NC STATE UNIVERSITY

# Bug Out

## LEADER'S GUIDE

# Introduction

**Bug Out** is a series of insect based activities that emphasize experiential, hands-on learning. The goal of Bug Out is to increase understanding and appreciation of insects and to reduce fear of insects. Bug Out also stimulates thinking ability, develops communication skills, and promotes positive social interactions. This will provide a fun, positive learning situation for young people, grades 2–5, when you follow the Bug Out lesson plans. Most of these activities are best done during the summer or fall when insects are most common and active out-of-doors.

Materials lists and pre-class preparations are laid out, along with a suggested script. Where appropriate, vocabulary lists, worksheets, and activity sheets are included. You may encourage 4-H'ers to make a Workbook with these pages.

Posters are included as a **.ppt** file for printing a large- scale poster, if you wish. These are used as references during several of the activities. An educational kit containing most of the nonconsumables needed for implementing these lessons is also available.

This is a revision of the previous Bug Out curriculum based on some original material by Susan P. Whitney and R.C. Hillmann. At the beginning of each activity are the purposes of each and the objectives met in the **NC Standard Course of Study** currently in effect for second grade.

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4-H - L- 9-12W

# Contents

LESSON 4

# Bugs in a Bottle

**PURPOSE** →
- To make a chamber so children can observe live insect behavior at home.
- To familiarize children with living insects over an extended period of time.

**NC STANDARD COURSE OF STUDY OBJECTIVES** →

L.2.1.1 Summarize the life cyle of animals including
- Birth
- Developing into an adult
- Reproducing
- Aging and death

L.2.1.2 Compare the life cycles of other animals such as, but not limited to, mealworms, ladybugs, crickets, guppies, or frogs.

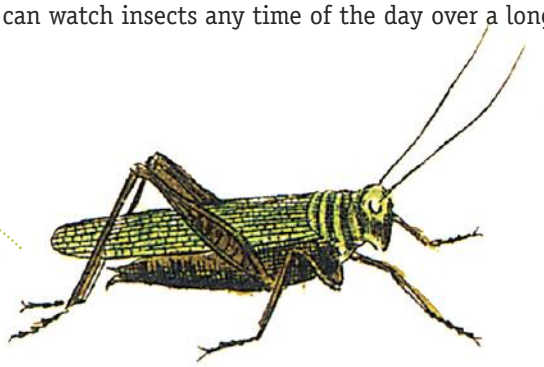
**LIFE SKILL** → Learning to learn – acquiring, evaluating, and using information; understanding the methods and skills for learning

**TIME** → 30 minutes

**MATERIALS YOU'LL NEED** →
- Empty, two-piece plastic soda bottles, 3-liter size preferred; one for each group of five
- Round section of turf containing clover, about 4 inches in diameter
- Scissors
- Trowel or small shovel
- One or two crickets, grasshoppers, or other type of insect for the demonstration, per bottle. Crickets may be easily purchased from a bait shop.

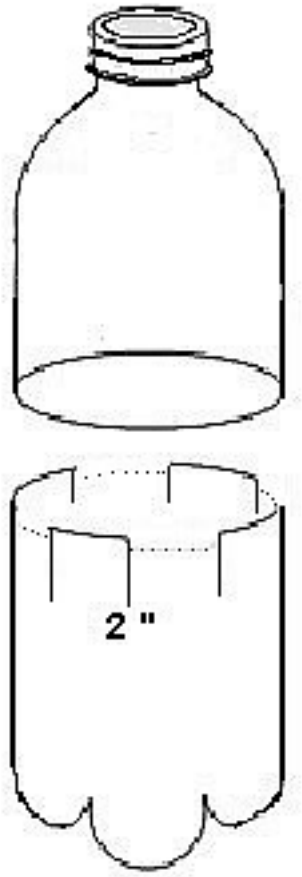
**BEFORE THE CLASS** →
- Dig a piece of turf that contains some clover from a lawn. Be sure to include the soil covering the roots. This may be kept in a plastic bag in the refrigerator for several days. Plants such as beans, which could be started from seed a week or two ahead, may be used as an alternative to turf.
- Prepare one bug bottle as described below for demonstration.
- Transplant turf piece into empty bottle base. Cover with inverted bottle. Add crickets to make demonstration bug bottle.
- Catch common insects, such as crickets, grasshoppers, or caterpillars (or buy crickets from a bait shop). If you find a caterpillar, collect the plant or part of the plant on which you found it.

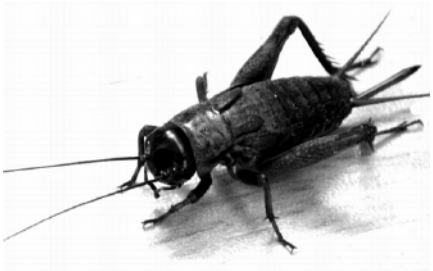
**LEAD-IN** → "We don't often have a chance to observe living insects for more than a few moments at a time or during more than one type of activity. Today we are going to build an insect observation chamber so we can watch insects any time of the day over a long period of time."



**PROCEDURE** →

1. Cut a 2- or 3-liter soft drink bottle in half.
2. Make eight parallel cuts around the edge of the open end of the bottom section, spaced evenly apart and about 2 inches long to form a series of tabs. Cut alternating tabs off about 1/2 inch so that every other tab is slightly shorter (see figure).
3. Place your turf plug or plant in the colored plastic base. Turn the clear cylindrical portion down over the base, sliding alternate tabs inside and outside the rim.
4. The bug bottle is ready for your insects. Place them in through the top of the bottle.
5. Your bug observation chamber will probably not need water often. If it does, a little may be dripped in through the top.
6. To change plants or add food, put the bug bottle in the refrigerator about 30 minutes. After the insects have stopped moving, the bottle may be opened and the plants or turf changed. As the insects warm up, they will become active again.
7. Do not let sunlight shine directly on the bottle and do not leave it in a car.



**LET'S TALK ABOUT IT** ➛ "What kind of insects are you going to put in your bug home? How many of you have ever caught crickets? Where did you find them? Tell me where you are going to look for insects for your bug home. Some good places are old weedy fields. Look for grasshoppers in roadside ditches and weedy patches on the edges of gardens, especially in late summer. Gardens and flower beds are good places, too."

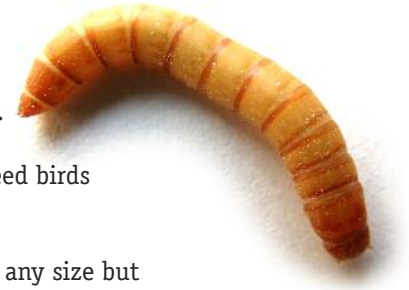
"What do you think you will see the insects do? Will they eat? Will they sleep? Tell me what you are going to look for when you watch your insects in their bug home."

"What would happen if you put a caterpillar in a bug bottle? Do you think it might pupate? Then what would happen? Yes, it would become a butterfly or moth!"

"Can you think of some experiments that you could do with several bug homes? What about using different plants or different insects? Could you put your bug bottles in different environments? In different temperatures?"

"If you want to change the clover, place your bug bottle in the refrigerator for about 30 minutes (ask your parents first). After the insects have stopped moving, dismantle the bug bottle, place it over another container of fresh clover and return the insects to their new home. They will become active again in a few minutes."

"You wouldn't want to let the sunlight shine directly on the bug bottle or leave it in a hot car. Do you know why? That's right. It would get so hot that your bugs would die."



**RAISING MEALWORMS** ➛ In addition to your "Bugs in a Bottle," you can also raise mealworms! You can do this along with your bug bottle activity or any time.

Raising mealworms is easy and fun. They can also be used for fishing bait or to feed birds or reptiles after your observations.

Use any container such as a disposable plastic storage container. It can be almost any size but should have a little depth. Fill it with oat bran or oatmeal about 1 inch in depth. Purchase some mealworms from a pet store for a few dollars. Be sure to tell them that you want *Tenebrio* and not "Giant mealworms."

Place the mealworms on the layer of bran or oats. You can add a little shredded paper on the surface for the adults to crawl on and hide under, if you wish. Add a baby carrot every three or so weeks for moisture. Punch a few holes in the lid and close the container. Set it aside in a safe place out of direct sunlight. Larvae develop depending upon temperature. You will want to keep your colony at least 4-6 weeks. Keep a record of the temperature and the number of days it takes for each life stage. If you want to keep the colony going on a longer term, set up a second container with oats and move pupae and adults to the new container to mate and lay more eggs. You can then go back and forth with the two containers.

**OTHER ACTIVITIES** ➛ "Take an insect-collecting hike through a park or garden or your own yard. Collect insects in wide-mouth jars, such as peanut butter jars. Put the jars in the refrigerator until the insects are cool and can be more easily placed in the bug bottle. Caterpillars are sometimes found feeding on the leaves of trees and shrubs. If you collect a feeding caterpillar, add leaves from the plant on which it was feeding. If the caterpillars feed and pupate, you may see the adult come out of the cocoon." (Some pupae require a few months of cold temperature before the adult will emerge.)

Participants may keep records of field trips and their insect's activity at different times of the day in their workbook.