



Armored Tanks of the Insect World

7A

Introducing the Read-Aloud

10 minutes

What Have We Already Learned?

5 minutes

Ask students to name the common characteristics of all insects. (three body parts; six legs; antennae; exoskeleton; and, often, wings) Tell students that they have been introduced to many different kinds of insects. Ask them to name as many as they can: cockroach, fly, butterfly, moth, mosquito, grasshopper, cricket, praying mantis, cicada, honeybee, paper wasp, ant, termite, firefly, etc.

Tell students that the insects they will learn about today are part of the largest group of insects on Earth.



◀ Show image 7A-1: Collage of beetles

Refer students to both the name of the read-aloud (“Armored Tanks of the Insect World”) and the pictures of beetles. Tell students that these insects are all beetles. Ask them to guess what these insects have in common with one another, besides being insects. Show students Image Card 15 (Armored Tank). Ask them how the beetles in the image are similar to the armored tank.

Vocabulary Preview

5 minutes

Armor/Elytra (EL-i-truh)

1. In today’s read-aloud, you will hear about a beetle’s *armor*, and how part of that armor is called *elytra*.
2. Say *armor* with me three times. Say *elytra* with me three times.



◀ Show image 2A-18

3. Armor is a strong cover or shell that protects some plants and animals. A beetle’s hard shell is like this suit of armor because it protects its body.



◀ **Show image 7A-4: Ladybug at rest and ladybug in flight**

Elytra are the hard front wings of beetles that cover and protect the back wings. [Point out the ladybug's elytra, or hard, colored wings in the image. Point out its soft back wings under the elytra.]

4. The ladybug's elytra, which are usually red with black dots, are part of its armor.
5. What other animals have armor? Use the word *armor* in your answer. [If possible, show images of the following: turtle, armadillo, porcupine, snails, clams, and other shellfish.]

Adapt

1. In today's read-aloud, you will hear that many species of beetles *adapt* to their environments or surroundings.
2. Say the word *adapt* with me three times.
3. *Adapt* means to change in order to adjust to or live in new conditions.
4. When we moved, we had to adapt to our new community and new school.
5. Tell your partner about a time when you had to adapt to a new situation. What changes did you have to make? Try to use the word *adapt* when you tell about it.

Purpose for Listening

Tell students that, like many other insects, most beetles have wings. However, beetle wings are different in an important way. Ask students to listen carefully to find out how beetle wings differ from other insects and why their wings are important to them.



Armored Tanks of the Insect World

◀ Show image 7A-2: Ladybug

My grasshopper friend tells me that he asked you to guess the largest group of insects on Earth. Did anyone guess flies? Perhaps you guessed ants. Both ants and flies are good guesses. You may notice flies and ants more often than you do the enormous group of insects to which I belong. Do you remember seeing a picture of me in the first lesson about insects? Who remembers my name? Yes, I'm a ladybug. But did you know that ladybugs are **beetles**? Fireflies are beetles, too. Beetles make up about two-thirds of all insects on our planet.¹ There are over four hundred thousand kinds of beetles.

By the end of today, you will know a lot about these amazingly diverse insects.² They come in all shapes, sizes, and colors.

◀ Show image 7A-3: Firefly, weevil, whirligig, and rhinoceros beetle (clockwise)³



Beetles include fireflies, weevils, whirligigs, and rhinoceros beetles. You already know what makes an insect an insect.⁴ So what makes a beetle a beetle?

First of all, because beetles are insects, we share the same characteristics as all insects. We have a head, a thorax, and an abdomen. We have antennae, six legs, a hard exoskeleton, and wings. Most beetles undergo a complete metamorphosis.⁵

What else do all beetles have in common? Beetles stand out in the insect world because of our heavy **armor**, or protective covering. In addition to our exoskeletons, our wings provide protection. Most beetles have two pairs of wings, but our front wings are not really wings at all. These thick, hard protective coverings are called **elytra** [EL-i-truh].

1 [Draw a simple pie chart on chart paper, a chalkboard, or a whiteboard to illustrate the concept of two-thirds.]

2 The word *diverse* means a wide variety of things, or many different things.

3 [Point to each image as you read the next sentence.]

4 What makes an insect an insect? (All have a head, thorax, abdomen, antennae, six legs, a hard exoskeleton, and many have wings.)

5 What does *metamorphosis* mean? (a change from one form to another)



← **Show image 7A-4: Ladybug at rest and ladybug in flight**

When we're resting, we tuck our delicate back wings under our elytra, or front wings, so that you cannot see them at all. Then, when we are ready to fly, we unlock our elytra and unfold our long, thin back wings. Our elytra provide lift like the wings of an airplane, but they remain quite still as our back wings beat up and down in flight.

Scientists believe one reason insects have survived, or continued to live, in such huge numbers on Earth is because we can fly, but beetles are not the fastest fliers in the insect world. In fact, some ground beetles do not fly at all. Surely one big reason for our survival is the hard, outer wing cases that set us apart from other insects. Being tough, we're able to burrow down under stones and logs into very narrow places where we remain hidden, protected from predators.⁶ It's hard to crush or bite a beetle.

6 or other animals that hunt and eat us



← **Show image 7A-5: Bombardier beetle**

We clever beetles have many means of protection. For instance, look at the bombardier beetle. This ground-living beetle produces chemicals in its abdomen.⁷ When attacked by a predator, the chemicals combine to form a bad-smelling, boiling liquid. The bombardier beetle makes a loud popping noise as it sprays its enemies with the chemicals, sometimes causing a bad burn to the other insect, or causing pain to people.

7 What part of an insect is the abdomen? (the section at the end, farthest away from the head)



← **Show image 7A-6: Wasp beetle**

Mimicry, or animal look-alikes, is another way beetles protect themselves. Look at this beetle. What does it look like? It is called a wasp beetle because its long yellow and black body mimics, or copies, that of a wasp. How do you think this keeps predators away from the wasp beetle? Of course, they are afraid of being stung.



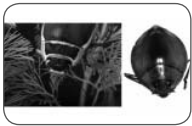
← **Show image 7A-7: Namibian desert beetles**

8 like hundreds and thousands and millions of years

Another reason for the large numbers of beetles is the fact that different species **adapt**, or change over very long periods of time,⁸ to suit their environments. Beetles live in some of the most difficult places to live on Earth, some surviving in the intense heat of the desert and others in underwater habitats where they have to develop ways of breathing underwater.

9 What are elytra? (thick, hard, protective front wing covers)

Many desert beetles are wingless and live beneath the sand where it is cooler and less dry. Some, like these Namibian desert beetles, have stilt-like legs, allowing them to rise above the hot sand. Still others have developed arched elytra, creating tiny air pockets to help protect them from the heat.⁹



← **Show image 7A-8: Diving beetle and whirligig beetle**

10 [Point to the image on the left.]

Because insects need air to live, water beetles must come to the surface to get the oxygen they need to breathe. Some water beetles, like this diving beetle,¹⁰ have developed a trick of carrying oxygen bubbles underwater, trapped just beneath their elytra. This whirligig beetle¹¹ solves the oxygen problem by staying mostly on the surface of ponds and streams, using its paddle-shaped legs to spin and turn. Its eyes, divided into two parts, can see above and below the surface of the water at the same time.

11 [Point to the image on the right.]



← **Show image 7A-9: Boll weevil**

Beetles have adapted over the years to eating different plant and animal foods, as well. With their strong, chewing mouthparts, nearly every possible food source is used by some kind of beetle. Weevils, like this boll weevil, are thought to be some of the peskiest of all beetles. Their long snouts enable them to bore down into the seedpods (bolls) of plants. Boll weevils have destroyed many fields of cotton, laying eggs in the holes they make. When the eggs hatch, the larvae eat the plants from the inside out.

Some beetles feed on grains and seeds. Others chomp on apples, cherries, and other fruits. Still others live on wood and decaying plant life. Carrion beetles and their larvae feed on dead animals.



← **Show image 7A-10: Dung beetle, rolling ball of dung**

Dung beetles are named for the food that they eat. Dung is manure, the solid waste of animals. Dung is very rich in nutrients and an ideal food for young dung beetles. Adult dung beetles compete to get some of the dung. They roll the dung into balls and push them away from the other beetles. They bury the balls in the ground and lay eggs in them. When the eggs hatch, the larvae feed on the dung.



← **Show image 7A-11: Tiger beetle**

12 What does *predator* mean? *Prey* refers to the animal that is hunted and eaten.

Tiger beetles are fierce predators, chasing down almost any prey they can find, including other insects.¹² Their fast legs and strong jaws make their job easy. Tiger beetles are the fastest runners in the insect world. Even the larvae of tiger beetles are predators who eat other insects. The larvae hide in burrows, popping partway out and snatching passing insects with their jaws.



← **Show image 7A-12: Stag beetle**

This stag beetle, with horns like the antlers of a stag (or male deer), looks rather fierce, but it is among the most harmless of all insects and eats mostly tree sap and other liquids. Its horns are actually its jaws. Male stag beetles use these jaws to wrestle with each other for females.



← **Show image 7A-13: Rhinoceros beetle**

13 [You may wish to ask students what they remember about Hercules's strength from the domain *Greek Myths*.]

Horned beetles, like this rhinoceros beetle, include some of the largest beetles in the world. Some of these beetles are also called Hercules beetles due to their great strength.¹³ The males use their horns to drive other males away from a female when it is time to mate. Many of them live in hot, wet, tropical areas.



← **Show image 7A-14: Goliath beetle**

14 [You may want to pass around two golf balls among students and remind them that a single goliath beetle could weigh as much as both golf balls together.]

One of the largest and heaviest of all insects is the male goliath beetle of Africa. Goliaths can grow to be more than five inches long and weigh about as much as two golf balls.¹⁴ Their heavy bodies make them poor fliers, but they are able to climb trees with ease, using their strong legs and good claws.

Aren't we beetles amazing? All insects—from those with eardrums on their abdomens, to those that make their own honey, to those that glow in the dark—are truly amazing. Many insects are so small you may forget they are living all around you—in the trees, underground, even in your houses! It's true that some insects can become a real nuisance, but many insects, like me, are extremely helpful. Next time, you will learn how important insects are to your everyday lives.

Discussing the Read-Aloud

15 minutes

Comprehension Questions

10 minutes

1. *Inferential* The beetle's front wings are called elytra. How do beetles' front wings differ from those of other insects? (Their front wings are not really wings at all, but hard, protective coverings.)
2. *Inferential* Why is it important for beetles to have two sets of wings? (One set is for protection and one is for flying; it also gives them a double chance at survival.)
3. *Inferential* Why can't beetles survive underwater without coming to the surface? (Like us, they need to come to the surface to breathe in oxygen from the air.)



◀ Show image 7A-10 Dung beetle, rolling ball of dung

4. *Literal* What do dung beetles do with the dung that they collect? (They lay their eggs in it, providing a nutritious and readily available meal for their young when they hatch.)
5. *Evaluative* Which of the beetles that you heard about today is your favorite? Why? Give us one fact about it. (Answers may vary.)

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

6. *Evaluative Think Pair Share:* The author of today's read-aloud gave several reasons why there are more beetles in the insect group than any other insect. What are some of those reasons and which do you think is the best reason? Why? (Answers may vary, but may include their heavy armor, including exoskeleton and elytra; ability to fly; mimicry tactics; ability to adapt; etc.)
7. 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: Mimicry

15 minutes

◀ Show image 7A-6: Wasp beetle

1. In the read-aloud you heard, "*Mimicry*, or animal look-alikes, is another way beetles protect themselves."
2. Say the word *mimicry* with me three times.
3. *Mimicry* is when a plant or animal looks like another plant or animal, usually to protect itself from a predator.
4. A wasp beetle's mimicry of a wasp keeps its predators away.
5. What insect in today's read-aloud uses mimicry? (wasp beetle) How does a wasp beetle use mimicry to protect itself? (By looking like a wasp, its predators stay away from it because they are afraid of being stung.)
Try to use the word *mimicry* when you tell about it.
[Ask two or three students. If necessary, guide and/or rephrase the students' responses: "_____ uses mimicry. It uses mimicry to protect itself by . . ."]
6. What's the word we've been talking about?

Use a *Drawing* activity for follow-up. Directions: If you were able to create an insect that used mimicry to protect itself from predators, what animal would your insect mimic, or copy? Draw a picture of your insect and write a short sentence explaining how your insect uses mimicry to protect itself.

Have students share their drawings and writing with classmates, and encourage them to use the word *mimicry* when describing their insect.



Complete Remainder of the Lesson Later in the Day



Armored Tanks of the Insect World

7_B

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

Insects Journal (Instructional Master 7B-1)

20 minutes

- Have students look through trade books for pictures of beetles. Have them draw a picture of a beetle in their journals and write one or two sentences about beetles based on what they learned from today's read-aloud. Tell students that they should also write down any questions they may have about beetles on the back of the page.
- Have students share their drawings, sentences, and questions with their partner or home-language peers. Encourage them to expand upon their vocabulary using richer and more complex language, including, if possible, any read-aloud vocabulary.
- ➦ Have students work in pairs or small groups to look through the book tub or other resources to search for answers to their questions. You may wish to extend this research beyond the classroom book tub to include online resources and/or library resources.

Writing an Insect Story: Draft and Draw (Instructional Master 7B-2)

20 minutes

- Students may continue drafting their Insect Story (Instructional Master 6B-2) that they began in the last lesson. You may wish to have students work together in groups to allow them to give and receive feedback.

- Have students draw an illustration of their story on Instructional Master 7B-2. Tell students that they will edit their story in the next lesson and that they will copy an edited version of their story to this worksheet.

Beetle Puzzle (Instructional Master 7B-3)

15 minutes

- Help students identify each beetle on the page: ladybug, stag beetle, rhinoceros beetle, wasp beetle.
- Then have students make their own puzzle by cutting the page into large shapes, no fewer than six pieces and no more than ten pieces.
- After they have finished cutting, have students write their name on the back of each piece of their puzzle.
- Have students trade puzzle pieces with another student. Students should then put the pieces of their classmate's puzzle together.
- As students put the Beetle Puzzle together, have them explain how they can tell that they are putting the pieces for a certain beetle together.