Oklahoma Ag in the Classroom

Be a Bug Scout

Objective

Students will learn how beneficial insects help plants, such as cotton, survive. Students will use an anticipation guide to as a pre-reading activity and will then read a passage to check their choices. Students will also use insects to create and solve math problems.

Background

A pesticide is anything used to kill a pest. This includes household pesticides like the flea and tick collars on the dog, the roach motel used to kill roaches in the kitchen, even the chlorine in the pool used to kill bacteria.

For many years, farmers have depended upon pesticides to help them grow bountiful crops. But pesticides are expensive, and sometimes they don't work. If the farmer isn't careful, the pesticides can also get into the water we all have to drink. Pesticides don't just kill destructive insects. They also kill beneficial insects. Beneficial insects help by feeding on the insects that are doing the damage. Other beneficial insects are pollinators

For all these reasons, many farmers look for different methods to control insects and weeds. Instead of spraying pesticides on their fields every year, they try a variety of methods. This is called Integrated Pest Management.

Many cotton and alfalfa farmers "scout" their fields to find out how many weeds or bugs are out there and what kind. Then they decide what to do. Encouraging beneficial insects is one method of pest control. Some farmers keep pests away by clearing areas where they like to reproduce. Another method is crop rotation. If the farmer grows a different crop in his field each year he can fool the pests into staying away. That's because different pests attack different crops. Crop rotation keeps pest populations from growing too large in one field from one year to the next.

The farmer may still decide to use some pesticides, but only if other methods fail. After they scout their fields they decide how much pesticide they should use and exactly which kind would work best just on the pests in their fields that year.

Language Arts

1. Read and discuss background and vocabulary.
2. Hand out copies of the Anticipation Guide.
   —Students will make checks next to the statements they think are true as you read the statements from the Anticipation Guide aloud.

Oklahoma Academic Standards

GRADE 2

Speaking and Listening: R.1,2,3,4; W.1,2. Fluency: 1. Critical Reading and Writing: R. 5,7; W.1,2. Vocabulary: R.1,3,5; W.1,2 Number & Operations: 2.5,6; 3.1,2. Geometry: 1.3; 2.1. Data: 1.2 Life Science: 4.1

GRADE 3

Speaking and Listening: R.1,2,3,4; W.1,2. Fluency: 1. Critical Reading and Writing: R.7; W.1,2. Vocabulary: R.1,3,5; W.1,2 Number & Operations: 2.6; 3.1,3; Geometry: 1.1; 2.1. Data: 1.1 Life Science: 3-1; 4-3,4

GRADE 4

Speaking and Listening: R.1,2,3,4; W.1,2. Fluency: 1. Critical Reading and Writing: R.7; W.1,2, Vocabulary: R.1,3,5; W.1,2 Number & Operations: 1.1,4,5; 2.1,4. Geometry: 1.2. Data: 1.1,2 Life Science: 1-1

Materials

rulers

craft sticks, pencils or paint sticks for use as stakes

magnifying glass

Vocabulary

pesticides—a substance used to control insect, plant, or animal pests

Integrated Pest Management (IPM)—ecological approach to pest management, incorporating all available techniques in a plan to manage the pest in such a manner that economic damage is reduced and adverse side effects are minimized

crop rotation—a method of maintaining and renewing the fertility of the soil by alternating the crops grown on one piece of land from one year to the next

beneficial insect—insects considered helpful to the farmer or gardener because they aid pollination (bees, butterflies) or help control harmful insects (lady beetles, dragonflies)

predators—animals that live by preying on others

—Students will work in groups to discuss the statements and their choices.

—Record how many students think each statement is true on the board.

3. Hand out copies of the Reading Page and the Comprehension Page.
   —Before reading the Reading Page, students will complete the Pre-concept Vocabulary Activity at the top of the Comprehension Page.
   —Assign each group a paragraph to read together to "scout out" the answers.
   —Read the passage aloud. Stop after each paragraph and allow the groups to share what they found and how that related to their pre-reading choice.
   —Compare the information they found with their pre-reading choices. How many statements did the majority of the class answer correctly before they read the passage? Discuss how their answers changed after reading the passage.
   —After discussion, students spend a few minutes on focus free writing by writing down what they learned from reading and discussing the passage.
4. After reading the Reading Page, students will write a student-friendly definition for each vocabulary word on the backs of their Comprehension Pages.
5. Students will answer the questions on the Comprehension Page. (Answers: 1. predator, beneficial insect 2.pesticides. 3. Integrated Pest Management 4. crop rotation)
6. After completing their outdoor surveys of insects (below), students will write stories about the insects they find all alone in their specified areas.

Math

1. Take the class outdoors on a day in spring or late summer.
   —Divide your class into groups of three or four.
   —Provide each group with a copy of the Bug Scout observation page, rulers and stakes for marking off a specified area in a grassy part of the schoolyard. Stakes may be craft or popsicle sticks, pencils or paint sticks.
   —Explain to students they will be marking off an area outdoors and counting all the insects they can find within that area. As a class, decide what the size of the area should be so that each group is surveying the same area.
   —Before going out, each group will estimate how many bugs they might find within the specified area and record the number on the observation page.
   —Students will use the stakes provided to measure and mark off the area.
   —Students will work in their groups to count all the insects they can find within the area. Students will record the data on the observation sheets. As an alternative, students may count all the dandelions, henbit or other common weeds within the staked area.
2. Students will create bar graphs, showing how many of each kind of insects they found.

3. Combine the observations of all the groups and graph them as a class.
   —As a class, students will total the number of insects and/or weeds.
   —Students will calculate the total perimeter and area measured by the class.
4. Students will create fractions based on the number of bugs they found, for example, 1/10 of the bugs in John's area were ants, 1/5 of the bugs in Mary's area were ladybugs.
   —Students will use the fractions to create word problems for others to solve.
5. Students will create survey question about insects, ("Which is prettier, a ladybug or a butterfly?" "What is your favorite insect or spider?" "Can you tell me the name of an ant?")
   —Students will use the questions to survey students in another classroom.
   —Students will create bar graphs, pie graphs or line graphs and develop evaluation statements. (e.g., "More than half the students surveyed preferred ladybugs to butterflies.")

Science

1. After learning about insects, students will work together to create a "Can, Have, Are" graphic organizer.
   —Bugs Can_____
   —Bugs Have_____
   —Bugs Are_____
   —Depending on the level of your students, provide them with a sentence starter (Bugs can _____.) or have them write their own sentences about bugs.
2. Students will use 4-H Entomology manuals, insect books from the school library or entomology websites to identify the insects they have drawn on the backs of their observation pages.
   —Students will classify the insects as harmful or beneficial to the farmer.
   —Students will write what they learned and share with the class.

Extra Reading

Hopkinson, Deborah, and Jen Corace, *The Humblebee Hunter,* Hyperion, 2010.
Kelly, Irene, *It's a Butterfly's Life,* Holiday House, 2007.
Llewellyn, Claire, *The Best Book of Bugs*, Kingfisher, 2005.
Mound, Laurence, *Insect (DK Eyewitness Books),* DK Children, 2007.

Name_____

Be a Bug Scout: Anticipation Guide

Before reading the "Be a Bug Scout Reading Page," make a prediction about each statement below. Put a check mark beside each statement you think is true.

1. ___All insects are harmful to a farmer's crops.
2. ___Chlorine for a city pool is considered to be a pesticide.
3. ___Money is probably the only reason Mr. Johnston doesn't use pesticides.
4. ___Plants can call for predator insects to help the.
5. ___Crop rotation is the best way to stop pesky insects.

Oklahoma Ag in the Classroom is a program of the Oklahoma Cooperative Extension Service, the Oklahoma Department of Agriculture, Food and Forestry and the Oklahoma State Department of Education.

Name_____

Be a Bug Scout: Reading Page

There are many insects in Benny Johnston's cotton field, and that's fine with him. Many of the insects are helping him by attacking insect pests that damage his cotton. Twenty years ago, Mr. Johnston probably would have sprayed his fields with pesticides every five days. A pesticide is anything used for controlling a pest. When you put a flea and tick collar on your dog, you are using a pesticide. When your parents put out roach motels to control roaches, they are using pesticides. When city workers pour chlorine into the city pool, they are using pesticides to kill bacteria.

For many years, farmers have depended upon pesticides to help them grow bountiful crops. But pesticides are expensive, and sometimes they don't work. If the farmer isn't careful, the pesticides can also get into the water that we all have to drink. For those reasons, many farmers look for different methods to control insects and weeds. Instead of spraying pesticides on their fields every year, they try several different methods of pest control. This is called Integrated Pest Management.

Many cotton and alfalfa farmers "scout" their fields to find out how many weeds or bugs are out there and what kind. Then they decide what to do. Benny Johnston has cotton bollworms in his fields. The cotton bollworm is a caterpillar that eats corn, cotton,soybeans, lettuce, tomatoes, and other crops. It costs farmers $2 billion each year and is one of the most damaging insects in the world. But Mr. Johnston doesn't want to spray pesticides in his field. Pesticides don't just kill the bad guys, like the cotton bollworm. They also kill the good guys, like the lady beetles and wasps that attack the cotton bollworm. The good guys are called "beneficial insects."

When the cotton bollworm feeds on the cotton plant, the cotton plant gives off distress chemicals. The chemicals attracts the attention of predators. Predators are insects that feed on other insects—lady beetles, wasps and other predators. The distress chemicals draw the attention of the predators. In the cotton field, the predators are the good guys.

When a female wasp locates the cotton bollworm, it attacks and lays a single egg inside the worm's body. The wasp egg hatches inside the worm within a few days and begins to feed on its blood and fat. Other predators eat the eggs and small larvae of the cotton bollworm.

Encouraging beneficial insects is only one method of pest control. Some farmers keep pests away by clearing areas where they like to reproduce. Another method farmers use is crop rotation. If the farmer grows a different crop in his field each year he can fool the pests into staying away. That's because different pests attack different crops. Crop rotation keeps pest populations from growing too large in one field from year to year.

Some farmers decide to go ahead and use pesticides, but they are careful to use them safely and responsibly. After they scout their fields they decide how much pesticide they should use and exactly which kind would work best just on the pests in their fields that year. Some years they may decide not to use them at all.

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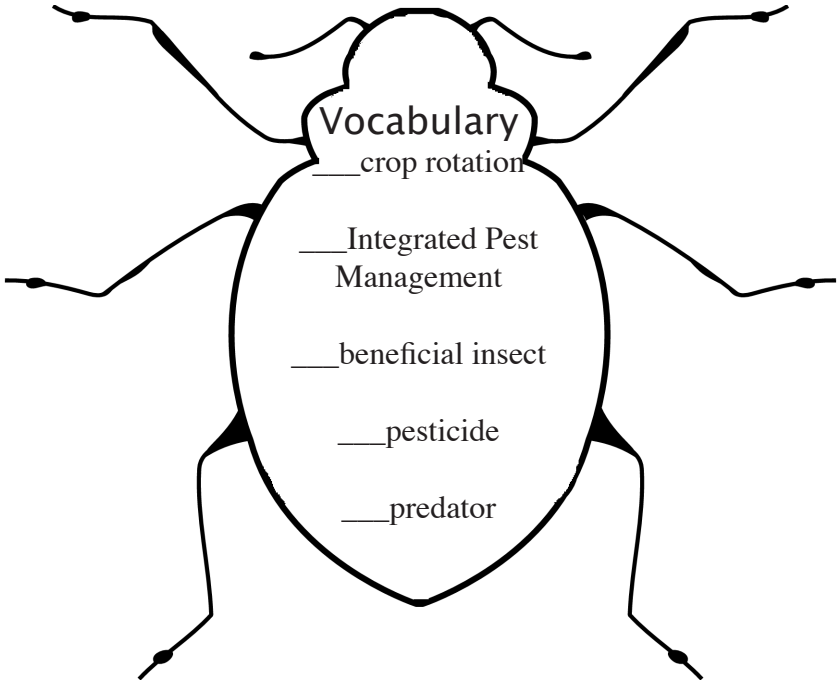
Be a Bug Scout: Comprehension Page

Before reading the "Be a Bug Scout Reading Page", use the following to show what you already know about the vocabulary words listed inside the bug.

+ means you are an expert. You know what the word means, and you can explain it to anyone here.
0 means you have heard the word before, but you are not an expert.
X means you have never heard the word.

SOME COMMON BENEFICIAL INSECTS

wasp
lady beetle
praying mantis
spider
dragonfly



Read the information on the Reading Page and answer the following questions.

1. List two names for "good guy" insects.

2. A dog's flea and tick collar, a roach motel, chlorine for killing bacteria in a swimming pool and chemicals farmers use in the field are all:

3. Mr. Johnston doesn't want to spray his field until he knows what he needs. Sometimes he switches crops from year to year to fool the pests. These are methods of:

   I_____ P_____ M_____

4. Switching crops from one year to the next to fool the pests is called:

   c_____ r_____

After reading the "Be a Bug Scout Reading Page," think about each vocabulary word listed in the insect outline on this page. Using the information you knew before reading the passage and the information you read, write sentences on the back of this page using each word.

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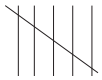
Name_____

Be a Bug Scout: Observation Page

Estimate how many insects you might might find._____

Tally the number of insects you find.



1. Count your tally marks to find out how many insects you saw. Write the number._____
2. Write two colors you saw on the insects you found. _____ and _____
3. Were the bugs crawling or flying? Circle one.
4. Did you touch any of the insects? What did they feel like? _____
5. How many legs does an insect have?_____
6. How many legs does a spider have?_____

On the back of this page, draw two of the insects you saw. Then write a story about one of the insects you drew.

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