Friend or Foe?

8A

The read-aloud for this lesson is especially long and is likely to take longer to present than the time allotted. You may wish to pause after Image 8A-8 and briefly review harmful ("foe") insects.

Introducing the Read-Aloud — *10 minutes*

Essential Background Information or Terms — *5 minutes*

Tell students that the title of today's read-aloud is "Friend or Foe?" Tell students that the word *foe* means enemy or opponent. Then ask what they think the title of the read-aloud means and what they think will be the main topic of the read-aloud. Tell students that they will also learn about one of the insect world's biggest foes, or enemies: human beings.

Vocabulary Preview — *5 minutes*

Pests/Pesticides

1. In today's read-aloud, you will hear about *pesticides.* Pesticides are used to kill certain types of insects called *pests.*
2. Say *pests* with me three times.
   Say *pesticides* with me three times.
3. [Show Image Card 17.] A pest is an insect that destroys crops or food supplies. Pesticides are chemical substances used to kill pests.

Show image 8A-6: Spraying crops with pesticides, honeybee, and bird

4. A small airplane sprays pesticides over the fields to reach all the pests that may be trying to eat the plants there.
5. Why do you think pesticides are used to kill pests? What problems do pests cause? Try to use the words *pests* and *pesticides* in your answers.

Entomologist

Show image 8A-1: Woman entomologist

1. Today's read-aloud is told by someone called an *entomologist.*
2. Say the word *entomologist* with me three times.
3. An entomologist is a person who studies insects.
4. The entomologist traveled to rainforests in different parts of the world to compare the kinds of insects living in the different rainforests.
5. If you were an entomologist, what kinds of insects would you study? Why would you want to study them? What kinds of projects or experiments would you do with them? Try to use complete sentences and use the word *entomologist* in your answer.

Purpose for Listening

Tell students to listen carefully to find out what human beings are doing to harm insects and why this matters.

Presenting the Read-Aloud — **15** *minutes*

Friend or Foe?

Show image 8A-1: Woman entomologist

Hi boys and girls. Surprised to see me? I'll bet you were expecting another fabulous insect. Disappointed to see a fellow human being? I have been fascinated with insects ever since I was in second grade, so I wanted to let you know that if you are like me, you might be lucky enough to keep learning about insects your whole life. I am an **entomologist,** and studying insects is my job.

Some people call me the bug lady, but I study much more than bugs.[1] When I was your age, I called everything that creeps and crawls or buzzes and flies a bug. Do you do that sometimes, too? Lots of people do, but did you know that a bug and an insect are not the same thing? A bug is an insect, but not all insects are bugs. Confusing, isn't it?

1 Here the word *bug* means a small insect that has a beak-like mouth with sucking mouthparts. The word *bug* can also mean to annoy someone.

Show image 8A-2: Shield bug sucking sap from plant

Scientists identify true bugs as insects with beak-like mouths. These piercing, sucking mouthparts allow the insect to pierce the leaf or stem of a plant and suck out the plant juices inside.

Show image 8A-3: Stinkbug, bedbug, and cicada

Let's look at a few bugs. This is a stinkbug.[2] This is a bedbug.[3] Treehoppers and aphids are bugs, too. Here's one you should recognize: a cicada.[4] Look closely if you see one of these bugs outside and you may see its long, piercing mouthparts.

2 [Point to the image on the left.]

3 [Point to the image in the center.]

4 [Point to the image on the right.]

Show image 8A-4: Close-up of ladybug

This is another familiar insect. What is it called? Right, a ladybug! It's called a bug, but is it? Does it have a beak-like mouth with a long, piercing tube? No. Fascinating, isn't it—a ladybug isn't a bug at all!

Show image 8A-5: Leafcutter ant, locusts, fly, and moth (clockwise)

I thought you should know about bugs, but the real reason I'm here today is to talk to you about helpful and harmful insects. I'll start with the bad news. You already know that some plant-eating insects cause major crop damage.[5] Leafcutter ants can strip the leaves from an orange grove in one night. A swarm of locusts, or large grasshoppers, can strip large areas of grassland in just a few hours. Fruit flies are orchard pests as well. The larvae of many moths, flies, bugs, beetles, and weevils are pests. The Colorado potato beetle is another example of an insect that damages crops.[6]

5 What is the word used to describe something that causes major damage or harm? (*destructive*)

6 [Show Image Cards 16 (Potatoes) and 17 (Potato Beetles).] Adults and larvae eat the leaves of the potato plant. Damaged plants can't produce as many potatoes.

Show image 8A-6: Spraying crops with pesticides, honeybee, and bird

So, what's the solution? Humans thought they had a great idea. They created poisonous substances called **pesticides** that would kill all of the insect pests on the whole field so the crops could grow without being eaten.

But there was a problem with that. Do you think the pests were the only animals living in the field?[7]

7 [Pause for students to share.]

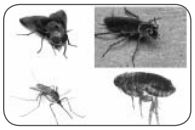
It turns out that the pesticides can be just as big a problem as the pests themselves. These poisons destroy both harmful and helpful insects. Frogs and birds may eat the poisoned insects and become sick, too. They may even die. Pesticides have killed **pollinators** like the honeybee.[8] Without pollinators, plants cannot make seeds to grow new plants or produce fruits. With fewer plants, fewer insects are able to survive. So, you see, the human use of pesticides changes the environment for everybody—and not in a good way. Because of this, you can see how a person can be a **foe,** or enemy, of insects.

8 Pollinators are insects that carry pollen from one plant to another to enable plants to grow and produce flowers or fruit.

Show image 8A-7: Natural insect predators: lacewing and ladybug

A better solution, and one that is being used by many farmers today, is to keep plant pests under control by introducing their natural enemies, one insect against the other. Ladybugs and lacewings are predators that catch and eat aphids. Wasps and ants eat insects harmful to crops as well. Doesn't it make better

sense to use animals to control the growth of pests and weeds instead of poisonous chemicals that kill all living things? I think so.



Show image 8A-8: Fly, cockroach, flea, and mosquito (clockwise)

I do have a little bit more bad news for you before I get to the good news. Some insects can be dirty. They can spread germs. When flies, ants, and cockroaches walk across our kitchen countertops with the same feet they use to crawl through dirt and rotting plants, they can poison our food and make us sick.

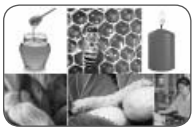
Some insects, such as mosquitoes, fleas, bedbugs, and lice, live off host animals.[9] These types of insects can be very harmful to people. The Anopheles mosquito carries malaria, a deadly disease that has wiped out whole villages in Africa. Hundreds of years ago, fleas that carried deadly bacteria spread the plague, a disease that killed millions of people—or almost one-third of Europe. Today, fleas are more irritating than deadly.

9 You heard about host plants. What is a host animal?

Show image 8A-9: Honeybee and dung beetle

That's enough bad news. Are you ready for some good news? There's lots of it! You already know how important honeybees and other plant pollinators are to the survival of the planet. Without pollinators, there would be no beautiful flowers or sweet fruit, because the crops would not be pollinated, and crops need to be pollinated in order to grow.

Scavenger insects, like the dung beetle, are important, too. By feeding on dead plants and animals and their waste products, scavengers break up dead material and return rich nutrients to the soil.



Show image 8A-10: Honey, honeybee, candle; silk thread, silkworm and cocoons, woman weaving silk cloth

Insects are also responsible for many products that humans use. What product does the honeybee give us? Yes, honey! They also give us beeswax, used to make wood polishes and candles, and even lipsticks! And did you know that the spider is not the only creature that spins silk? Many other insects produce silk as

well. The silk moth lays its eggs on the leaves of mulberry trees. Their larvae, silk caterpillars, spin cocoons out of a single strand of silk. The silk from their cocoons is gathered and unwound to produce beautiful silk thread used to make cloth.

Show image 8A-11: Bowl of crickets, roasted grasshoppers, roasted termites/ants

You know that insects are a food source for other insects and animals, but did you know that many people eat insects as well? Lightly salted crickets are eaten as snacks in many parts of Asia. Roasted grasshoppers with chili and lime are popular in Mexico. Roasted termites are a part of the regular diet of many Africans. Some Australians feast on beetle larvae, and some Europeans enjoy the sweet crunch of chocolate-covered ants.

Show image 8A-12: Collage of insects

You know that insects make up the largest group of animals on Earth. Their ability to adapt over time to nearly every environment has made them terrifically successful survivors on the planet. [10] Whereas, we think that humans have been around for about forty thousand years, some scientists believe that insects have lived on Earth for about four hundred million years! They are the most varied of all animals, coming in all shapes, colors, and sizes. Scientists guess that there are over one million species, but it's hard to know for sure because it is impossible to count them all as they crawl, fly, swim, and hide all around the world.

10 What does the word *adapt* mean?

Show image 8A-13: Rainforest clearance and desert homes

Even with all of these millions and billions and trillions of insects, some are in danger of **extinction,** or disappearing from the earth. How can that be? It happens when many insects are killed at the same time. We humans are insects' worst enemies because we often destroy their native habitats. [11] For example, huge areas of the rainforests have been cleared. [12] When trees are cut down for wood, all of the plants are removed and the insects that live on the plants are destroyed. Insects and other animals

11 What is the word you heard a few minutes ago that means an enemy?

12 [Point to the image on the left.] You may have learned about the rainforest in Grade 1 *Animals and Habitats*. A rainforest is a forest with evergreen trees. It grows near the equator and gets a lot of rain.

that feed on those insects are affected when they can no longer find enough food. Also, people build homes in the desert [13] and not only destroy animal habitats, but also very quickly use up all the water that the desert insects need to survive.

13 [Point to the image on the right.]

Show image 8A-14: Grassland and wetland

Grasslands are often cleared for planting crops. When the grassland host plants disappear, their visiting insects cannot survive. Water is often drained from wetlands to build farms, homes, and roads. When this happens, fertilizers from the farmers' fields often run into the wetlands and encourage plants there to grow out of control. They soak up all the water and the wetland dries up.

Show image 8A-15: Honeybee

So, why do you think it matters whether insects become extinct? Isn't it good to kill those often pesky, sometimes deadly, critters? I don't think so. Think about the honeybee. It may sting you, but a moment's pain is nothing compared to all the benefits it provides by helping to pollinate plants and produce fruits or other foods that you need to survive. We still have a lot to learn about the insect world, but we do know that everything in our world is connected, and that plants and animals depend upon one another for survival. We do not want to upset the balance of nature.

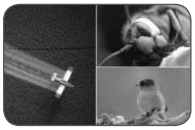
Show image 8A-16: Looking at trees and looking at flowers

Now that you know how important insects are to our world, I hope that you will think twice before squashing a bug beneath your feet. I encourage you to use your own schoolyard to look for insects and spiders. Where might you look? Lots of places—under a rock, in the grass, on bushes and trees, on flowers, and in the soil. Remember, many insects are very good at camouflage, so don't give up. They may be hiding in plain sight.

Discussing the Read-Aloud **15** *minutes*

Comprehension Questions **10** *minutes*

1. *Inferential* What was the main topic of today's read-aloud? (how people can harm the habitat of insects and contribute to their extinction)
2. *Literal* Who is the narrator of today's read-aloud? (an entomologist, or someone who studies insects)
3. *Inferential* What are the characteristics of a bug? (beak-like mouth and triangular head)



Show image 8A-6 Spraying crops with pesticides, honeybee, and bird

4. *Inferential* What is the plane in this image doing and why? (spraying crops with pesticides to kill pests that may destroy the crops) What do you think will happen to this field of crops? (Pests will die; will affect the food chain, killing more than the insects that the pesticide was intended to kill.)
5. *Inferential* You heard in the read-aloud that people can be foes, or enemies, to insects. How are insects foes to people? (Answers may vary, but may include the fact that they can destroy crops, they carry diseases, and they can cause injury.)
6. *Literal* Name one of the many useful products that are produced by insects. (honey; beeswax for candles, wood polish, lipsticks; silk)
7. *Inferential* [Show Image Cards 18 (Cicada) and 19 (Ladybug).] Which one of these two insects is also a bug? (cicada) How do you know? (It has a beak-like mouth and piercing mouthparts, which are the traits that define a bug.)

[Please continue to model the *Think Pair Share* process for students, as necessary, and scaffold students in their use of the process.]

I am going to ask a question. I will give you a minute to think about the question, and then I will ask you to turn to your neighbor and discuss the question. Finally, I will call on several of you to share what you discussed with your partner.

8. *Evaluative* ***Think Pair Share:*** You heard in the read-aloud about a better way for farmers to control pests. What was it? (introduce natural enemies, one insect against another) Do you think that would work? Why or why not? (Answers may vary.)

9. After hearing today's read-aloud and questions and answers, do you have any remaining questions? [If time permits, you may wish to allow for individual, group, or class research of the text and/or other resources to answer these questions.]

Word Work: Foe

***5** minutes*

1. In the read-aloud you heard, "Because of this, you can see how a person can be a *foe,* or enemy, of insects."
2. Say the word *foe* with me.
3. *Foe* means enemy or opponent.
4. When a person tries to kill insects, he becomes the insects' foe.
5. What are some of the ways an insect can become a foe to people? [Ask two or three students. If necessary, guide and/or rephrase the students' responses: "An insect can become a foe to people by . . . "]
6. What's the word we've been talking about? What part of speech is the word *foe*? (noun) How do you know it is a noun? (It is a thing.)

Use an *Antonyms* activity for follow-up. Directions: The antonym of, or the opposite of, a foe is a friend. I am going to describe some interactions between people or between animals. If the person or animal acts like an enemy or opponent, say, "That person/animal is a foe." If the person or animal acts like a friend, say, "That person/animal is a friend."

1. The tiger attacked the antelope. (The tiger is a foe.)
2. The mother cuddled her newborn baby. (The mother is a friend.)
3. The boys and girls played on the playground together. (The boys and girls are friends.)
4. The Persians battled the Spartans in ancient Greece. (They are foes.)
5. Sallie gave Issac a balloon on his birthday. (Sallie is a friend.)

Complete Remainder of the Lesson Later in the Day

Friend or Foe?

8B

Note: Extensions may have activity options that exceed the time allocated for this part of the lesson. To remain within the time periods allocated for this portion of the lesson, you will need to make conscious choices about which activities to include based on the needs of your students.

Extensions — *20 minutes*

Multiple Meaning Word Activity: Bug — *5 minutes*

Multiple Choice: Bug

Note: You may choose to have students hold up one, two, or three fingers to indicate which image shows the meaning being described, or have a student walk up to the poster and point to the image being described.

1. [Show Poster 4M (Bug).] In the read-aloud you heard, "Some people call me the *bug* lady, but I study much more than bugs." Here *bug* refers to a type of insect that has a beak-like mouth and piercing, sucking mouthparts. Which picture shows this kind of *bug?*
2. *Bug* also has other meanings. The word *bug* can mean to bother or annoy someone. Which picture shows this meaning of *bug?*
3. The word *bug* also means a mild sickness, such as a cold, that can be passed from one person to another. Which picture shows this kind of *bug?*
4. Now that we have gone over the different meanings for *bug,* quiz your partner on these different meanings. Use complete sentences. For example, you could say, "Robert is not feeling well; I think he has a bug." And your partner should respond, "That's number '3,'"

Writing an Insect Story: Edit and Final (Instructional Master 8B-1)

20+ *minutes*

- Give each student their copies of their writing plan, draft, and final worksheets. Have students look over their work so far to check that they have said everything they needed or wanted to say about their character(s), setting(s), and plot.
- Give each student an editing checklist. Explain that they are going to edit their paragraphs. Explain that this means they are going to read the paragraph to check for any mistakes and to make sure they have said everything they wanted or needed to say. As time allows, have students share any mistakes they see, what they like about what has been written, and what changes they may suggest.
- After students have edited their draft, have them copy the final version of their story onto the worksheet with their illustration.
- You may also wish to have students share their narratives during the Culminating Activities.