Lesson ten: How do we manage pests in the garden?

“Garden Patrol” from GROWING IN THE GARDEN, Iowa State University Extension and Outreach

It’s time to do investigative work and to set up some garden security. Students work in groups to investigate possible garden bad guys and how they could prevent them from getting into the garden. If possible and if necessary, they can use the best plan in their school garden. You might want to talk to a local gardener. To become healthy detectives and security people, they can pick a veggie to learn about and to eat.

Content objectives: Identify garden creatures that can harm garden plants; Create ways to protect plants

Life skill objectives: Critical thinking, Problem solving, Decision making, Communication, Citizenship, Leadership, Healthy living

Core and STEM concepts and skills:
Science Life science, Science as inquiry
Math Operations and algebraic thinking, Measurement and data
Language Arts Reading, Main Idea, Sequencing, Synthesizing, Interpreting, Inferring, Character development, Speaking, Listening, Viewing, Writing

Healthy snack: Cabbage with Asian Dressing or Cabbage Apple Salad

Additional and supporting resources:
How Groundhog’s Garden Grew by Lynne Cherry, Eddie’s Garden by Sarah Garland
LESSON PLANS FOR 2011-12 SCHOOL YEAR      Grade 2

BEFORE THE LESSON

1. **Grade 2, Lesson 10:**
   This document contains all the curriculum items and resources you need for this lesson. All lesson downloads are located on the www.peoplesgarden.wsu.edu Educational Toolkit.

2. Look for “Where You Born in a Barn?” by Chris Rowlands cassette. This is difficult to find. There are a few of the songs available from the album on YouTube.


4. Check materials list for complete description of items needed.

5. Assemble necessary ingredients and materials for the selected recipe(s).

THE LESSON

1. **Garden Patrol** are meant to be taught over several days.
2. Garden Journal - Have students draw the garden in their journal with harmful pests and a pest plan.

AFTER THE LESSON

Optional activities are included in the lesson plan to investigate clues of pests in the garden.

RECIPES

Although this lesson does not include a vegetable tasting, you can fit in a recipe where it works for you. Try Cabbage with Asian Dressing or Cabbage Apple Salad (next page).
# Cabbage Slaw with Asian Dressing

<table>
<thead>
<tr>
<th>Slaw</th>
<th>Directions for Slaw</th>
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</thead>
<tbody>
<tr>
<td>½ small head Green Cabbage</td>
<td>Wash cabbage and carrot, if used. Thinly slice cabbage. Grate carrots, if used. Make Asian Dressing. Pour enough Asian Dressing over the slaw to coat the cabbage; toss.</td>
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<tr>
<td>½ small head Red Cabbage</td>
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<tr>
<td>½ cup grated carrot (optional)</td>
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<table>
<thead>
<tr>
<th>Dressing</th>
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<tr>
<td>1/4 cup vegetable oil</td>
<td>Place all ingredients into a jar with a tight-fitting lid. Shake jar to blend ingredients. Store in the refrigerator until needed. Makes about 3/4 cup. May not need all of it for this recipe.</td>
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<tr>
<td>1/4 cup rice vinegar</td>
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<tr>
<td>1-2 tablespoons soy sauce</td>
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<tr>
<td>2 teaspoons brown sugar</td>
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Recipe makes about 20 tasting servings.
Cabbage-Apple Slaw

**Slaw**
3 cups cabbage, washed and shredded
2 cups Red Delicious apples, unpeeled, scrubbed, cored and chopped
1 cup celery, washed and sliced diagonally
1 ½ cup onion, peeled and sliced into thin rings (optional)

**Pineapple Yogurt Dressing**
1-1/3 cup low fat yogurt
2 tablespoons pineapple juice
1 ¼ teaspoon prepared mustard
1 teaspoon celery seed

**Directions for Slaw**
Combine cabbage, apples, celery, and onions (if used). In a separate bowl, combine ingredients for pineapple yogurt dressing and mix. Gently toss pineapple yogurt dressing with apple-cabbage mixture.

Recipe makes about 20 tasting servings.
Garden Patrol

CONTENT OBJECTIVES
Identify garden creatures that can harm garden plants, Create ways to protect plants from harmful creatures

LIFE SKILL OBJECTIVES
Critical thinking, Problem solving, Decision making, Communicating in small and large groups using verbal and nonverbal communication skills, Cooperation

INDICATORS
Successfully lead a charade game so that others can learn about garden creatures; Draw a picture illustrating a garden, harmful pest and management strategy; Respond to questions to determine what can damage plants and when and how to manage pest problems

EVALUATIONS

SUBJECT STANDARDS
Science: Life (characteristics of organisms, organisms and environments)
Language Arts: Main idea, Sequencing, Synthesizing, Interpreting, Inferring, Character development, Listening, Observing, Communicating in small and large groups with verbal and nonverbal skills
Social Studies: Individuals, groups and institutions

LEARNER TYPES
Linguistic-words, Spatial-visual, Bodily-kinesthetic, Intrapersonal, Interpersonal, Music, Natural

MATERIALS
"Grady's Garden" name tags and "Creature Expert" cards (copy from Growing in the Garden, Animal Unit, Lesson 2, "Life in the Garden;" one name tag or expert card per student, see the Introduction section)
8 index cards or large sticky notes (Write one of the following creatures on each card: viruses, bacteria, fungi, squash vine borers, slugs, tomato hornworms, birds, deer; see the Introduction section)
Large sheets of paper, poster board, marker or chalkboard and markers (see the Introduction section)
Large sheets of white drawing paper (one sheet per team, see the Do section)
Markers
Sticky notes (one per student)
"Pest Control" lyrics by Chris Rowlands (one transparency or write on the board, found at the end of the lesson)
Were you Born in a Barn? cassette by Chris Rowlands
Cassette tape player
How Groundhog's Garden Grew by Lynne Cherry or Eddie's Garden by Sarah Garland

IOWA STATE UNIVERSITY
University Extension

4-H Youth Development
4H-905A2
Revised April 2008
INTRODUCTION

ENGAGE

SET THE STAGE

15 MINUTES

Life Science:
Characteristics of organisms

Make a copy of the “Grady’s Garden” name tags and “Creature Expert Cards” found at the end of Growing in the Garden, Animal Unit, Lesson 2, “Life in the Garden.” Cut them apart and distribute them one per student. Designate three areas of the room, one for Good Guys, one for Bad Guys, and one for Both Bad and Good Guys. Have the students decide what their garden creature is and go stand in the corresponding area of the room. When everyone has moved, have the students discuss in their groups what creature they are and why they thought they belonged to the group. If the rest of the group doesn’t agree with their choice, the rest of the garden creatures should send him/her to the correct area of the room. After the groups feel satisfied with their members, have them take their name tag or expert card and tape it or write it in one column or list under Good Guy, Bad Guy, or Both on the board or on large sheets of paper taped on the wall. Make extra cards for viruses, bacteria, fungi, squash vine borers, slugs, tomato hornworms, birds, and deer and ask the students to add them to the lists.

Why are the bad guys so bad in the yard and garden?
They destroy plants and they may bite people and animals.

What would you do to manage the bad guys in your yard and garden?
Brainstorm a couple ideas and ask the students to think about it.

In this lesson, we are going to learn more about bad guys in the garden, what they do to plants, why their damage is a problem, and how we can manage them so that they won’t destroy the plants. Some of you will become Garden Scene Investigators (GSI), similar to the crime scene investigators (CSI) on television. Others of you will become Garden Protection Agents (GPA), similar to the United States Environmental Protection Agency (EPA) that protects human health and the environment.

PART I

DO

EXPLORE

INVESTIGATE CONCEPTS

20 MINUTES.
POSSIBLY THE NEXT DAY

Life Science:
Characteristics of organisms, Organisms and environments

Social studies:
Individuals, groups and institutions

Language Arts:
Main idea, Factual understanding, Inferring, Interpreting, Synthesizing, Sequencing, Character development, Listening, Observing, Communicating verbally and nonverbally in small and large groups

What do crime scene investigators look for when they are trying to solve a crime?
We are going to find and investigate clues to determine what is damaging plants. In our investigation, all of the bad guys on our list are suspects when we look at damaged plants. Let’s remember or think about the kind of damage they do.

Working together as a class, discuss the type of damage that each pest does and write it next to the pest on the board. For example, next to the rabbits write “eats plants” or “eats leaves.” Consider whether the bad guys have chewing mouth parts that eat away parts of plants or sucking mouth parts that cause discolored or wilted leaves. Some culprits, such as large wild turkeys and deer, trample plants as they make nests and travel in fields.

How do you think the United States Environmental Protection Agency comes up with rules and regulations to protect humans and the environment?
The EPA employs 18,000 people across the United States; many of them are scientists, engineers, and other specialists that do research to identify, understand and solve environmental problems.

We are going to use the clues from the crime scene investigators to figure out the best way to protect the plants and the environment. First, let’s read a story about garden problems and how they were solved.
At this point, you may choose to read How Groundhog’s Garden Grew by Lynne Cherry or Eddie’s Garden and How to Make Things Grow by Sara Garland. Read the questions below and decide if you want to use them during or after reading the book.

**HOW GROUNDHOG’S GARDEN GREW**

Who was the main character of the story?

Little Groundhog

At the first of the story, was Little Groundhog a good guy or a bad guy in the garden?

Bad guy

If you were a garden scene investigator, what clues would make you think Little Groundhog was originally a bad guy in the garden?

He was eating lettuce in a neighbor’s garden that didn’t belong to him.

Who was the woodland animal that acted like a garden protection agent?

Squirrel

What did the squirrel suggest that Little Groundhog should do to protect the neighbor’s vegetable garden and the food that was not intended for him?

Squirrel suggested that Little Groundhog should plant his own garden. When Little Groundhog didn’t know how, Squirrel said he would help.

Identify the creatures on the first page of the story and discuss whether they are good guys or bad guys in the garden. Squirrels could eat seeds and dig holes to bury nuts. Birds (a goldfinch and robin) eat insects and seeds. A field mouse eats seeds. The ground squirrel and mole could make tunnels that disturb the roots of the plants. The snake can eat insects and small rodents that eat plants. The turtle eats slugs, which are bad for the plants, but turtles also eat lettuce and worms. The butterfly sucks nectar and pollinates the flowers, but in its caterpillar stage can eat leaves and destroy plants. The honey bee is a pollinator. The praying mantis eats insects in the garden.

On the seed page, an opossum and a raccoon join the group. Why is it risky for all these animals to collect seeds to plant a garden?

They would all be good collectors of seeds, but they would also be very tempted to eat the seeds.

What did many of the woodland creatures do in the wintertime?

Squirrel went to sleep in her tree hole. Groundhog, turtle and mole are sleeping in burrows in the ground.

What does the garden look like in the winter?

In the winter, is there anything in the garden that woodland animals can eat?

There may be seeds in the sunflower heads or other flower heads. There are some plant remains for food and shelter.

Where did the animals put the seeds for the winter?

In a burrow under the ground

What did Wren and Praying Mantis say they could do to protect Little Groundhog’s garden?

They said they would eat the insects that could harm the plants.

What did Little Groundhog have to promise Wren and Praying Mantis?

Not to use bug spray or insecticides.
Why don’t Wren and Praying Mantis want Little Groundhog to use bug spray?
Because it might harm them
Will all bug sprays kill birds and all insects?
No, but if you use them inappropriately it could harm animals, insects and plants that you
don’t want to harm.
What garden creatures, good guys, helped the plants to produce fruits and vegetables?
Bees, flies, butterflies

What garden creatures enjoyed the garden produce at the Thanksgiving dinner?
Squirrel, Groundhog, Skunk, Ground Squirrel or Chipmunk, Bluebird, Mouse, Turtle,
Opossum, Raccoon, Butterfly, Snake, Frog, Toad

For your personal reference, please read Lynne Cherry’s Author’s Note at the end of the story.

EDDIE’S GARDEN by Sarah Garland

What is Lily’s favorite garden creature?
Worms
Are worms good guys or bad guys in the garden?
Good guys
Why?
Lily’s Grandad said they mix the earth up, which is good for the plants.
What were the “bad guys” in Eddie’s garden?
Caterpillars, bugs such as aphids pictured on the leaves, slugs, and sometimes little sisters
who don’t quite understand gardening
What were the clues that Eddie found to determine that these were bad guys in his garden?
The caterpillars ate the lettuce. Some bugs, such as aphids, eat leaves. Slugs ate up the
plants. Sometimes Eddie got upset with his sister for playing in the garden.

What were the “good guys”?
Birds, ladybugs, hoverflies, bees, worms, people
What were the clues that Eddie found to determine that these were the good guys in his
garden?
The birds ate the caterpillars. The ladybirds or ladybugs and hoverflies ate the aphids. The
bees made honey from the flowers. People like to eat honey. Worms improve the soil for
the plants. Eddie and his Mum picked the slugs off the plants at night.

Read about pests on the last page of Eddie’s Garden. Then proceed with the following questions.

If you were garden protection agents, what could you do to protect your garden from the
following pests?

   Aphids – squash them
   Slugs and snails – collect them or set out saucers of sugar water to trap them
   Birds – netting, windmills (for motion) or strips of rustling foil
   Cats, squirrels, mice,
   rabbits, dogs or other
   creatures that dig in the
garden and leave deposits – netting or fencing such as chicken wire
GARDEN PATROL

Decide how you would like to divide the group into eight teams or however many needed for the number of students that you have. Write each pest name from the following list on strips of paper and put them in a bowl or envelope so that the Garden Patrol Teams can draw one. Use Post-it® notes or cut pieces of paper, one per student, for name tags.

PESTS: Rabbits, Deer, Raccoons, Birds, Moles, Ground Squirrels, Insects, Slugs

There are many ways gardeners and farmers keep the “bad guys” away from their crops. We are going to form Garden Patrol Teams to investigate and protect imaginary gardens. You will either become a Garden Scene Investigator (GSI) or a Garden Protection Agent (GPA) on your team. Once I have assigned you to your team, this is what you will do:

1. Count off starting with one. All odd number team members will become Garden Scene Investigators (GSI). All even number team members will become Garden Patrol Agents (GPA). You will each get a blank name tag. Write either GSI or GPA on your name tag so your team members know who you are.

2. Next, your team will draw the name of a garden pest out of the bowl. Talk quietly about the pest. Have you seen one before? What does it look like? What was it doing?

3. The GSI team members will have three questions to investigate and respond to before the GPA team members can respond to their own three questions. Write down the answers to your questions so you can refer to them. (The questions are listed below these instructions.)

4. After answering all six questions, the GSI and GPA team members will use the answers to plan how to lead a game of charades so that the other students can figure out your pest, how it got in the garden, what it did in the garden, and what you decided to do to manage the pest and protect the plants. Everyone in your group must have a part in acting out your charade.

5. Draw a picture illustrating your garden patrol decisions. You will show the picture after the rest of the class guesses your charade.

6. You will have 20 minutes to answer your questions, plan your charade, and draw your pictures.

Divide the group into teams. Have the teams count off and make GSI or GPA name tags. Draw pest names, one per team. As the students are discussing their pest, write the following Garden Patrol questions on the board.

GARDEN SCENE INVESTIGATORS (GSI)

1. How does the culprit get into the garden?
   (Their answers will be something like walk, fly, jump, dig, or tunnel.)

2. What kind of damage does it do to the garden?
   (Their answers will be something like suck juices out of leaves, eat holes in leaves, eat the entire plant, chew holes in the roots, tunnel underneath the plants causing the plants to collapse and die.)

3. How many of these garden bad guys does it take to cause serious damage to the plants?
GARDEN PROTECTION AGENCY (GPA)

Use the GSI responses to answer these questions.

1. When should something be done to protect the garden from the bad guys?
   (Their answers will be something like when there are too many to pick off the leaves,
   when you find tracks, when you see a plant has been eaten, when you plant the garden.)

2. What should be done to eliminate the bad guys from the garden?
   (Their answers will be something like fences, nets or traps. The students will need to
   describe what they will use and how they will use it in the garden.)

3. What method will cause the least amount of other damage to the gardener, other
   insects or animals, or the environment? Give your reasons why.

Reflect

Explain

Develop Concepts

20 MINUTES

Life Science:
Characteristics of organisms
and their environments

Language Arts:
Listening, Observing,
Interpreting, Inferring,
Sequencing, Synthesizing,
Communicating verbally
and nonverbally in large
and small groups

Play charades and show drawings. Use this as an opportunity to evaluate how well they
know their pests, what kind of damage they do in the garden, how to manage them, and how
they communicate what they learned. Acknowledge their creativity even if their management
strategies may not be very realistic. Talk about the consequences of their choices to manage
the pests. You may want to display the drawings on a bulletin board titled “Wanted: Out of My
Garden” or “Garden Patrol.” Here are some tips for discussion.

1. Rabbits hop, walk or burrow their way into a garden. Gardeners keep rabbits out of
   their gardens with 2-foot high chicken wire fences that are buried a few inches deep.
   Rabbits will not jump over a fence this tall, but we can.

2. Deer walk or leap into a garden. Very tall fences, such as 6 feet tall, are needed to
   keep out deer. Some smells that deer are not familiar with such as human hair and
   fragrant bar soap will keep them away. There are some chemicals that deer don’t like
   the taste or smell of, called “deterrents,” that can be sprayed on plants to keep deer
   from eating them. Brightly colored electric fences around a garden also keep deer
   away. They are curious about the colored tape around the wire and put their noses on
   it. After getting a little shock, the deer will turn around and walk away.

3. Raccoons walk or climb over fences into a garden. They love sweet corn, berries and
   grapes. Electric fences give raccoons a little shock to prevent them from entering the
garden. Raccoons can be lured into small cage-like traps, then taken a few miles into
the country and let go. Some gardeners keep a bright light on in their gardens or play
very loud music on the radio all night to scare raccoons away. Unfortunately, these
tricks don’t always work.

4. Birds fly into the garden to eat berries and grapes. Crows are problems to farmers
   because they feed on corn by tearing open the cobs and exposing the ears to the weather.
   Although they cause damage to corn crops, crows are very beneficial to farmers by
   eating the June bugs, grasshoppers, weevils, and other insects that affect farmers’
   fields. A net over fruit trees and grape vines keep the birds from reaching the fruit.
   Gardeners try to put all sorts of things in their gardens, including shiny objects such as
   aluminum pie pans, noise makers, hanging inflatable predators such as owls and
   snakes, and scarecrows to scare away birds. Unfortunately, these don’t always work.

5. Moles dig tunnels and eat soil insects and earthworms. They damage garden plants by
   disrupting their roots when they burrow through a lawn or garden. The best way to
   get rid of moles is to trap them.

6. Ground squirrels dig holes and tunnels under sidewalks and in gardens. They eat seeds
   and bulbs. They can be trapped and moved to another place away from the garden.
7. **Insects** usually fly into a garden, or they deposit their eggs there and the larvae hatch on plant leaves or in the soil. There may be only a few insects or hundreds of them. Gardeners can pick the pests off the plants, use chemicals (insecticides) to kill the insects without damaging the plants, or they rely on other insects or animals (predators and parasites) to eat the garden pests.

8. **Slugs** are snails without shells. They come out at night and chew holes in the leaves of many different kinds of plants. Gardeners go out at night and hand-pick slugs from their plants. They also put traps out that contain things that attract slugs, such as beer or a sweet beverage. The slugs go in the trap, can’t get out and drown. There are chemical baits that can be used to kill slugs.

If you found two insects in a garden would you use the same method to get rid of them as you would if you found two hundred insects?

No, you could easily hand pick them off.

**Why is it important to be careful when controlling pests in gardens and farms?**

So you control only the pest and don’t harm other organisms, yourself or the environment.

**Where have you seen fences?**

**How are they used?**

Around gardens to protect the plants, around farms to keep livestock in and predators out, around homes for privacy, around public places to protect the property and keep people out when the place isn’t open, etc.

**How are nets used for pest control?**

As a barrier to keep the pest from reaching the crop.

There may be other things that cause damage to plants that aren’t caused by a pest. As good GSIs and GPAs, we need to be aware of these things, too. Let’s see how many we can list on the board. (Have a student write these on the board.)

- **Wind** can blow plants over.
- **Pesticides** can drift from a field onto a garden plant and damage it.
- Too much or too little **fertilizer** in the soil
- Too much water or too little **water**
- Too much or too little **light**
- **Hail** damage will make holes in leaves or shred the leaves.
- **A late freeze** in the spring or an **early freeze** in the fall can kill or damage garden plants.

We, people, can be a harmful pest in a garden.

**What kind of damage can we do to plants?**

We can step or fall on plants and break them off, accidentally hoe or pull them up thinking they are weeds, forget to water them if it hasn’t rained, put too many chemicals on them, plant them too closely so they compete for water and space, etc.

*(Play “Pest Control” from Were You Born in a Barn? by Chris Rowlands. Then ask the following questions. You may want to copy the lyrics found at the end of this lesson on an overhead transparency or write the lyrics on the board, flip chart, or poster so the students can follow along.)*

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**Apply**

**Expand**

**ELABORATE IN A NEW WAY**

**15 MINUTES**

**Life Science:**

Characteristics of organisms and their environments

**Language Arts:**

Listening and speaking

**Social Studies:**

Individuals, groups and institutions
Why do farmers want to get rid of pests?  
They harm cattle and crops, which they depend on to make a living for their family.

What were some of the pest controls the farmer mentioned in the song?  
Chemicals, predators such as ladybugs, and crop rotation

What was the farmer’s concern as he was considering which pest control to use?  Using what is best and safest for the land, plants and people.

(Play the song a second time to see if the students can hear all the answers.)

There are many careers related to pest control. Let’s see how many we can list on the board.

- Animal control officer (city government)
- Farmer, gardener, grower, producer (anyone growing plants as a business)
- Home and business pest control operator (i.e., Orkin®)
- Research and development scientist (develops and tests new products and methods)
- Pesticide applicator (applies pesticides on large fields or gardens from sprayers mounted on tractors or carts)
- Aerial pesticide applicator (applies pesticides on large fields from airplanes)
- Department of Natural Resources officer
- Environmental Protection Agency agent
- Educator to help people learn about pests and what they can do to manage them
- Pesticide dealer (sells pesticides)
- Marketing

You may want to construct a scarecrow or two for your classroom or outdoor garden.
Whether you own a ranch or you own a farm,  
You want to keep it healthy, keep it safe from harm.  
But that's not always easy to do  
'Cause when those pests get your crops  
It can really bug you.

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**Chorus:**  
Pests!!! I just hate them.  
Pests!!! I want to exterminate them.  
Pests!!! They damage my cattle and crop.  
Pests!!! Whether you like it or not,  
Pests!!! They've all got to go with the pest control.

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I'm gonna check my crops to see  
Just what kind of pest control that I might need.  
It might not be chemical.  
There are other types of pest control.

Predatory insects like ladybugs  
Can get rid of those unwanted thugs!  
Crop rotation and plants like marigolds  
Other alternative types of pest control  
Make it safe for the plants and the people!

I'm gonna do what's best for the land  
And I'm gonna do it as safe as I can.  
So when the pests get to bothering me  
I'm gonna wipe them out responsibly.
OPTIONAL ACTIVITY IDEAS

OUTSIDE ACTIVITY

This activity is recommended if the weather is conducive to outdoor activities, such as early fall. Give each student several Post-it® notes and a pencil.

Let’s talk about how to be a good garden scene investigator.

How do you know when a creature has been in a garden?

It leaves clues.

Here are some clues that may lead you to the “good guys” or the “bad guys.”

- Holes chewed in the leaves mean insects or slugs may have been feeding there.
- Spots on the leaves mean there may be a disease-causing organism on that plant.
- Look for animal tracks on the soil.
- Entire plants eaten, stems bitten, or missing leaves may mean a rabbit was in the garden.
- Large webs may mean a garden spider is nearby.
- Insects often hide. Turn the leaves over and look.
- Look under mulch and rocks for insects.
- Look at plants such as those with flowers that attract insects.

We are going to walk through the garden, playground or park and look for clues indicating the presence of insects, diseases and animals. On Post-it® notes, write the names or descriptions or draw a picture of any clues or pests that you find.

Take the students outside to look for and write down clues. After returning to the classroom, have the students stick their Post-it® notes on the board in the appropriate column - “good guys” or “bad guys.” Create a separate column and title it “clues.”

Let’s find out how many garden “good guys” we found.
(Have a student read the notes in the “good guys” column.)

Let’s find out how many garden “bad guys” we found.
(Have a student read the notes in the “bad guys” column.)

What clues did we find indicating that pests were present?
(Have a student read the notes in the “clues” column. Discuss the clues and have the students try to match the clues with creatures in the other columns. Place the clues next to the appropriate “bad guy” that could be causing the problem.)

RESOURCES


Grady’s garden is a beautiful, peaceful place where the bright pink flowers of Zo and Zeta Zinnia sway back and forth on their long, straight, slender stems in the golden sunshine. The Zinnias’ leaves occasionally flutter in the breeze. Fruitilda’s long, twisted vines hold a small green fruit growing near some fading blossoms. The plants enjoy each day out in the sun or in the gentle rain. They smile while Grady, the gardener, works in the garden. Grady stands back and admires the beautiful garden. Then Grady takes the tools and walks toward the house. Grady is a hero for caring for the plants in the garden. (Hold up the “Applause” sign.)

Here comes a honeybee, buzzing and flying toward the flowers. The honeybee flaps its little wings hard and fast. It’s on a journey to visit more than six hundred flowers before returning to its hive. The honeybee flies close to Zc Zinnia’s flower to collect nectar from deep inside. The honeybee gets a dusting of pollen on its body while it is searching for nectar. The honeybee leaves Zc Zinnia and flies over to Zeta Zinnia to collect more nectar and pollen. It sheds some pollen on Zeta’s flower. Then it flies back to Zo. The honeybee has just pollinated Zo and Zeta Zinnia. Now they can produce seeds. The honeybee is a hero for helping the plants. (Hold up the “Applause” sign) The honeybee flies off to find more nectar and pollen.

Just as the plants are enjoying the sunny day, along comes an aphid. An aphid is a tiny, hungry insect. Aphids move around on stems and leaves and suck out their juices. Because they suck food instead of chewing, aphids don’t make holes in the leaves. They cause the leaves to turn yellow and brown. This makes aphids villains. (Hold up the “Boo” sign.) Wait, here comes a cute, little, red lady beetle, or ladybug, with black spots. As she flies and crawls around, she spots the aphid and eats it! Lady beetle saved the plants! What a hero! (Hold up the “Applause” sign.) Lady beetles can eat fifty or more aphids a day. The Zinnias and Fruitilda nod thank you while the lady beetle flies off to look for more aphids or other small, tasty insects.

Even smaller than aphids are teeny-tiny organisms called viruses, bacteria and fungi. We can’t see them, but they are working away in the garden and in the plants. Viruses, bacteria and fungi can be heroes when they help plants grow healthy and beautiful. (Hold up the “Applause” sign.) They also can be villains when they make plants sick. (Hold up the “Boo” sign.)
What's that tunneling through the soil around the plants? It's a long, slippery earthworm. The earthworm crawls around and creates tunnels near the plants' roots. Now Zo, Zeta, and Fuitilda's roots can easily absorb more air and water. The plants look at the earthworm to thank it while it squirms away. The earthworm is a hero for making the soil better for plants to grow strong and healthy. *(Hold up the "Applause" sign.)*

As the earthworm squirms away, a small, spotted bean leaf beetle lands on Zeta Zinnia's flower. It looks around and sneers like a villain. *(Hold up the "Boo" sign.)* Then it flies around the garden looking for bean plants to eat. Bean leaf beetles, cucumber beetles, tomato hornworms, and slimy slugs chew holes in leaves and fruits. A squash bug flies to Fuitilda and begins feeding on the leaves by sucking out their juices. A squash bug's favorite foods are pumpkins and squash. You can't see it, but there's also a squash vine borers eating away inside Fuitilda's stem. These insects are villains because they destroy plants. The plants look as if they are in pain. *(Hold up the "Boo" sign.)*

Here comes a long, slender praying mantis stepping smoothly and slowly into the garden. It looks like a dinosaur standing on its back two legs with its front legs held together like it's praying. When the bean leaf beetle gets too close, the praying mantis quickly reaches out, grabs it, and eats it! The praying mantis is a hero for saving the plants. *(Hold up the "Applause" sign.)* Garden creatures such as the praying mantis, lady beetle, lacewing, and spider are called predators. They are good predators because they eat insects that damage plants. They are heroes. *(Hold up the "Applause" sign.)* The praying mantis walks away slowly, looking for its next meal.

Fuitilda is starting to look sick because the squash bug is sucking a lot of juice from her leaves. Out hops a toad, right next to the squash bug. The toad sticks out its tongue, grabs the squash bug, eats it, and hops away. The toad is a hero for helping Fuitilda. *(Hold up the "Applause" sign.)* Turtles and birds such as wrens and robins also eat insects that eat garden plants.

The sun has set and the Zinnias and Fuitilda are looking tired. During the dark and dreary night, a cutworm crawls to the top of the soil. It chews off Zo Zinria's stem right next to the soil. The villain cutworm looks up and sneers as it watches Zo fall to the ground. *(Hold up the "Boo" sign.)* The cutworm takes a few more bites then crawls away.

The animals come out of the forest for a nighttime garden party. The rabbit wiggles its nose and hops to the garden. The raccoon and deer also are invited. These animals think gardens are like "potluck picnics" with an assortment of tasty foods. Animals are fun to watch, but they can be villains in the garden. *(Hold up the "Boo" sign.)* The rabbit starts nibbling on leaves in the garden. Just in time, Grady, the gardener, runs out of the house and over to the garden to chase away the rabbit and other animals. Grady is a hero for saving the plants from the animals that eat them. *(Hold up the "Applause" sign.)* Grady smiles and picks up Zo Zinnia. *(By the hand) Grady takes Zo into the house and puts her in a pretty vase with water *(sets her on a chair.)* Zo and Zeta Zinnia, Fuitilda and Grady feel happy and content. They know that the creatures and people will work together another day to find peace and harmony in the garden.

*THE END*
<table>
<thead>
<tr>
<th>ZINNA</th>
<th>EARTHWORM</th>
<th>PRODUCER</th>
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<tbody>
<tr>
<td>ZETA</td>
<td>BUG</td>
<td>APPLES</td>
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<td></td>
<td>SQUASH</td>
<td>BALL</td>
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<tr>
<td>HONEYBEE</td>
<td>BEETLE</td>
<td>NARRATOR</td>
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<tr>
<td>ZO</td>
<td>BEEF LEAF</td>
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<td></td>
<td></td>
<td>PRAYING MANTIS</td>
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<tr>
<td>Zeta Zinnia – (Onstage in the garden as the melokodora begins) The bright pink flowers of Zeta and Z並花 sway back and forth on their long, straight, slender stems in the golden sunshine. The leaves of the Zinnias are occasionally flutter in the breeze. (Exaggerate the motions that the narrator reads as the creatures come and go in the garden.)</td>
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<th>Earthworm – What’s that rumbling through the soil around the planting? It’s a long, slimy, earthworm. It crawls around and creates tunnels near the plants’ root... The plants look a little away, but the earthworm never leaves them...</th>
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<td>Honeybee – Here comes a honeybee. It’s buzzing and flying toward the flowers. The honeybee flies close to Zeta Zinnia. It Collects nectar from deep inside the flower. Then, it flies away. The honeybee leaves little pollen on Zeta’s petals. Then, it flies back to Zeta. The honeybee flies around looking for more pollen and nectar...</td>
</tr>
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<td>Grady – (Onstage in the garden as the melokodora begins) They (the plants) are at the top of the soil, their leaves sway back and forth in the breeze. (Exaggerate the motions that the narrator reads as the creatures come and go in the garden.)</td>
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<td>Fruilita – (Onstage in the garden as the melokodora begins) Fruilita is flying around near the squash. It spots some squash blossoms. (Exaggerate the motions that the narrator reads as the creatures come and go in the garden.)</td>
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