

# Buggy Diner

**Key Topics:** Beneficial Insects, Pests, Experiments, Controls, Variables

**Grade Levels:** K, 2

**Inside and Outside**

## Lesson Overview:

In this lesson students will set up a simple food preference test to demonstrate the feeding preferences of some common garden insects. They will use the data they collect to classify insects as beneficial or pests and relate how we can use this information to help grow a healthier garden.

## Activities:

Option 1 - Buggy Diner: Classroom discussion, bug hunt, and leaf gathering (25 minutes); Setting up experiment (25 minutes)



## Suggested Activities & Learning Objectives by Grade:

- K:
  - K-LS1-1 What do plants and animals need to survive?
  - K-ESS3-1 How do plants and animals depend on each other for survival?
- 2:
  - 2-LS4-1 What is habitat and how does it allow different plants or animals to survive in different locations?
- 3:
  - 3-LS1-1 What do you discover about the life cycles of the insects you are examining?
  - 3-LS4-3 Does your insect survive in the habitat you created--why or why not?
- 4:
  - 4-LS1-1 Does your insect have special structures that help it survive? Do the plants you are feeding to it have special structures to defend themselves?

## Essential Question(s) that Connect CCCs and SEPs:

- Were there any patterns to where you found insects? How can you use these patterns to help determine if a bug is a beneficial or pest? ([Patterns](#); [Asking Questions and Defining Problems](#))
- How can we design an investigation to see which insects are beneficials and which are pests? If our cabbage has holes, how can we see if a given insect is the cause of this effect? ([Cause and Effect](#); [Planning and Carrying out Investigations](#))
- Is there a pattern to our classroom data? (*a food that many bugs like, a food that many bugs avoid, etc.*) How can I organize and display my data to show this pattern of insects and diets? How can I use this information to help grow a healthier garden? ([Patterns](#); [Analyzing and Interpreting Data](#))

## Materials:

- [Buggy Diner Student Lab Sheet](#)- 1 per group

- Clipboards
- 10 plastic petri dishes with covers
- Garden insects (students will collect)
- Variety of plant leaves (students will collect)
- Plant and insect reference guides (optional)

### **EG Team Support Needed:**

- None

### **Prep:**

Both Part 1 and 2 of this lesson are designed to take place outside! Alternative options in the case of rain: collect a variety of leafs for students and lay them out on a table for groups to choose from, play a short insect video for kids instead of going on a bug hunt, set up the experiment inside the classroom.

- The day before this experiment, collect 10 different insects into a jar with air holes and place them out of direct sunlight. Do not feed them.
- Walk around the school campus and garden to note areas where there are a lot of insects and leafs for students to observe and collect from.
- Connect with the classroom teacher and provide him or her with: [Classroom Data Chart Example and Wrap Up](#). He or she will be responsible for monitoring the experiment, collecting classroom data, and having the final wrap up discussion.
- Even though the teacher is responsible for follow up and filling out the chart, you are responsible for making them their chart. Make this in advance for the teacher before the lesson and ask them to tape it to their wall or door for them to review with their class. You may even find time to tape it up with them after school or right after the lesson! Making it fun and pretty is a good strategy. Butcher paper that is colorful is usually found in the teacher's lounge.

### **Activity Procedure:**

#### **Engage:**

Begin with a classroom discussion in the seating area in your garden:

How do you help other people? Share ideas. How do other people help you? Share again. In the garden, plants and animals can help each other too. Of course we know that some insects harm our crops by eating them. But did you know that many other insects can help our garden grow?



#### **Comprehension Check**

Write the following underlined questions on your board, record answers, and discuss with the class:

What are some ways insects can help our garden? Some pollinate the flowers so that the plants can make fruits and seeds. Without pollinators, we wouldn't have any apples, cucumbers, watermelon, pumpkins, avocados, or many other fruits! Other beneficial insects eat pests, keeping them off our crops. Ladybugs, for example, eat aphids.

What is the difference between a beneficial insect and a pest? These insects are like the guardians of the garden. Insects that help the garden grow are called beneficial insects. A pest is an insect that is destructive to the plants in the garden we want to grow (not weeds).

How can you tell if an insect is a beneficial or a pest?

We share our garden with lots of critters. Who lives in our garden? Where do they go for food? Not all insects eat the same foods. Some like to eat leafy parts of vegetables and some like the roots. Would this be a beneficial or pest? Some insects prefer other weeds or other insects! Would this insect be a beneficial or pest? We are going to be detectives and find out which insects in our garden are beneficials or pests! What do detectives do? (*Collect evidence!*)

### Explore:

#### Action:

1. Introduce the call back for this activity (howl like a coyote, crow like a rooster, etc.)
2. Divide the class into 10 groups. Pass out clipboards and Buggy Diner Lab Sheets to each group. Have each group go on an insect hunt. Students are observing bugs, not collecting them. Some good places to look are under logs or other objects on the ground; in and around flowers; and on the undersides of leaves. For each insect students find, have them draw a picture of the insect and the place they found it on their Buggy Diner Lab Sheet.
3. Gather back in a circle. What did you **notice**? What did you **wonder**? **Were there any patterns** to where you found insects? Which types did you find on the flowers? On the ground? On the leaves? Etc. How can you use these **patterns** to help you **determine if a bug is a beneficial or pest**? (**Patterns**; **Asking Questions and Defining Problems**)
4. Now have each group collect six different leaves from the garden. These will be food samples to determine the insects' preferences. Have students collect leaves that they know are edible as well as leaves that are from plants people do eat. Be sure the students know what type of plant each leaf comes from.
5. Have students record observations about the leaves on the Buggy Diner Lab Sheet. Are they edible? What plants do they come from? What do they look like? Does it look like they provide food for insects or other garden animals? How can you tell?

### Explain:

Return to the concept of what makes a bug a beneficial insect or pest in our garden. With the bugs that I have in this jar, and the leaves that your groups just collected, **how can we design an investigation** to test which insects are beneficials and which are pests? If our cabbage in the garden has holes, **how can we see if a given insect is the cause of this effect**? In this experiment we will invite garden insects to our buggy diner and serve food samples to test what they prefer to eat. What should we **control** for, or in other words, keep the same? (*The size of plant leaves*). What should be our **variable**, or in other words, the thing we test? (*The bug! We can change the type of bug in the diner to see which bugs prefer which leaves*). (**Cause and Effect**; **Plan and Carry out Investigations**)

### Elaborate:

#### Action:

1. Have each group cut a circular sample from each plant leaf they collected. It is important that the samples be the same size to get accurate results.

2. Have each group label the bottom of their dish with the leaf names. Place six different samples around the inside edge of each dish.
3. The diner is now ready to open for lunch. Whom will you invite? Each group can choose one of the insects from the jar. For example, one group may invite a common and voracious eater, the spotted cucumber beetle named Spot. First, make a prediction as to what you think Spot will order to eat. Place Spot in the prepared petri dish and cover it.
4. Let Spot stay in the diner for 24 hours inside of the classroom out of direct sunlight. Observe Spot every two or three hours during the day to see what he is munching.
6. At this point, the classroom teacher will take over leading the experiment and discussions.  
**Please provide teacher with:** [Classroom Data Chart Example and Wrap Up](#). Review that depending on desire and time availability of teacher, groups can just test one insect or continue the experiment for multiple days by inviting a new insect into the diner each day for a 24 hour period. Have each group estimate the amount of each leaf that was eaten and record the results in their Student Lab Sheets. To verify results, some groups may introduce insects of the same variety. Record classroom results so students can see all of the data. Release insects after experiment.

### **Evaluation:**

Use the Evaluation section in the handout: [Classroom Data Chart Example and Wrap Up](#)

Also, refer back to the Learning Objectives for your grade level and ensure that they have been met by asking the given learning objective question.

### **Extension Activities:**

- Invite the class to adopt a space in the garden to plant a beneficial insect garden. Students can research further what bugs are beneficials and what plants attract them to our garden. Follow this Sprout Scouts lesson plan for ideas and guidance: [Homes for Our Helpers](#)
- Construct a bug hotel, such as a solitary bee hive. Follow this Sprout Scouts activity for ideas and guidance: [Build a Bee Hotel](#)
- Observe and draw the external structures of the insects and research how these structures support survival, growth, behavior, and reproduction. Are there any patterns in the structures of beneficial insects? Pests?

**Tips and Caveats:**

**Adaptations for K-1**

Print just the first page of the lab sheet.

K-1 can still search for insects and leaves and practice drawing them as accurately as possible on the lab sheet.

Instead of having groups conduct individual experiments, investigate with the class by observing insects in a class buggy diner. Test insects over the period of a week by inviting a new insect into the buggy diner every day for a 24 hour period. Record the results as a class.

**Cited Curriculum:**

- LifeLab - The Growing Classroom: [Buggy Diner](#)
- FoodCorps & LifeLab - Sprout Scouts: [Homes for Our Helpers](#)