



# Scarecrows and Ladybugs

## 3<sup>rd</sup> Grade

### Standards

GPS S3-L2  
NGSS 3.LS4-4

### Time

40 min for Day 1  
40 min to Day 2  
60 min for Days 3 and 4

### Supplies

#### *For the student*

- Recycled materials for making a scarecrow
- Support pole
- Fabric
- Clothing items
- Bug keeper with viewer

#### *For the class*

- Garden bed
- Beneficial insects,
- Recycled netting from vegetable bags
- Seeds for intercropping and companion planting
- Aluminum foil and old aluminum pie pans
- Cardboard and mulch

### Garden Connection

The garden will be the scene of the Bug Hunt and the beneficiary of gardening techniques that are effective in scaring away pests and protecting threatened pollinator species.

### Overview

Students will learn about the harmful effects of pesticides and herbicides on pollinator species and demonstrate effective organic gardening practices for controlling pests, such as scarecrows, netting, foil, beneficial insects, hand-removal of bugs, intercropping, and companion planting; and for controlling weeds by using cardboard, mulch, and hand-weeding techniques.

### Essential Questions

Of what benefit is organic gardening? How can I keep bugs from eating plants in the garden before I do?

### Engaging Students

Students will view a video about the loss of bees and question what is causing the decline of these pollinators.

### Exploration

Students will participate in a schoolyard bug hunt and attempt to identify the species they collect and determine whether they are beneficial or harmful to the garden. Then they will play a role-play simulation game to see how bugs and plants interact. Students will brainstorm ways to garden that attract pollinators.

### Explanation

Students will argue from evidence regarding the best gardening techniques that are compatible with pollinator protection and provide evidence to that effect.

### Environmental Stewardship

Students will implement pollinator-friendly practices in the school garden.

### Evaluation

A rubric is provided to assess student performance in lesson activities and understanding of key concepts.

### Extension

A link to Bee-Friendly Teaching Resources is provided.

## Standards

### Georgia Performance Standards in Science

#### **S3L2. Students will recognize the effects of pollution and humans on the environment.**

- a. Explain the effects of pollution (such as littering) to the habitats of plants and animals.
- b. Identify ways to protect the environment.
  - Conservation of resources
  - Recycling of materials

### Next Generation Science Standards

**3.LS4-4 Make a claim about the merit of a solution to a problem** caused when the environment changes and the types of plants and animals that live there may change.

## Teacher Background Information

View the films and slide shows in advance for an overview of the problem with honeybee decline.

## Teacher Preparation

Select a time of year when insect populations are present (before first frost in fall or after last in spring). Obtain supplies for lesson.

## PROCEDURES FOR LESSON ACTIVITIES

Day 1

### **Engagement** (20 minutes)

View a short You Tube video the [Natural History of Bees](#) and on [colony collapse](#) and the decline of these pollinators, thought to be caused – at least in part - by pesticides. Discuss student ideas about what a world without bees would look like, and then show this 22 slide presentation on [The World Without Honeybees](#).

### **Exploration**

#### **Bug Hunt** (20 minutes)

Take students outside to collect one of every type of bug that can be found in the school garden, keeping them in bug-keepers with viewers. Identify the bugs by comparing them to these [Bug Mugs](#) or these [top Georgia insects](#). Note that not all insects eat crops planted by humans, and some insects have evolved with plants to be very beneficial, such as pollinating bees, (as well as bats, and hummingbirds). Also note that there are other kinds of garden pests than insects. Ask students to brainstorm a few (deer, birds, small mammals, viruses, mites). Whether an animal is considered a pest is a matter of viewpoint. From the gardener’s perspective, anything that competes for the food being grown is considered a pest.

Day 2

#### **Bugs vs Plants Role Playing Model** (20 minutes)

Play the Bugs vs. Plants simulation (cards and directions attached) to explore how the way we garden can contribute to damage from pests, especially when we plant in large (single-species) monocultures that make it easy for pests to spread quickly from one plant to the next. Discuss.

#### **Explanation** (20 minutes)

(Complete this section after the Environmental Stewardship activities). Students should be able to identify at least two specific organic gardening practices and argue from evidence why they are preferable to pesticides, herbicides, or commercial fertilizers in the garden. Students may want to compete in teams and argue on behalf of the “best garden practice that will contribute to pollinator health.”

### **Environmental Stewardship** (2 days: 1 hour each day)

Demonstrate organic plant and pollinator friendly practices in the school garden by avoiding pesticides and herbicides. Encourage students to try any of the following: foil flags and flutterers, fruit and veggie nets or plastic wrap, introducing beneficial insects such as ladybugs and green lacewings, attracting beneficial insects by placing a shallow bowl of water in the garden, removing pest species by hand, or concocting non-toxic pest removal sprays such as soapy water. Also demonstrate organic practices in weed control instead of using herbicides. Such methods include placing cardboard or wet newspaper on the ground and covering it with straw mulch, or weeding by hand. Making compost from leftover lunch food (except meat) can be effective in revitalizing soils without using commercial fertilizers.

Diver the class into teams of four. Announce an engineering design challenge in which each team will design and build a scarecrow to keep away harmful garden pests. Review the engineering design challenge, as summarized in this flow chart. Provide an assortment of materials such as fabric, stuffing (straw), fasteners, old clothing, wooden dowels, etc. and let students add to the materials with items from home. After brainstorming ideas and drawing a sketch of their scarecrow plan, allow each team to choose a limited number of items for building the scarecrow. After scarecrows are built, ask each team to tell about their creation and how it is intended to keep garden pests away.

### **Evaluation**

Students will demonstrate proficiency in protecting the earth by using at least two specific organic gardening practices and arguing from evidence why these practices are preferable to using pesticides, herbicides, or commercial fertilizers in the garden. When debriefing the lesson, make the point that garden pests can be a nuisance for farmers if fruits and vegetables are blemished or ruined by bug bites, but the damage from pesticides and herbicides can be even greater. Some pesticides and herbicides are lethal enough to kill bees, birds, stream invertebrates and other garden pollinators, as well as the pests they are targeting.

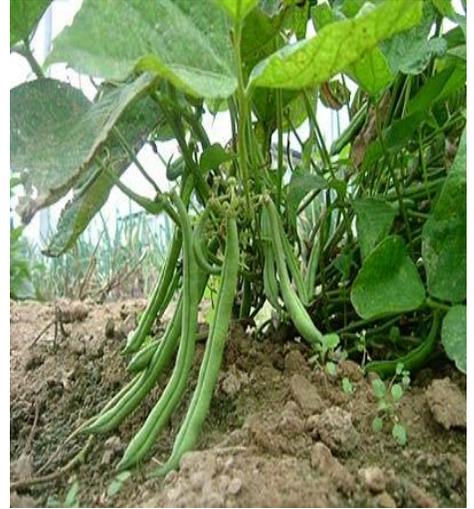
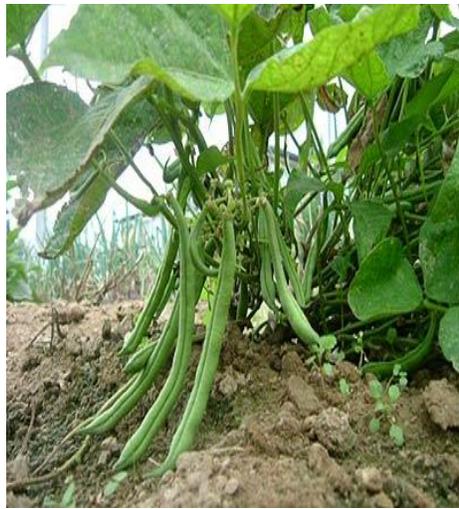
### **Extension**

Use these [Bee-friendly Teaching Resources](#) for additional activities about bees, pollinators, and the threats they face. Ladybugs and other beneficial insects such as green lacewings can be obtained from [BioBest](#), [Insect Lore](#), and [Beneficial Insectary](#).



## Role Play Cards for Bugs vs Plants Game

**Directions:** Assign plant and bug roles (with at least three of one type of bug). Tell students playing the part of plants to arrange themselves in monocultures, an arms-length apart. A monoculture is a planting of one species. Then introduce the bug students and explain the rules for movement and infestation. Allow the game to play and for plants to be killed (sit down), if infested by three bugs of the correct species. In the second round, students rearrange themselves in a diverse planting, next to different species. Release the bugs again and compare results. Note: most garden pests specialize in eating only one type of plant.





Squash bug role- can only move to another squash plant that can be reached from the original squash plant. Three bugs on a squash plant kills the plant.



Lady bug role: eats any garden pest it can touch / can move from any plant to any other plant.



Corm worm role: can only move to another corn plant that can be reached from the original corn plant. Three bugs on a corn plant kills the plant.



Bean plant bug role: can only move to another bean plant that can be reached from the original bean plant. Three bugs on a bean plant kills the plant.



## Assessment for Scarecrows and Ladybugs

Student Name(s): \_\_\_\_\_

Date: \_\_\_\_\_

<p style="text-align: center;"><b>Level of Mastery</b></p> <p style="text-align: center;">↓</p> <p style="text-align: center;">→</p> <p style="text-align: center;"><b>Benchmark or Performance Measure</b></p>	 <p style="text-align: center;"><b>EMERGING</b> Not yet proficient 1 point</p>	 <p style="text-align: center;"><b>COMPETENT</b> Partially proficient 4 points</p>	 <p style="text-align: center;"><b>PROFICIENT</b> Mastered task 5 points</p>	<p style="text-align: center;"><b>TOTAL POINTS</b></p>
Bug Hunt	Student will participate in a bug hunt but will not collect a bug nor i.d. it.	Students will participate in schoolyard bug hunt, but will not be able to identify the captured one	Student will participate in schoolyard bug hunt, capture at least one bug, and identify it	
Bugs vs Plants Game	Student will participate in role-playing game	Student will participate in the game and be able to explain that it is better to have a variety of plants in a small area.	Students will participate in the game and be able to articulate the risks of monoculture and planting in the same place every season.	
Argument regarding gardening techniques	Student will be able to name at least one gardening technique that reduces incidence of pests and / or protects pollinators in the garden	Student will be able to name at least two gardening techniques that reduces incidence of pests and / or protects pollinators in the garden	Student will be able to name two gardening techniques that reduce harmful pests and increase or protect pollinator species.	
Demonstration of additional gardening techniques	Student may not be able to show two other gardening techniques	Student can show one other gardening technique that cuts pests or increases beneficial insects.	Student can show two other gardening techniques that cut pests or increases beneficial insects.	
Scarecrow engineering design challenge	Student participates in a team that is building a scarecrow but does not follow engineering design process	Student participates in a team that is building a scarecrow and follows some parts of the engineering design process;	Student participates in a team that is building a scarecrow and follows the engineering design process: refining design after testing prototype	