



Armored Tanks of the Insect World

7

✓ **Lesson Objectives**

Core Content Objectives

Students will:

- ✓ Classify and identify particular insects as small, six-legged animals with three main body parts
- ✓ Identify and describe the three body parts of insects: head, thorax, and abdomen
- ✓ Identify the placement and/or purpose of an insect's body parts
- ✓ Describe an insect's exoskeleton

Language Arts Objectives

The following language arts objectives are addressed in this lesson. Objectives aligning with the Common Core State Standards are noted with the corresponding standard in parentheses. Refer to the Alignment Chart for additional standards addressed in all lessons in this domain.

Students will:

- ✓ Describe the reasons or facts the author of “Armored Tanks of the Insect World” gives to explain why beetles are the largest group of insects on Earth (RI.2.8)
- ✓ Plan, draft, and edit an informative text that presents information about insects, including an introduction to a topic, relevant facts, and a conclusion (W.2.2)
- ✓ Participate in a shared research project on insects (W.2.7)
- ✓ With assistance, categorize and organize facts and information from “Armored Tanks of the Insect World” about beetles (W.2.8)
- ✓ Generate questions and gather information from multiple sources to answer questions about beetles (W.2.8)

- ✓ Add drawings to descriptions of insects that use mimicry to protect themselves to clarify ideas, thoughts, and feelings (SL.2.5)
- ✓ Prior to listening to “Armored Tanks of the Insect World,” identify orally what they know and have learned about insects

Core Vocabulary

adapt, v. Change in order to adjust to new conditions

Example: Children must adapt to new classrooms every year.

Variation(s): adapts, adapted, adapting

armor, n. Protective layer or shell of some plants and animals

Example: A turtle’s protective shell provides heavy armor against its predators.

Variation(s): none

beetles, n. Insects known for their tough outer coverings, including hardened forewings

Example: Beetles have the ability to adapt to nearly every environment on Earth, both land and water.

Variation(s): beetle

elytra, n. Hardened front wings of beetles that cover and protect the back wings


Example: The beetle’s elytra are not used for flight, but provide excellent protection for its delicate back wings.

Variation(s): elytron

mimicry, n. The close resemblance of one plant or animal to another, often serving a protective purpose

Example: A wasp beetle’s mimicry, which makes it look like a stinging wasp, keeps its predators away.

Variation(s): none

<i>At a Glance</i>	Exercise	Materials	Minutes
<i>Introducing the Read-Aloud</i>	What Have We Already Learned?	Image Card 15	10
	Purpose for Listening		
<i>Presenting the Read-Aloud</i>	Armored Tanks of the Insect World	chart paper, chalkboard, or whiteboard; two golf balls	15
<i>Discussing the Read-Aloud</i>	Comprehension Questions		10
	Word Work: Mimicry	drawing paper, drawing tools	5
 Complete Remainder of the Lesson Later in the Day			
<i>Extensions</i>	Insects Journal	trade books; journals from previous lessons	20
	Writing an Informational Narrative: Draft, Part II	Instructional Masters 5B-1, 6B-1; journals from previous lessons; trade books (optional)	



Armored Tanks of the Insect World

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Introducing the Read-Aloud

10 minutes

What Have We Already Learned?

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.

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.



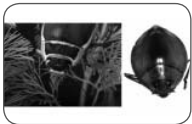
← **Show image 7A-7: Namibian desert beetles**

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.

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

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

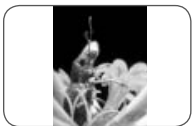


← **Show image 7A-8: Diving beetle and whirligig beetle**

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.

9. *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.)
10. 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

5 minutes

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.
3. *Mimicry* is when a plant or animal looks like another plant or animal, often so it can protect itself from a predator.
4. A wasp beetle's mimicry of a wasp protects it from predators who fear that, like a wasp, it will sting them.
5. What insect in today's read-aloud uses mimicry to protect itself? (wasp beetle) 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: "_____ used mimicry to protect itself from predators."]
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



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Extensions

20 minutes

Insects Journal

5 minutes

Have students look through trade books for pictures of beetles. Have them draw a picture of a beetle in their journals. Then, based on what they have learned, have them write one sentence about something they have learned about beetles. Tell students that they should also write down any questions they may have about beetles. 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.

Have students share their drawings and sentences with the class, and encourage them to expand upon their vocabulary, using richer and more complex language, including, if possible, any domain-related vocabulary.

Writing an Informational Narrative: Draft, Part II (Instructional Masters 5B-1 and 6B-1)

Have students continue drafting their informational narrative that was begun in the last lesson. Remind students that they have now learned about beetles, and they may include beetles in their narrative. You may wish to have students work together in groups to allow them to give and receive feedback.

Tell students that they will have time to edit their narratives in the next lesson.