational checklist to assess students' current development of the life skills.
4. Provide the call back signal for each student to return attention to the whole group gathering space.
5. Instruct students on how to return their coloring materials, how to carefully return their insects to the garden, and how to return their bug boxes to the storage place. If time allows, have students record how many insects they found using the Tracking Garden Changes - Insect Count Data Sheet. In their teams of 2, one student can return the coloring materials and the other can return the insect to the garden and the bug box to the storage place. Instruct students to return to the whole group gathering space when these tasks are complete.

#### REFLECT (5 MINUTES) *evaluate*

1. Review the different insect structures and functions with students by allowing volunteers to present their scientific drawings of the bugs they collected, ensuring that the appropriate vocabulary is used to describe the drawings.
2. Discuss how these structures help insects fulfill important roles in the garden (eating plants, decomposing dead plants, pollinating flowers, eating other insects/pests, etc).
3. Explain that there is a lot of diversity in our insect population, meaning we have a lot of different insects. Ask students: Do we have a lot of diversity in our community? (Yes). Share examples. (Students' cultural backgrounds, interests, hobbies, languages, etc). Discuss how diversity makes communities stronger.



#### ADAPTING FOR INDOORS

In the case of inclement weather, the Cultivate Curiosity, Grow Understanding, Observe the Fruits sections of this lesson can occur inside the classroom. The insect collection in the Root Around section should take place in the garden area on the next garden day that the weather allows.

## CONNECTIONS TO KITCHEN LESSONS

In the kitchen, research insects eaten around the world.

## POSSIBLE EXTENSIONS

**Classroom:** Create imaginary insects in teams of 3. Give each team a blank piece of paper folded in thirds. Have each student draw an insect head on the top third, with the neck just passing the top fold. Fold to hide the head, then pass the papers.

## ADDITIONAL RESOURCES

- *Are You a Butterfly?* by Allen, Judy and Tudor Humphries
- *Are You a Ladybug?* by Allen, Judy and Tudor Humphries
- *The Grouchy Ladybug* by Carle, Eric
- *The Very Lonely Firefly* by Carle, Eric
- *Backyard ABCs* by Green, Janice
- *Bugs!* by Greenberg, David T.
- *Insect Soup: Bug Poems* by Polisar, Barry Louis
- *Honey in a Hive* by Rockwell, Anne
- *Backyard Pets: Activities for Exploring Wildlife Close to Home* by Amato, Carol A.
- *Insects* by Ansary, Mir Tamim
- *Insects: DK Eyewitness Books* by DK Publishing
- *Spiders* by Gibbons, Gail
- *Simon & Schuster Children's Guide to Insects and Spiders* by Johnson, Jinny
- *Field Guide to North American Insects and Spiders* by National Audubon Society