

Insects

Tell It Again!™ Read-Aloud Anthology



Core Knowledge Language Arts® • Listening & Learning™ Strand



Core Knowledge®

GRADE 2



Insects

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Listening & Learning™ Strand

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Core Knowledge Language Arts®



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Alignment Chart for Insects

The following chart contains core content objectives addressed in this domain. It also demonstrates alignment between the Common Core State Standards and corresponding Core Knowledge Language Arts (CKLA) goals.

Alignment Chart for Insects	Lesson							
	1	2	3	4	5	6	7	8
Core Content Objectives								
Explain that insects are the largest group of animals on Earth	✓	✓						✓
Explain that there are many different types of insects	✓	✓						✓
Explain that most insects live solitary lives, but some, such as honeybees, paper wasps, ants, and termites, are social	✓			✓	✓			
Explain that insects live in virtually every habitat on Earth, with the exception of the oceans	✓							
Classify and identify particular insects as small, six-legged animals with three main body parts		✓				✓	✓	
Identify and describe the three main 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		✓				✓	✓	
Explain why spiders are not insects		✓						
Describe insect life cycles and the processes of complete and incomplete metamorphosis			✓					
Describe how some insects look like miniature versions of adults when they are born from eggs			✓					
Explain why some insects molt			✓					
Describe how some insects go through four distinct stages of development, including egg, larva, pupa, and adult			✓					
Distinguish between social and solitary insects				✓	✓			
Describe how all members of a social insect colony come from one queen				✓	✓			
Describe the roles of honeybee workers, drones, and queens				✓				
Describe how honeybees communicate with one another through "dances"				✓				

Alignment Chart for Insects

Lesson

	1	2	3	4	5	6	7	8
Describe the social behavior of ants and ant colonies					✓			
Describe the roles of worker ants, males, and queens					✓			
Compare and contrast grasshoppers and crickets						✓		
Identify ways in which insects can be helpful to people								✓
Identify ways in which insects can be harmful to people								✓

Reading Standards for Informational Text: Grade 2

Key Ideas and Details

STD RI.2.1	Ask and answer such questions as <i>who</i> , <i>what</i> , <i>where</i> , <i>when</i> , <i>why</i> , and <i>how</i> to demonstrate understanding of key details in a text.							
CKLA Goal(s)	Ask and answer questions (e.g., <i>who</i> , <i>what</i> , <i>where</i> , <i>when</i> , <i>why</i> , <i>how</i>), orally or in writing, requiring literal recall and understanding of the details and/or facts of a nonfiction/informational read-aloud				✓			
	Answer questions that require making interpretations, judgments, or giving opinions about what is heard in a nonfiction/informational read-aloud, including answering <i>why</i> questions that require recognizing cause/effect relationships				✓			
STD RI.2.2	Identify the main topic of a multiparagraph text as well as the focus of specific paragraphs within the text.							
CKLA Goal(s)	Identify the main topic of a multiparagraph nonfiction/informational read-aloud as well as the focus of specific paragraphs within the text							✓
STD RI.2.3	Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.							
CKLA Goal(s)	Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a nonfiction/informational read-aloud				✓			✓
Craft and Structure								
STD RI.2.4	Determine the meaning of words and phrases in a text relevant to a Grade 2 topic or subject area.							
CKLA Goal(s)	Determine the meaning of unknown words and phrases in nonfiction/informational read-alouds and discussions				✓			

Alignment Chart for Insects

Lesson

		1	2	3	4	5	6	7	8
STD RI.2.6	Identify the main purpose of a text, including what the author wants to answer, explain, or describe.								
CKLA Goal(s)	Identify the main purpose of a nonfiction/informational read-aloud, including what the author wants to answer, explain, or describe		✓						
Integration of Knowledge and Ideas									
STD RI.2.8	Describe how reasons support specific points the author makes in a text.								
CKLA Goal(s)	Describe how reasons or facts support specific points the author makes in a nonfiction/informational read-aloud					✓		✓	
STD RI.2.9	Compare and contrast the most important points presented by two texts on the same topic.								
CKLA Goal(s)	Compare and contrast (orally or in writing) similarities and differences within a single nonfiction/informational read-aloud or between two or more nonfiction/informational read-alouds		✓		✓				
Range of Reading and Level of Text Complexity									
STD RI.2.10	By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the Grades 2–3 text complexity band proficiently, with scaffolding as needed at the high end of the range.								
CKLA Goal(s)	Listen to and demonstrate understanding of nonfiction/informational read-alouds of appropriate complexity for Grades 2–4					✓			
Writing Standards: Grade 2									
Text Types and Purposes									
STD W.2.2	Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.								
CKLA Goal(s)	Plan and/or draft, and edit an informative/explanatory text that presents information from a nonfiction/informational read-aloud that introduces a topic, uses facts and definitions to develop points, and provides a concluding statement or section			✓	✓	✓	✓	✓	✓
Production and Distribution of Writing									
STD W.2.5	With guidance and support from adults and peers, focus on a topic and strengthen writing as needed by revising and editing.								
CKLA Goal(s)	With guidance and support from adults and peers, focus on a topic and strengthen writing as needed by revising and editing								✓

Alignment Chart for Insects

Lesson

		1	2	3	4	5	6	7	8
Research to Build and Present Knowledge									
STD W.2.7	Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).								
CKLA Goal(s)	Participate in shared research and writing projects (e.g., after listening to several read-alouds, produce a report on a single topic)			✓	✓	✓	✓	✓	
STD W.2.8	Recall information from experiences or gather information from provided sources to answer a question.								
CKLA Goal(s)	Make personal connections (orally or in writing) to events or experiences in a fiction or nonfiction/informational read-aloud and/or make connections among several read-alouds		✓						
	With assistance, categorize and organize facts and information within a given domain to answer questions	✓		✓	✓	✓	✓	✓	
	Generate questions and gather information from multiple sources to answer questions	✓		✓	✓	✓	✓	✓	
Speaking and Listening Standards: Grade 2									
Comprehension and Collaboration									
STD SL.2.1	Participate in collaborative conversations with diverse partners about Grade 2 topics and texts with peers and adults in small and large groups.								
STD SL.2.1a	Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).								
CKLA Goal(s)	Use agreed-upon rules for group discussions, e.g., look at and listen to the speaker, raise hand to speak, take turns, say “excuse me” or “please,” etc.					✓			
STD SL.2.1b	Build on others’ talk in conversations by linking their comments to the remarks of others.								
CKLA Goal(s)	Carry on and participate in a conversation over at least six turns, staying on topic, linking their comments to the remarks of others, with either an adult or another child of the same age					✓			
STD SL.2.1c	Ask for clarification and further explanation as needed about the topics and texts under discussion.								
CKLA Goal(s)	Ask questions to clarify information about the topic in a fiction or nonfiction/informational read-aloud					✓			
STD SL.2.2	Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.								
CKLA Goal(s)	Retell (orally or in writing) important facts and information from a fiction or nonfiction/informational read-aloud					✓			

Alignment Chart for Insects

Lesson

		1	2	3	4	5	6	7	8
STD SL.2.3	Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information, or deepen understanding of a topic or issue.								
CKLA Goal(s)	Ask questions to clarify directions, exercises, classroom routines and/or what a speaker says about a topic to gather additional information, or deepen understanding of a topic or issue	✓							
Presentation of Knowledge and Ideas									
STD SL.2.4	Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.								
CKLA Goal(s)	Recount a personal experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences		✓						
STD SL.2.5	Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings.								
CKLA Goal(s)	Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings	✓	✓	✓	✓	✓	✓	✓	
STD SL.2.6	Produce complete sentences when appropriate to task and situation in order to provide requested detail or clarification. (See Grade 2 Language.)								
CKLA Goal(s)	Produce complete sentences when appropriate to task and situation in order to provide requested detail or clarification					✓			
Language Standards: Grade 2									
Vocabulary Acquisition and Use									
STD L.2.5	Demonstrate understanding of word relationships and nuances in word meanings.								
STD L.2.5a	Identify real-life connections between words and their use (e.g., describe foods that are <i>spicy</i> or <i>juicy</i>).								
CKLA Goal(s)	Identify real-life connections between words and their use (e.g., describe foods that are <i>spicy</i> or <i>juicy</i>)					✓			
	Provide synonyms and antonyms of selected core vocabulary words		✓			✓	✓		✓
	Determine the meaning of unknown and multiple meaning words and phrases in fiction or nonfiction/informational read-alouds and discussions				✓				✓

Alignment Chart for Insects

		Lesson							
		1	2	3	4	5	6	7	8
STD L.2.6	Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using adjectives and adverbs to describe (e.g., <i>When other kids are happy that makes me happy</i>).								
CKLA Goal(s)	Learn the meaning of common sayings and phrases	✓							
	Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using adjectives and adverbs to describe (e.g., <i>When other kids are happy that makes me happy</i>)	✓							
Additional CKLA Goals									
	Prior to listening to a read-aloud, identify (orally or in writing) what they know and have learned that may be related to the specific story or topic to be read aloud		✓	✓	✓	✓	✓	✓	
	Make predictions (orally or in writing) prior to and during a read-aloud, based on the title, pictures, and/or text heard thus far, and then compare the actual outcomes to predictions		✓						
	Share writing with others	✓							
	Use adverbs correctly in oral language						✓		



These goals are addressed in all lessons in this domain. Rather than repeat these goals as lesson objectives throughout the domain, they are designated here as frequently occurring goals.



Introduction to Insects

This introduction includes the necessary background information to be used in teaching the *Insects* domain. The *Tell It Again! Read-Aloud Anthology for Insects* contains eight daily lessons, each of which is composed of two distinct parts, so that the lesson may be divided into smaller chunks of time and presented at different intervals during the day. The entire lesson will require a total of sixty minutes.

This domain includes a Pausing Point following Lesson 4. At the end of the domain, a Domain Review, a Domain Assessment, and Culminating Activities are included to allow time to review, reinforce, assess, and remediate content knowledge. **You should spend no more than twelve days total on this domain.**

Week One						
Day 1	#	Day 2	Day 3	Day 4	Day 5	# ¹⁰
Lesson 1A: "Insects Everywhere!" (40 min.)		Lesson 2A: "What Makes an Insect an Insect?" (40 min.)	Lesson 3A: "Life Cycles of Insects" (40 min.)	Lesson 4A: "Social Insects: Bees and Wasps" (40 min.)	Pausing Point (60 min.)	
Lesson 1B: Extensions (20 min.)		Lesson 2B: Extensions (20 min.)	Lesson 3B: Extensions (20 min.)	Lesson 4B: Extensions (20 min.)		
60 min.		60 min.	60 min.	60 min.		60 min.

Week Two							
Day 6	Day 7	Day 8	#	Day 9	#	Day 10	#
Lesson 5A: "Social Insects: Ants and Termites" (40 min.)	Lesson 6A: "Insects that Glow and Sing" (40 min.)	Lesson 7A: "Armored Tanks of the Insect World" (40 min.)		Lesson 8A: "Friend or Foe?" (40 min.)		Domain Review (60 min.)	
Lesson 5B: Extensions (20 min.)	Lesson 6B: Extensions (20 min.)	Lesson 7B: Extensions (20 min.)		Lesson 8B: Extensions (20 min.)			
60 min.	60 min.	60 min.		60 min.			60 min.

Week Three			
Day 11	# ¹⁰	Day 12	#
Domain Assessment (60 min.)		Culminating Activities (60 min.)	
60 min.		60 min.	

¹⁰ Lessons include Student Performance Task Assessments

Lessons require advance preparation and/or additional materials; please plan ahead

Domain Components

Along with this Anthology, you will need:

- *Tell It Again! Media Disk* or the *Tell It Again! Flip Book** for *Insects*
- *Tell It Again! Image Cards* for *Insects*
- *Tell It Again! Supplemental Guide* for *Insects*

*The *Tell It Again! Multiple Meaning Word Posters* for *Insects* are found at the end of the *Tell It Again! Flipbook*.

Recommended Resource:

- *Core Knowledge Grade 2 Teacher Handbook*, edited by E. D. Hirsch, Jr. and Souzanne A. Wright (Core Knowledge Foundation, 2005) ISBN 978-1890517748

Why Insects Are Important

This domain will introduce students to the largest group of animals on Earth. Students will learn the characteristics of insects, the life cycles of insects, how insects can be categorized as solitary or social, and how insects are viewed as both helpful and harmful. For example, students will learn how insects are important to the process of pollination and in the production of honey, some cosmetics, and even medicines. Students will gather the information they learn in a journal and will have the opportunity to further research questions and points of interest. Students will use the information gathered in their journals to plan, draft, and edit an informational narrative.

Each of the read-alouds in this domain is narrated by a different character. Lessons 1 through 7 are narrated by an insect character, and Lesson 8 is narrated by an entomologist.

This domain will lay the foundation for review and further study of the life cycles, habitats, and classifications of insects and other animals.

What Students Have Already Learned in Core Knowledge Language Arts During Kindergarten and Grade 1

The following domains, and the specific core content that was targeted in those domains, are particularly relevant to the read-alouds students will hear in *Insects*. This background knowledge will greatly enhance students' understanding of the read-alouds they are about to enjoy:

Plants (Kindergarten)

- Describe how bees collect nectar and pollen
- Explain how bees make and use honey
- Describe the important role bees play in plant pollination

Animals and Habitats (Grade 1)

- Describe what a habitat is
- Explain why living things live in habitats to which they are particularly suited
- Classify animals on the basis of the types of food they eat (herbivore, carnivore, omnivore)

Core Vocabulary for Insects

The following list contains all of the core vocabulary words in *Insects* in the forms in which they appear in the domain. These words appear in the read-alouds or, in some instances, in the “Introducing the Read-Aloud” section at the beginning of the lesson. Boldfaced words in the list have an associated Word Work activity. The inclusion of the words on this list does not mean that students are immediately expected to be able to use all of these words on their own. However, through repeated exposure throughout all lessons, they should acquire a good understanding of most of these words and begin to use some of them in conversation.

Lesson 1

habitats

host

insects

social

solitary

Lesson 2

abdomen

antennae

exoskeletons

microscopic

thorax

Lesson 3

larva

metamorphosis

molt

nymph

progression

pupa

Lesson 4

colonies

cooperate

drones

pollen

societies

Lesson 5

aggressive

chambers

destructive

emit

nurseries

Lesson 6

bioluminescence

forelegs

lanterns

transparent

tymbals

Lesson 7

adapt

armor

beetles

elytra

mimicry

Lesson 8

entomologist

extinction

foe

pesticides

pollinators

Student Performance Task Assessments

In the *Tell It Again! Read-Aloud Anthology for Insects*, there are numerous opportunities to assess students' learning. These assessment opportunities range from informal observations, such as *Think Pair Share* and some Extension activities, to more formal written assessments. These Student Performance Task Assessments (SPTA) are identified in the *Tell It Again! Read-Aloud Anthology* with this icon: ⑩. There is also an end-of-domain summative assessment. Use the Tens Conversion Chart located in the Appendix to convert a raw score on each SPTA into a Tens score. On the same page, you will also find the rubric for recording observational Tens scores.

Above and Beyond

In the *Tell It Again! Read-Aloud Anthology for Insects*, there are numerous opportunities in the lessons and in the Pausing Point to challenge students who are ready to attempt activities that are above grade level. These activities are labeled “Above and Beyond” and are identified with this icon: ↗.

Supplemental Guide

Accompanying the *Tell It Again! Read-Aloud Anthology* is a *Supplemental Guide* designed specifically to assist educators who serve students with limited English oral language skills or students with limited home literary experience, which may include English Language Learners (ELLs) and children with special needs. Teachers whose students would benefit from enhanced oral language practice may opt to use the *Supplemental Guide* as their primary guide in the Listening & Learning Strand. Teachers may also choose to begin a domain by using the *Supplemental Guide* as their primary guide before transitioning to the *Tell It Again! Read-Aloud Anthology*, or may choose individual activities from the *Supplemental Guide* to augment the content covered in the *Tell It Again! Read-Aloud Anthology*.

The *Supplemental Guide* activities that may be particularly relevant to any classroom are the Multiple Meaning Word Activities and

accompanying Multiple Meaning Word Posters, which help students determine and clarify different meanings of words; Syntactic Awareness Activities, which call students' attention to sentence structure, word order, and grammar; and Vocabulary Instructional Activities, which place importance on building students' general academic, or Tier 2, vocabulary. These activities afford all students additional opportunities to acquire a richer understanding of the English language. Several of these activities have been included as Extensions in the *Tell It Again! Read-Aloud Anthology*. In addition, several words in the *Tell It Again! Read-Aloud Anthology* are underlined, indicating that they are multiple-meaning words. The accompanying sidebars explain some of the more common alternate meanings of these words. *Supplemental Guide* activities included in the *Tell It Again! Read-Aloud Anthology* are identified with this icon: ↔.

Recommended Resources for Insects

Trade Book List

The *Tell It Again! Read-Aloud Anthology* includes a number of opportunities in Extensions, Pausing Point, and the Culminating Activities for teachers to select trade books from this list to reinforce domain concepts through the use of authentic literature. In addition, teachers should consider other times throughout the day when they might infuse authentic domain-related literature. If you recommend that families read aloud with their child each night, you may wish to suggest that they choose titles from this trade book list to reinforce the domain concepts. You might also consider creating a classroom lending library, allowing students to borrow domain-related books to read at home with their families.

1. *About Insects*, by Cathryn Sill and illustrated by John Sill (Peachtree Publishers Ltd., 2003) ISBN 978-1561452323
2. *Ant Cities*, by Arthur Dorros (HarperCollins Publishers, 1987) ISBN 978-0064450799
3. *Are You a Bee?*, by Judy Allen and Tudor Humphries (Kingfisher, 2001) ISBN 978-0753458044

4. *Are You a Butterfly?*, by Judy Allen and Tudor Humphries (Kingfisher, 2003) ISBN 978-0753456088
5. *Are You a Dragonfly?*, by Judy Allen and Tudor Humphries (Kingfisher, 2001) ISBN 978-0753458051
6. *Are You a Grasshopper?*, by Judy Allen and Tudor Humphries (Kingfisher, 2002) ISBN 978-0753458051
7. *Are You a Ladybug?*, by Judy Allen and Tudor Humphries (Kingfisher, 2000) ISBN 978-0753456033
8. *Are You an Ant?*, by Judy Allen and Tudor Humphries (Kingfisher, 2002) ISBN 978-0753458037
9. *Bee Life*, by Lynette Evans (Insight Editions, 2013) ISBN 978-1608871988
10. *Beetles*, by Cheryl Coughlan (Capstone Press, 1999) ISBN 978-0736802352
11. *Bugs are Insects*, by Anne Rockwell and illustrated by Steve Jenkins (HarperCollins Publishers, 2001) ISBN 978-0064452038
12. *Children's Guide to Insects and Spiders*, by Jinny Johnson (Simon & Schuster, 1996) ISBN 978-0689811630
13. *Chirping Crickets*, by Melvin Berger and illustrated by Megan Lloyd (HarperCollins Publishers, 1998) ISBN 978-0064451802
14. *Clara Caterpillar*, by Pamela Duncan Edwards (HarperTrophy, 2001) ISBN 978-0064436915
15. *Crickets*, by Cheryl Coughlan (Capstone Press, 1999) ISBN 978-0736882088
16. *The Dragonfly Door*, by John Adams and illustrated by Barbara L. Gibson (Feather Rock Books, Inc., 2007) ISBN 978-1934066126
17. *Eliza and the Dragonfly*, by Susie Caldwell Rinehart and illustrated by Anisa Claire Hovemann (Dawn Publications, 2004) ISBN 978-1584690597
18. *From Caterpillar to Butterfly*, by Deborah Heiligman and illustrated by Bari Weissman (HarperCollins Publishers, 1996) ISBN 978-0064451291

19. *Grasshopper on the Road*, by Arnold Lobel (HarperCollins Publishers, 1978) ISBN 978-0064440943
20. *Grasshoppers*, by Margaret Hall (Capstone Press, 2005) ISBN 978-0736850964
21. *Helpful and Harmful Insects*, by Molly Aloian and Bobbie Kalman (Crabtree Publishing Company, 2005) ISBN 978-0778723752
22. *Hey Little Ant*, by Phillip and Hannah Hoose illustrated by Debbie Tilley (Tricycle Press, 1998) ISBN 978-1883672546
23. *Honey in a Hive*, by Anne Rockwell and illustrated by S.D. Schindler (HarperCollins Publishers, 2005) ISBN 978-0064452045
24. *The Honey Makers*, by Gail Gibbons (Mulberry Books, 1997) ISBN 978-0688175313
25. *Honeybees*, by Joyce Milton and illustrated by Pete Mueller (Grosset & Dunlap, 2003) ISBN 978-0448428468
26. *How to Hide a Butterfly*, by Ruth Heller (Grosset & Dunlap, 1992) ISBN 978-0448404776
27. *Hurry and the Monarch*, by Antoine Ó Flatharta illustrated Meilo So (Dragonfly Books, 2009) ISBN 978-0385737197
28. *Insects: Six-Legged Animals*, by Suzanne Slade and Rosiland Solomon (Picture Window Books, 2010) ISBN 978-1404855243
29. *The Insect Book*, by Connie Zakowski (Rainbow Books, Inc., 1997) ISBN 978-1568250373
30. *Insect Bodies*, by Molly Aloian and Bobbie Kalman (Crabtree Publishing Company, 2005) ISBN 978-0778723745
31. *Insect Life Cycles*, by Molly Aloian and Bobbie Kalman (Crabtree Publishing Company, 2005) ISBN 978-0778776239
32. *Inside an Ant Colony*, by Allan Fowler (Children's Press, 1998) ISBN 978-0516263656
33. *The Life and Times of the Ant*, by Charles Micucci (Houghton Mifflin, 2003) ISBN 978-0618689491

34. *The Life and Times of the Honeybee*, by Charles Micucci (Houghton Mifflin, 1995) ISBN 978-0395861394
35. *The Life Cycle of a Butterfly*, by Bobbie Kalman (Crabtree Publishing Company, 2002) ISBN 978-0778706809
36. *The Life Cycle of a Honeybee*, by Bobbie Kalman (Crabtree Publishing Company, 2004) ISBN 978-0778706946
37. *The Life Cycle of an Ant*, by Bobbie Kalman and Hadley Dyer (Crabtree Publishing Company, 2006) ISBN 978-0778707004
38. *The Magic School Bus: Inside a Beehive*, by Joanna Cole and Bruce Degen (Scholastic Inc., 1996) ISBN 978-0590257213
39. *Monarch Butterfly*, by David M. Schwartz and photography by Dwight Kuhn (Creative Teaching Press, Inc., 1999) ISBN 978-1574715798
40. *Monarch Butterfly*, by Gail Gibbons (Holiday House, 1989) ISBN 978-0823409099
41. *A Monarch Butterfly's Life*, by John Himmelman (Children's Press, 1999) ISBN 978-0516265377
42. *Old Cricket*, by Lisa Wheeler and illustrated by Ponder Goembel (Aladdin Paperbacks, 2003) ISBN 978-1416918554
43. *On Beyond Bugs!*, by Tish Rabe and illustrated by Aristides Ruiz (Random House, 1999) ISBN 978-0679873037
44. *Sarah's Story*, by Harley Bill and illustrated by Eve Aldridge (Tricycle Press, 1996) ISBN 978-1582461786
45. *The Very Quiet Cricket*, by Eric Carle (Penguin Group, 1990) ISBN 978-0399218859
46. *Where Butterflies Grow*, by Joanne Ryder and illustrated by Lynne Cherry (Puffin Books, 1989) ISBN 978-0140558586
47. *A World Without Bees*, by Kenneth Peters and illustrated by Sonya Opal (Ken W. Peters, 2011) ISBN 978-0986615818
48. *Joyful Noise: Poems for Two Voices*, by Paul Fleischman (HarperCollins, 1988) ISBN 978-0060218522

Websites and Other Resources

Student Resources

1. **Insect and Bug Word Search**
http://www.primarygames.com/science/insects/games/word_search/search.htm
2. **Insect Riddles**
http://www.bugs.com/kids_corner/insect_riddles.asp
3. **San Diego Zoo Insect Page (for students)**
<http://kids.sandiegozoo.org/animals/insects>
4. **University of Michigan Wasps, Bees, and Ants**
<http://www.biokids.umich.edu/critters/Hymenoptera/pictures>

Teacher Resources

5. **Honeybee Mystery**
<http://kids.nationalgeographic.com/kids/stories/animalsnature/honey-bee-mystery>
6. **Insects**
<http://www.insects.org>
7. **San Diego Zoo Insect Page (for teachers)**
<http://www.sandiegozoo.org/animalbytes/a-insects.html>

There are numerous places, both on-line and at science supply stores, to purchase live and/or preserved insect specimens for use in classroom observations.



Insects Everywhere!

1

✔ **Lesson Objectives**

Core Content Objectives

Students will:

- ✓ Explain that insects are the largest group of animals on Earth
- ✓ Explain that there are many different types of insects
- ✓ Explain that most insects live solitary lives, but some, such as honeybees, paper wasps, ants, and termites, are social
- ✓ Explain that insects live in virtually every habitat on Earth, with the exception of the oceans

Language Arts Objectives

Students will:

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.

- ✓ With assistance, categorize and organize facts and information from “Insects Everywhere!” to determine in which habitats insects can be found (W.2.8)
- ✓ Generate questions and gather information from multiple sources to answer questions about insects (W.2.8)
- ✓ Ask questions to clarify directions for a research and writing activity involving insects (SL.2.3)
- ✓ Add drawings to descriptions of insects to clarify ideas, thoughts, and feelings (SL.2.5)
- ✓ Explain the meaning of “eaten out of house and home” and use in appropriate contexts (L.2.6)

Core Vocabulary

habitats, n. The natural homes or environments of plants and animals

Example: Desert habitats are home to plants and animals that can survive without regular rainfall.

Variation(s): habitat

host, n. A plant or animal on which, or in which, another organism lives

Example: The milkweed plant is a host for the Monarch butterfly.

Variation(s): hosts

insects, n. Small animals with six legs and three main body parts

Example: Mackenzie likes all kinds of insects, especially butterflies.

Variation(s): insect

social, adj. Living together in organized communities


Example: The social honeybees worked all through the night to take care of the queen bee.

Variation(s): none

solitary, adj. Living alone or in pairs

Example: The solitary fly circled the food-covered table alone before landing on my ham sandwich.

Variation(s): none

<i>At a Glance</i>	Exercise	Materials	Minutes
<i>Introducing the Read-Aloud</i>	Domain Introduction		10
	What Do We Already Know?	chart paper, chalkboard, or whiteboard	
	Purpose for Listening		
<i>Presenting the Read-Aloud</i>	Insects Everywhere!	suction cup (optional)	15
<i>Discussing the Read-Aloud</i>	Comprehension Questions		10
	Word Work: Habitats		5
 Complete Remainder of the Lesson Later in the Day			
<i>Extensions</i>	Sayings and Phrases: Eaten Out of House and Home		20
	Insects Journal	trade books; premade booklet for each student with a minimum of ten pages [This exercise requires advance preparation.]	
<i>Take-Home Material</i>	Family Letter	Instructional Masters 1B-1, B-2	



Insects Everywhere!

1A

Introducing the Read-Aloud

10 minutes

Domain Introduction

Ask students the following:

- What is the smallest animal you have ever seen?
- Do you know of any small animals that have six legs?

Tell students that for the next several days, they will be learning about small, six-legged animals called insects. Tell students that insects are the largest group of animals on the earth and that there are many different types of insects. Tell them that they will learn about some of the many different types of insects, what characterizes an animal as an insect, the life cycle of insects, and how insects may be helpful and/or harmful.



What Do We Already Know?

← Show image 1A-1: Insect collage

Point to the collage and tell students that all of the insects pictured in this domain are shown bigger than life size so the students can see them better. Ask students if they recognize any of the insects pictured in this image. Ask if any of these insects live in the area in which students live. Ask students to share one fact they know about any of the insects pictured. You may want to record student responses on chart paper, a chalkboard, or a whiteboard to review during the course of the domain.

Purpose for Listening

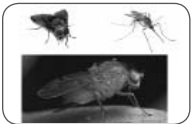
Tell students they are going to be introduced to a variety of insects with homes all over the planet. Tell them that today's read-aloud is called "Insects Everywhere!" because insects live in nearly every habitat on Earth. Ask them to listen carefully to find out the only places on Earth where insects cannot survive.



Insects Everywhere!

← Show image 1A-2: Common housefly

Hello, boys and girls. I've been invited to join you today to talk about a very important subject—me. Who knows what type of animal I am? Right. I'm a fly. I'll bet most of you have seen lots and lots of flies, haven't you? I'm told that you find us flies rather annoying, so I'm guessing that you've swatted at one of my billions of cousins at least once in your life!



← Show image 1A-3: Different types of flies

I'm wondering just how much you really know about us. For example, did you know that I could walk straight up a wall? I'll bet you can't do that, can you? I have thousands of tiny hairs on my feet that act like suckers.¹ I am a housefly, the most common type, but there are many other fly species on Earth. A species is a group of plants or animals that are alike in important ways. Horseflies, robber flies, fruit flies, gnats, and mosquitoes have many different species that all belong to the same group.

1 These hairs attach to the wall, acting like suction cups, allowing the fly to climb vertical surfaces. [Demonstrate with your hand the difference between vertical and horizontal. You may wish to show how a suction cup works.]



← Show image 1A-4: Planet Earth

Scientists group animals into different categories. What different kinds of animals can you name? Yes—fish, snakes, frogs, birds, and insects are just a few of the animal groups you know. Flies, like me, belong to the largest group of animals on Earth. Who knows which group is the largest? **Insects!**² Insects are small animals with six legs and three main body parts. We flies are insects, and we share the planet with millions of other insects in many different **habitats**.

2 For every ten animal species in the world, about eight of them are insects! And scientists continue to discover more.

3 [If students participated in the Core Knowledge Language Arts program in Grade 1, remind them they learned the names of several different habitats when they studied the *Animals and Habitats* domain. Ask them to name some of the habitats they remember learning about.]

Habitats are the natural homes of plants and animals. Can you name a few?³ Great—deserts, forests, mountains, grasslands, and tundra are some you may know about. During the next few lessons, some of my fellow insect friends are going to teach you lots of interesting facts about insects that live in different kinds of habitats.

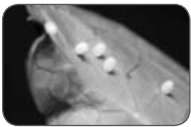
We insects live all over the globe—everywhere except the oceans. Insects can even live in some very cold or very hot areas of the earth!



← **Show image 1A-5: Alfalfa field in bloom**

We'll start today by looking at meadow grasslands. Look out over this field of alfalfa. Do you see any animals in the picture? It just looks like an ordinary grassy field without much going on, doesn't it? But, don't be fooled; this field is teeming with life!⁴ If you sat down in the middle of this meadow and closed your eyes, you would likely hear birds singing, but you might be completely unaware of the often silent, hidden world of insects all around you.

4 or full of life



← **Show image 1A-6: Insect eggs on leaf**

Many insects depend on plants to live. Many insects eat plants and some lay their eggs on plants. The plant on which an insect lays its eggs, and which provides food for its young, acts as **host** and is called a host plant.⁵ Each host plant attracts different types of insects. Many insects would die without their host plants because they have developed very specific diets needed to live.

5 A host is a plant or animal on which, or in which, another thing lives.



← **Show image 1A-7: Grasshopper, leafhopper, aphids**

Many meadow plants attract grasshoppers. Grasshoppers⁶ feed on the leaves and stems of the alfalfa plant. Harder to find is the tiny leafhopper,⁷ but this wedge-shaped insect can slow down the plant's growth, turning it brown as it sucks nutrition from its host plant.

6 [Point to the insect in the top left corner of the image.]

7 [Point to the insect in the bottom left corner of the image.]

8 [Point to the insects on the right side of the image.]

Many insects, such as these tiny aphids,⁸ can damage entire meadows. Grasshoppers, leafhoppers, and aphids are all pests. Farmers are never happy when they discover them on their plants because they can destroy their crops. But not all insects are pests.

← **Show image 1A-8: Ladybug, lacewing, ambush bug**

Who knows what this insect is called?⁹ That's right. It's a ladybug. Did you know that ladybugs are some of the most helpful insects on Earth? They feed on aphids and the eggs of moths and



9 [Point to the insect on the left side of the image.]

10 [Students who participated in the Core Knowledge Language Arts program in Kindergarten may remember that these trees are called conifers and deciduous trees.]

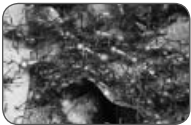


beetles that destroy crops. Lacewings and ambush bugs also eat aphids, so farmers are happy when they see these insects on their plants.

From grasslands, let's move to a forest habitat. Both cone-bearing evergreens and trees that drop their leaves each year live in this forest.¹⁰

← **Show image 1A-9: Pine trees and bark beetle**

Many, like these pine trees, are hosts to a variety of bark beetles. These tiny insects can kill huge trees! How can that be possible? Bark beetles burrow, or dig, under the tree's bark, creating a series of tunnels in which they lay their eggs. Well, let's think about this . . . what does a tree need to live? By burrowing into the layer of wood beneath the bark, these beetles stop the flow of nutrients, or food and water, throughout the tree and often kill the tree.



← **Show image 1A-10: Swarm of army ants**

Lots of insect activity takes place overhead in the forests, but many insects also live on the forest floor. Can you think of any? Ants are one of the most common insects on Earth, and many live in the forest. Unlike many of us **solitary** insects that live on our own, ants are **social** insects that live in colonies, or groups.¹¹ Let's look at an especially interesting social ant that lives in the rainforest.

11 How are social insects and solitary insects different from one another?



← **Show image 1A-11: Army ant**

This is an army ant. Army ants travel in big raiding parties that cooperate to hunt prey.¹² They resemble, or look like, an army of soldiers as they move across the ground together in a large group. These ants are known for swarming their prey all at once, which means that the swarm can attack a lot of prey at the same time. You'll learn more about ants another day, so let's take a quick peek at one more forest insect.

12 Prey are animals that are hunted and eaten by other animals.



← **Show image 1A-12: Rhinoceros beetle**

This beetle is named for the long, large horn at the front of its head. Does its horn look like that of any other animal that you already know? I'm thinking of a much larger animal. Yes, a rhinoceros! The rhinoceros beetle uses its horn for digging hideouts and finding food along the forest floor. Male rhinoceros beetles use the horn for wrestling with other males in an effort to win over a female beetle. The male that succeeds in throwing the other off a branch gets the female rhinoceros beetle.



← **Show image 1A-13: Tundra and crane fly**¹³

What kinds of insects do you think live in the coldest habitats? There are many types of flies on the tundra, this very cold habitat, including houseflies like me.

This Arctic crane fly has amazingly long legs.¹⁴ And, guess what? Adult crane flies have no mouths . . . so they never eat! Here's another fact about them that's not too surprising: they only live for a few days.¹⁵

13 What habitat is shown in this image?

14 [You may wish to show a picture of a Sandhill Crane or a Siberian Crane, two birds of the Arctic that also have very long legs.]

15 Why do you think they live only for a few days?

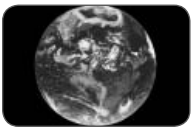


← **Show image 1A-14: Dragonfly hovering above water**

Some insects are aquatic, meaning that they live in or near water. Here's one that you may have seen in rivers, ponds, or streams. This insect is a dragonfly!

A few minutes ago, however, I told you that there is one large water habitat that does not support the life of insects. Do you remember what that habitat is?¹⁶ The ocean!

16 [Pause for students' responses.]



← **Show image 1A-15: Planet Earth**

Let's look at the globe again. Is the earth covered by more land or more water? Right—nearly two-thirds of the earth is covered by water and most of that water is in our oceans. Think about it. Oceans are the world's biggest habitat, yet no insects live there. But insects, found on only one-third of the earth's surface, are still the largest group of animals on Earth!



← Show image 1A-16: Insect collage¹⁷

17 [Point to the insect as you read its name.]

18 Even though they look different, what are some things these insects might have in common with each other?

Flies. Grasshoppers. Ants. Caterpillars. Beetles. These are all insects, yet they look quite different from one another—different shapes, sizes, and colors. So, what makes an insect an insect? You'll find out next time. In the meantime, be thinking about how a fly is like a grasshopper, or a beetle is like an ant.¹⁸

Discussing the Read-Aloud

15 minutes

Comprehension Questions

10 minutes

If students have difficulty responding to questions, reread pertinent passages of the read-aloud and/or refer to specific images. If students give one-word answers and/or fail to use read-aloud or domain vocabulary in their responses, acknowledge correct responses by expanding the students' responses using richer and more complex language. Ask students to answer in complete sentences by having them restate the question in their responses.

1. *Literal* What is the largest group of animals on Earth? (insects) Are there many different types of insects or only a few different types of insects? (many)
2. In what large water habitat are insects unable to survive? (oceans)
3. *Inferential* Many insects depend upon host plants to stay alive. In what ways do these host plants help the insects? (provide food and a place to lay eggs)
4. *Inferential* If you were a farmer, which would you rather see on your crops: a ladybug or a grasshopper? Why? (a ladybug, because grasshoppers eat and kill some plants)
5. *Inferential* You heard in the read-aloud that flies are solitary, or live on their own. How are ants, which are social insects, different from solitary insects, like a fly? (Social insects live in groups.)

[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.

6. *Evaluative Think Pair Share:* Imagine that there was no water on Earth. Do you think insects could still survive? Why or why not? (No, because they depend upon plants to live and plants need water; all living things need water to survive.)
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: Habitats

5 minutes

1. In the read-aloud you heard, "We flies are insects, and we share the planet with millions of other insects in many different *habitats*."
2. Say the word *habitats* with me.
3. Habitats are the natural homes of plants and animals.
4. Chimpanzees live in rainforests, their natural habitats.
5. Think of some other animals that you have learned about. What are the types of habitats in which those animals live? Use the word *habitats* when you talk about them. [Ask two or three students. If necessary, guide and/or rephrase the students' responses: "_____ live in habitats called . . ."]
6. What's the word we've been talking about? What part of speech is the word *habitats*? (noun) How do you know it is a noun? (It is a thing.)

Use a *Making Choices* activity for follow-up. Directions: I am going to name some habitats. If what I name is a habitat where insects live, say, “That is an insect habitat.” If what I describe is not a habitat where insects live, say, “That is not an insect habitat.”

1. desert (That is an insect habitat.)
2. rainforest (That is an insect habitat.)
3. tundra (That is an insect habitat.)
4. ocean (That is not an insect habitat.)
5. grassland (That is an insect habitat.)

Note: You may wish to help students distinguish between the natural habitats of animals in the wild and the artificial homes people sometimes provide for animals. For example, rivers and ponds are habitats for fish; aquariums are not habitats because they are not natural homes for fish.



Complete Remainder of Lesson Later in the Day



Insects Everywhere!

1
B

Extensions

20 minutes

Sayings and Phrases: Eaten Out of House and Home

5 minutes

Proverbs are short, traditional sayings that have been passed along orally from generation to generation. These sayings usually express general truths based on experiences and observations of everyday life. Although some proverbs do have literal meanings—that is, they mean exactly what they say—many proverbs have a richer meaning beyond the literal level. It is important to help your students understand the difference between the literal meanings of the words and their implied or figurative meanings.

Ask the students if they have ever heard anyone say they were “eaten out of house and home.” Have students repeat the proverb. Explain that this proverb is another way of saying that someone (or something) has eaten all of the food in your house. Tell students that instead of saying, “When my friends came over, they ate all the food in the house,” you could say, “When my friends came over, we were eaten out of house and home.”

Remind students that they heard about a few insects today that live on, and eat, different types of plants and trees. For example, grasshoppers, leafhoppers, and aphids feed off various types of plants and can even eat enough to destroy entire meadows. These insects, which also live on these host plants, can be said to have “eaten [themselves] out of house and home.”

Look for opportunities to use the saying “eaten out of house and home” in your classroom.

Insects Journal

Tell students that they are going to create an Insects Journal to record the information they will learn about insects. Tell students that they should also write down any questions they may have about insects, and that they will have the opportunity later to look

through several trade books about insects to look 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, having students work in pairs or small groups to conduct their research.

Give each student a premade booklet with at least ten pages, and tell them to write their name on the cover as author and illustrator. Students may illustrate their covers now or later, as time allows. They may also create a title now or create one later after hearing more read-alouds.

Have students look through the classroom book tub for trade books about insects. Tell them to choose a picture of an insect they would like to draw in their journals.

Tell students that because you have just given them several instructions, they may wish to turn to another student and ask a question about the instructions such as, “What should we do first?”

Have students write a complete sentence about their drawings. Also tell them to write down any questions they may have about insects. As students share their drawings, sentences, and questions with the class, expand upon their vocabulary using richer and more complex language, including, if possible, any read-aloud vocabulary. Tell students to keep in mind any unanswered questions to see if they are answered in the following days.

Take-Home Material

Family Letter

Send home Instructional Masters 1B-1 and 1B-2.



What Makes an Insect an Insect?

2

✔ **Lesson Objectives**

Core Content Objectives

Students will:

- ✓ Explain that insects are the largest group of animals on Earth
- ✓ Explain that there are many different types of insects
- ✓ Classify and identify particular insects as small, six-legged animals with three main body parts
- ✓ Identify and describe the three main 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
- ✓ Explain why spiders are not insects

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:

- ✓ Identify the main purpose of “What Makes an Insect an Insect?” including what the author wants to explain (RI.2.6)
- ✓ Orally compare and contrast insects and non-insects, such as spiders (RI.2.9)
- ✓ Make a personal connection in writing to experiences with insects (W.2.8)

- ✓ Recount a personal experience with insects with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences (SL.2.4)
- ✓ Add drawings to descriptions of insects to clarify ideas, thoughts, and feelings (SL.2.5)
- ✓ Use the antonyms *microscopic* and *gigantic* appropriately in oral language (L.2.5a)
- ✓ Prior to listening to “What Makes an Insect an Insect?” identify orally what they know and have learned about insects and their habitats
- ✓ Prior to listening to “What Makes an Insect and Insect?” orally predict the characteristics of an insect, and then compare the actual outcomes to predictions

Core Vocabulary

abdomen, n. The end part of an insect’s body; the body segment that contains the digestive and reproductive structures

Example: The abdomen is the largest body part of most insects.

Variation(s): abdomens

antennae, n. Sensory appendages, or feelers, on the heads of insects

Example: The mosquito’s feathery antennae provide it with a highly developed sense of smell.

Variation(s): antenna

exoskeletons, n. The stiff body coverings of insects, providing support and protection; skeletons on the outside of the body

Example: The thick exoskeletons on beetles protect them from being squashed by larger animals.

Variation(s): exoskeleton

microscopic, adj. Refers to something that is too small to be seen without the aid of a microscope; very small


Example: Tiny microscopic bugs live in the pond behind my house, but they are too small for me to see with my eyes alone.

Variation(s): none

thorax, n. The middle part of an insect’s body between the head and the abdomen; the body segment that contains the heart and the leg attachments

Example: Joshua’s favorite dragonflies have a bright green thorax.

Variation(s): thoraxes, thoraces

<i>At a Glance</i>	Exercise	Materials	Minutes
<i>Introducing the Read-Aloud</i>	What Have We Already Learned?		10
	Making Predictions About the Read-Aloud	chart paper, chalkboard, or whiteboard	
	Purpose for Listening		
<i>Presenting the Read-Aloud</i>	What Makes an Insect an Insect?	Image Card 1	15
<i>Discussing the Read-Aloud</i>	Comprehension Questions	list of predictions made prior to read-aloud	10
	Word Work: Microscopic		5
 Complete Remainder of the Lesson Later in the Day			
<i>Extensions</i>	Insects Journal: Personal Narrative	trade books; journals from previous lesson	20
	Vocabulary Instructional Activity: Sections	drawing paper, drawing tools	
	Am I an Insect?	Image Cards 2–5	



What Makes an Insect an Insect?

2A

Introducing the Read-Aloud

10 minutes

What Have We Already Learned?

Ask students to name the largest group of animals on Earth. Remind them that the fly in the previous read-aloud introduced them to a variety of insects that live in nearly all parts of the world. Ask to name the one habitat in the world that does not have insects. (oceans) Also ask students to explain the difference between social and solitary insects. (Social insects live in groups, whereas solitary insects live alone or in pairs.)



← **Show image 1A-16: Insect collage**

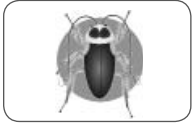
Ask students to look at the collage of insects once more and name some ways in which these insects are different from one another. Then ask students to name several ways in which the insects are similar to one another. Tell them that today they are going to learn what all insects have in common.

Making Predictions About the Read-Aloud

Ask students to make predictions about what things all insects have in common, or what makes an insect an insect. Record students' predictions on chart paper, a chalkboard, or a whiteboard.

Purpose for Listening

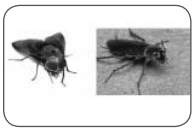
Tell students to listen carefully for the things all insects have in common, or what makes an insect an insect, and to see if their predictions are correct.



What Makes an Insect an Insect?

← Show image 2A-1: Cockroach

Hello, boys and girls. The last time you gathered to learn about insects you were joined by a fly, an insect with whom you are surely familiar. I am also a very common insect that loves to live in bathtubs or underneath kitchen sinks. My cousins and I often hide during the day so you may not notice us. Does anyone know what type of insect I am? I am a cockroach. Do you think I look anything like a fly?



← Show image 2A-2: Fly and cockroach

There are millions of insects on Earth. At first glance, we may look very different from one another. What are some of those differences? ¹ What are some ways we are the same?

1 [Pause for students' responses.]



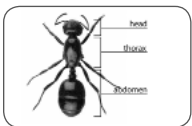
← Show image 2A-3: Butterfly, grasshopper, lice, and fleas (clockwise)

Some insects, like butterflies and grasshoppers, have wings whereas others, like fleas and **microscopic** lice, don't. ² Some eat plants and others eat animals, but all insects have certain features in common. I am here to talk about what makes an insect an insect.

2 The word *microscopic* refers to things that are very, very small, like something that can only be seen well or at all with a microscope.

3 [Say the word *insect* followed by the word *section*.] What part of both these words sounds similar?

Our name should give you a clue. ³ An insect's body is built in sections, or parts—three parts to be exact. We'll use one of my friends, the ant, as an example.



← Show image 2A-4: Ant with three sections labeled ⁴

All insects have a head, a **thorax**, and an **abdomen**. The head is the center of an insect's senses, but different kinds of insects can have very different-looking heads. The thorax is the middle part of the insect's body. The abdomen is the end of the insect's body farthest away from the head.

4 [Point to the body parts in the image as you read about them.]



← **Show image 2A-5: Insect heads**

What do you notice about the heads of these common insects? Do they look anything like yours? Do they have eyes? Yes, they do, but they are different from your eyes. For one thing, many insects have more than two eyes.



← **Show image 2A-6: Cricket's head**

Most insects, like this cricket, have big eyes located on the side of the head. Many insects also have smaller, simple eyes on the tops of their heads. Look closely at this cricket's head. Can you see its eyes? Although some insects see better than others, most insects also use other senses to get information about their environments.



← **Show image 2A-7: Bush cricket's head with focus on its mouth**

Look at this bush cricket. Does it have a mouth? Yes, its mouth is a small hole at the front of its head, surrounded by mouthparts. You and the cricket both use your mouths to taste and eat.⁵

5 What are the parts of your mouth called? (tongue, teeth, taste buds, lips)



← **Show image 2A-8: Cockroach, aphids, mosquito, and bee (clockwise)⁶**

Look at the variety of insect mouthparts. Some look like sponges; others look like scissors or needles. An insect's mouth is carefully designed for eating certain types of foods. Some insects bite and chew solid foods; others suck liquids; still others pierce their foods.

6 [Point to the image as you read about the specific insect.]

For example, cockroaches like me eat just about anything we can find. We have two pairs of jaws for biting, cutting, and chewing food well. Other insects, like the tiny aphids that destroy farmers' crops, have mouthparts that look more like drinking straws. They feed by sucking sap from plant leaves and stems through these tubes.

Look how long and sharp this mosquito's mouthpart is—perfect for piercing the skin of its prey and sucking its blood. Have you ever been bitten by a mosquito? They love to feed on people, as well as other animals like horses and birds. Butterflies and bees have long mouthparts for sucking nectar from flowers.⁷

7 [Show Image Card 1 (Butterfly).] Look closely. Can you see this Monarch butterfly's mouthparts working like a straw to suck nectar from this flower?



8 What are the body parts humans use to sense things, or to learn more about our surroundings? (eyes, ears, nose, mouth, skin)



9 What is the middle section of an insect's body called?



10 Here the word *patch* means a piece of skin covering an opening. The word *patch* can also mean a small area of land where a particular plant grows, like a pumpkin patch.

← **Show image 2A-9: Variety of insect antennae**

So, now you've seen insect eyes and mouths. What else do you see on the head of these insects? Ah, yes, those long feelers! Those are the insects' **antennae**, their most important sense organs. Insect antennae come in a variety of shapes and sizes and help insects learn more about their surroundings.⁸

← **Show image 2A-10: Cricket antennae**

These jointed feelers, such as those on this cricket, are often covered with tiny bristles and pegs, and some are even quite feathery. Antennae are primarily used for smell and touch, although some can pick up sounds or detect movements in the air. Do you see a nose on this cricket? No, at least nothing that looks like your nose. Instead of a nose, the cricket uses its antennae to smell.

Eyes. Mouth. Antennae. What else might you expect to find on an insect's head? What other sensory organs do you have on the side of your head? Right—ears! Do you see any ears on this cricket? No. The cricket's ears are located on its legs, attached to the middle section of the cricket's body.⁹

The middle section of an insect's body is called the thorax. The thorax has three pairs of jointed legs and usually, but not always, two pairs of wings. Notice I said *pairs*. A pair is two of a specific item. If there are three pairs of legs, how many legs does an insect have altogether? Yes, all insects have six legs.

Let's take a look at the cricket's thorax and see if we can spot its ears.

← **Show image 2A-11: Cricket's thorax and front legs**

Look just below its knee joint on the front leg. Do you see a smooth patch of skin?¹⁰ That is the cricket's eardrum which is very important for it as it communicates with other crickets through sound. The cricket's eardrum bends in and out to catch the sound waves so it can communicate with other crickets.



11 [Pause for students to answer as you read the following questions.]

← **Show image 2A-12: Grasshopper, bee, and backswimmer beetle**

Insect legs vary according to an insect's lifestyle.¹¹ How do you think the long, muscular, back legs of a grasshopper might help it? That's right—its legs are designed for jumping to quickly escape danger. Have you ever seen the fuzzy legs of a honeybee covered with yellow clumps of pollen that it carries back to its hive? And how do you think the backswimmer beetle's pair of long legs help it in its water habitat? Notice the oar-like shape of the legs that it uses for paddling.



12 If caterpillars have three pairs of true legs, how many true legs do they have?

← **Show image 2A-13: Caterpillar with focus on true legs and prolegs**

Caterpillars have three pairs of true legs on the front part of their bodies, but their long bodies need extra support so they also have several pairs of stubby legs in back to help them cling to stems and leaves.¹² These false legs are called prolegs. Caterpillars loop along, grasping stems with their front legs, or true legs, before drawing their bodies up into a loop to hold on with their hind legs, or prolegs.



13 [You may wish to show the veins in your hand or the veins in a leaf.] Veins carry needed materials to different parts of the body.

← **Show image 2A-14: Dragonfly wings**

Only adult insects have wings, and some insects don't have any wings at all. If an insect does have wings, they are located on the insect's middle section, or thorax. Wings allow insects to move quickly from place to place, and they are surely one reason insects have survived in such large numbers for so many years. Insect wings may look very different from one another, but a network of veins supports each wing.¹³



← **Show image 2A-15: Cricket wing**

When it's quiet at night, especially in the summer time, you may hear an interesting chirping noise coming from insects outside. That sound may be a cricket! Crickets' wings have veins. The veins of a male cricket's wings are thicker and shaped differently from many other insects. You'll learn more another day about how a cricket uses its wings to make its unique chirping sounds.

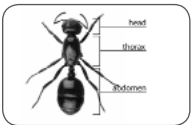


← **Show image 2A-16: Cricket's abdomen with spiracles**

14 [Pause for students' responses.]

So far, we've looked at an insect's head and its thorax. Every insect body is made up of three sections. What is the name of the third section?¹⁴ The third and largest section is called the abdomen. Do you have an abdomen? Yes, you do. Your abdomen is your belly. Like an insect, your abdomen is where you digest your food, or break it down so your body can use it to grow and stay healthy. An insect's abdomen is also the part of its body where the female produces eggs. The abdomen is also where insects breathe. Like you, insects need oxygen from the air to live, but they do not have lungs, and they do not take in air through their noses or mouths.

Instead, if you look closely at this cricket's abdomen, you will see a line of tiny holes along its side. That is where insects take in air, containing oxygen, to breathe.



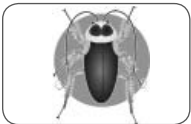
← **Show image 2A-17: Ant with three sections labeled**

So, what makes an insect an insect? Well, it has three body parts—head, thorax, and abdomen. It also has six legs, and most insects have wings. But that's not all. All insects are invertebrates, meaning that they have no backbones. Instead of having skeletons inside their bodies like you, insects wear their skeletons on the outside.



← **Show image 2A-18: Insect's exoskeleton and suit of armor**

These waterproof **exoskeletons**, made of a tough, flexible material called chitin [ki-tin], protect the insect's soft insides like a suit of armor. Just like your backbone and bones, an insect's exoskeleton is the thing to which the insect's muscles attach.



← **Show image 2A-19: Cockroach**

Here is a picture of another one of my cousins. We cockroaches were around long before the dinosaurs. I think our thick exoskeletons may have something to do with our long survival, don't you?¹⁵

15 Why would the cockroach's hard exoskeleton help it to survive for so long?

Next time the narrator of the read-aloud will be an insect that holds its front legs together in a prayer position. What do you think that might be? She'll tell you how insects grow from tiny eggs into adults. Be prepared to be amazed!

Discussing the Read-Aloud

15 minutes

Comprehension Questions

10 minutes

If students have difficulty responding to questions, reread pertinent passages of the read-aloud and/or refer to specific images. If students give one-word answers and/or fail to use read-aloud or domain vocabulary in their responses, acknowledge correct responses by expanding the students' responses using richer and more complex language. Ask students to answer in complete sentences by having them restate the question in their responses.

1. *Evaluative* What do all insects have, or what makes an insect an insect? (All insects have three body parts: head, thorax, abdomen. They also have exoskeletons, or hard outer coverings.) [Refer students to the list the class made before listening to the read-aloud.] Were your predictions correct about what makes an insect an insect? (Answers may vary.)
2. *Inferential* In this read-aloud you heard about, and saw pictures of, many different insects. Based on what you heard and on the pictures you saw, what do you think the author was trying to explain in this read-aloud? (The author was trying to explain what makes an insect an insect and that, although there are many different types of insects, they all have the same body types.)
3. *Literal* On what part of the cricket's body are its ears located? (its front legs just below the knee joint)



← **Show image 2A-8: Cockroach, aphids, mosquito, and bee (clockwise)**

4. *Inferential* Look at these insect mouth parts again. Which insects bite and chew their food? (cockroaches) How can you tell? (by the shape of its mouth; no long tube for sucking or sharp object for piercing) Which insect has a mouth shaped like a straw and is used to suck out sap from plant leaves and stems? (aphid) Which insect has a long tongue that is used to suck nectar from flowers? (bee) Which insect has a sharp mouthpart that is used to pierce the skin of its prey? (mosquito)
5. *Evaluative* In what ways is an insect's skeleton different from yours? (It is on the outside of the body and is called the exoskeleton; it is hard like armor.) In what ways is it the same? (They serve the same purpose—protection and support; both are flexible; and both have muscles attached.)



← **Show image 2A-13: Caterpillar with focus on true legs and prolegs**

6. *Inferential* How many legs do insects have? (six) This caterpillar has many more legs than that. Is it an insect? Why or why not? (Yes; it has six true legs and the rest are prolegs, or false legs.)

[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.

9. *Evaluative Think Pair Share:* If you could choose any insect feature (antennae, special mouth parts, more legs, wings, etc.) to add to your own body, what would it be? Why? (Answers may vary.)
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: Microscopic

5 minutes

1. In the read-aloud you heard, “Some insects, like butterflies and grasshoppers, have wings whereas others, like fleas and *microscopic* lice, don’t.”
2. Say the word *microscopic* with me.
3. If something is microscopic, it is very, very small, such as something so small you would need a special tool like a microscope to see it.
4. The germs that cause many diseases are microscopic, so they can’t be seen with just your eyes.
5. What are some other things that are microscopic? [Ask two or three students. If necessary, guide and/or rephrase the students’ responses: “Something that is microscopic is . . .”]
6. What’s the word we’ve been talking about?

Use an *Antonyms* activity for follow-up. Directions: The opposite, or antonym, of the word *microscopic* is the word *gigantic*. If *microscopic* means very, very small, what do you think *gigantic* means? *Gigantic* means very, very large. I am going to name some things. If what I name is very, very small, say, “That is microscopic.” If what I name is very, very large, say, “That is gigantic.”

1. a building that is forty stories tall (That is gigantic.)
2. an insect that we can’t see crawling through the soil (That is microscopic.)
3. the Sun (That is gigantic.)
4. the Pacific Ocean (That is gigantic.)
5. a single grain of sand on the beach (That is microscopic.)



Complete Remainder of Lesson Later in the Day



What Makes an Insect an Insect?

2_B

Extensions

20 minutes

Insects Journal: Personal Narrative

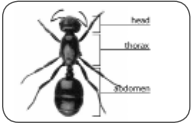
Have students think about the times they have interacted personally with insects. Ask them to think about what the insect looked like, where they saw the insect, and how the insect interacted with them. Ask students to write at least two to three complete sentences about their experiences with insects in their journals. Allow students to share their personal narratives with the class. They may also wish to draw a picture to illustrate their narrative. As students share their sentences and drawings, expand upon their vocabulary using richer and more complex language, including, if possible, any read-aloud vocabulary.

- ↗ Above and Beyond: For any students who are ready to do so, they may extend this activity by using the trade books and other resources to gather more information about the insect they wrote about.

↔ Vocabulary Instructional Activity: Sections

1. In the read-aloud you heard, “An insect’s body is built in *sections*, or parts.”
2. Say the word *sections* with me.
3. Sections are parts of something larger.
4. We planted the tomatoes, corn, and cucumbers in different sections of the garden.
5. What other items are made of different sections? [Ask two or three students. If necessary, guide and/or rephrase the students’ responses: “_____ is made up of sections.”]
6. What’s the word we’ve been talking about?

Use a *Drawing* activity for follow-up. Directions: Draw a picture of something that is made up of different sections. When you complete your drawing, write a sentence or two that describes the sections in the item you drew.



Am I an Insect?

← Show image 2A-4: Ant with three sections labeled

Have students identify the three body parts of all insects: head, thorax, and abdomen.

← Show image 2A-5: Insect heads

Have students identify parts of insect heads, including antennae (used for touch and smell) and mouthparts with specially developed uses.

← Show image 2A-11: Cricket's thorax and front legs

Ask students to identify the part of the insect's body visible in this image where legs and wings are attached. (thorax)

Ask students to identify the part of the body not visible in this image that is responsible for digestion, egg production, and breathing. (abdomen)

Show students Image Cards 2 (Cockroach), 3 (Dragonfly), 4 (Beetle), and 5 (Spider), and ask them to identify the four animals in the images. Ask students to compare and contrast the animals in the images, focusing on the parts of the different bodies. Ask students how the animal in Image Card 5 is different from the animals in the other images. (It has eight legs.) Ask them if a spider is an insect. (no) How can you tell? (Insects have six, not eight, legs.)



Life Cycles of Insects

3

✔ **Lesson Objectives**

Core Content Objectives

Students will:

- ✓ Describe insect life cycles and the processes of complete and incomplete metamorphosis
- ✓ Describe how some insects look like miniature versions of adults when they are born from eggs
- ✓ Explain why some insects molt
- ✓ Describe how some insects go through four distinct stages of development, including egg, larva, pupa, and adult

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:

- ✓ Plan, draft, and edit an informative text that presents information from “Life Cycles of Insects,” including an introduction to a topic, relevant facts, and a conclusion (W.2.2)
- ✓ Participate in a shared research project on the life cycles of insects (W.2.7)
- ✓ With assistance, categorize and organize facts and information from “Life Cycles of Insects” to determine the differences between complete and incomplete metamorphosis (W.2.8)
- ✓ Generate questions and gather information from multiple sources to answer questions about the life cycles of insects (W.2.8)

- ✓ Add drawings to descriptions of insect metamorphosis to clarify ideas, thoughts, and feelings (SL.2.5)
- ✓ Prior to listening to “Life Cycles of Insects,” identify orally what they know and have learned insects

Core Vocabulary

larva, n. The immature stage of an insect’s complete metamorphosis, between egg and pupa; insect larva do not resemble the adult insect
Example: A butterfly egg turns into a larva known as a caterpillar.
Variation(s): larvae


metamorphosis, n. The process of change, taking place in two or more distinct stages, in the life of an insect
Example: Tadpoles develop into frogs during a process of change known as metamorphosis.
Variation(s): metamorphoses

molt, v. To shed old feathers, hair, skin, or shells, making way for new growth
Example: As it grows, a snake will molt, leaving behind the skin it sheds.
Variation(s): molts, molted, molting

nymph, n. The immature stage of an insect that does not undergo a complete metamorphosis, between egg and adult; the nymph resembles the adult insect
Example: The nymph stage of a cicada can last for years before the cicada emerges as a fully-developed, winged adult.
Variation(s): nymphs

progression, n. A continuous and connected series of actions or events
Example: The progression of the phases of the moon from new moon to full moon and back to new moon again follows a predictable pattern.
Variation(s): progressions

pupa, n. The inactive, immature stage of an insect, between larva and adult
Example: The moth larva spun its cocoon, a safe place to stay during its transformative pupa stage.
Variation(s): pupae

<i>At a Glance</i>	Exercise	Materials	Minutes
<i>Introducing the Read-Aloud</i>	What Have We Already Learned?	journals from previous lessons; chart paper, chalkboard, or whiteboard	10
	Purpose for Listening		
<i>Presenting the Read-Aloud</i>	Life Cycles of Insects		15
<i>Discussing the Read-Aloud</i>	Comprehension Questions	Image Cards 6, 7	10
	Word Work: Progression	drawing paper, drawing tools	5
 Complete Remainder of the Lesson Later in the Day			
<i>Extensions</i>	On Stage	Image Cards 1, 2, 8–13	20
	Insects Journal	trade books; journals from previous lessons	



Life Cycles of Insects

3_A

Introducing the Read-Aloud

10 minutes

What Have We Already Learned?

Ask students what three body parts all insects have (head, thorax, abdomen), and ask them how many legs all insects have. (six) Remind students that most, but not all insects, have wings. Tell them that the cockroach in the previous lesson gave them a hint about the insect they will meet today, an insect that holds its front legs together in a prayer position. Ask students to guess its name. Tell them this insect will be the narrator of today's read-aloud.

Now tell students that today they will learn about the stages in the life of an insect. Tell students that all living things are born, and all living things die, but that different types of animals experience different stages of development in between. Ask them to name the stages of a human being's life cycle. (infant, child, adolescent, adult)

Purpose for Listening

Tell students that not all insects experience the same stages of development. Their life cycles vary according to the types of insects. Ask students to listen carefully to be able to identify two distinctly different ways insects develop and to be able to name the stages of each kind of change.



Life Cycles of Insects

← Show image 3A-1: Praying Mantis

Hi, boys and girls. It's time to meet one of the most fascinating insects on the planet. That's me. I'm a praying mantis, named for the way I hold my two front legs together as though I am praying. I might look like I am praying, but my incredibly fast front legs are designed to grab my food in the blink of an eye!

I'm here to talk to you about the life stages of insects—how insects develop from birth to adult. Many insects undergo a complete change in shape and appearance. I'm sure that you are already familiar with how a caterpillar changes into a butterfly. The name of the process in which a caterpillar changes, or morphs, into a butterfly is called **metamorphosis**.



← Show image 3A-2: Life cycle of a butterfly ¹

Insects like the butterfly pass through four stages in their life cycles: egg, **larva** [LAR-vah], **pupa**, and adult. Each stage looks completely different from the next. The young never resemble, or look like, their parents and almost always eat something entirely different. The female insect lays her eggs on a host plant.² When the eggs hatch, the larvae [LAR-vee] that emerge look like worms.³ Different names are given to different insects in this worm-like stage, and for the butterfly, the larva state is called a caterpillar.

1 [Point to each stage of the life cycle as you read it.]

2 What is a host? (an animal or plant on which, or in which, another organism lives)

3 The word *larva* is singular, and the word *larvae* is plural.



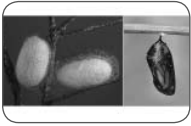
← Show image 3A-3: Insect larvae: maggot, grub, and caterpillar

Fly larvae are called maggots;⁴ beetle larvae are called grubs;⁵ and the larvae of butterflies and moths, as you just heard, are called caterpillars.⁶ Larvae feed and grow as quickly as they can. They also **molt**, or shed their hard exoskeletons, many times as they grow, because the exoskeletons don't grow with them. In this way, insect larvae grow larger each time they molt, until they are ready to change into adult insects.

4 [Point to the insect on the top left part of the image.]

5 [Point to the insect on the top right part of the image.]

6 [Point to the insect on the bottom part of the image.]



← **Show image 3A-4: Cocoon (soft silk) and chrysalis (hard case)**

Once the larvae have eaten all that they can eat, they take a break. Sometimes people call this next stage a resting stage, but the larvae are hardly resting. A larva often spins a cocoon⁷ to protect itself during the pupa stage when it will remain quite still for several weeks. Inside this shell-like covering, the pupa transforms, or changes, into something that looks altogether different than before. Some insects have a soft cocoon for the pupa stage, and some, like the butterfly, have a harder case called a chrysalis.⁸

7 [Point to the image on the left.]

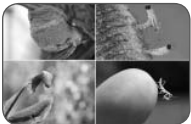
8 [Point to the image on the right.]



← **Show image 3A-5: Butterfly emerging from chrysalis**

If you have ever seen a butterfly emerge from its chrysalis, you know how extraordinary it is to watch the first flutter of its fully developed butterfly wings. Its wings were completely invisible before it disappeared into its seemingly magic chrysalis. It looks nothing like it did at any of its earlier stages. Scientists call this **progression**, through four separate stages, a complete metamorphosis.⁹ I can't argue with that, can you? The change is indeed complete. Butterflies, moths, beetles, and flies all undergo a complete metamorphosis.

9 The word *progression* means a connected series of events.



← **Show image 3A-6: Life cycle of praying mantis: egg case, nymphs emerging, older nymph, adult**

Not all insects change so completely. Some insects' young, like mine, are miniature, or very small, models of their parents after hatching. They do change, so they do experience a metamorphosis, but because it is not a complete change, scientists call it an incomplete metamorphosis.

Just like you, the young start off as a smaller version of what they will end up being. Just as you started off as a baby person and are slowly growing into an adult person, some young insects slowly grow and change into an adult.

A praying mantis goes through three life stages: egg, **nymph**, and adult.¹⁰ In the autumn, the female mantis lays as many as 400 eggs inside an egg case, attached to a plant. In spring, the eggs

10 [Point to each stage of the life cycle as you read about it.]

hatch. The tiny praying mantis babies emerge from the egg case. These brand-new hatchlings, or nymphs, don't quite look like me, do they? A little later, the nymph resembles me more—the only thing it is missing is its wings. Even though you can't see them yet, there are tiny developing wing buds. These nymphs eat the same sorts of food as I do as an adult praying mantis—flies, aphids, moths, and other insects—just smaller.

Let's take a close look at one of these nymphs.



← **Show image 3A-7: Praying mantis nymph**

Can you tell at this stage that it is an insect? Can you find its head? How many legs are on its thorax?¹¹ Can you see how many pairs of wings it has?¹² Is there a third section as well? What's that called?¹³

What is the outside skeleton of an insect called? Right—an exoskeleton. The baby insect, or nymph, is born with an exoskeleton, but these hard, nonliving coverings do not grow with the growing praying mantis nymph. As a nymph grows, its exoskeleton splits open.

← **Show image 3A-8: Praying mantis nymph, molting**

The nymph wriggles out to reveal softer skin that can stretch and expand before it hardens. It molts its exoskeleton again and again, growing a new one as many as ten times before it reaches adulthood.¹⁴ The nymph stage often lasts all summer long. After its final molt, each surviving praying mantis has a fully developed exoskeleton and full-grown wings like mine. Grasshoppers, crickets, and cockroaches belong to the group of insects that experience an incomplete metamorphosis similar to this one.

An insect's life cycle is quite short compared to yours. In some cases, it takes only a few weeks. Scientists believe that this is one reason there are so many insects on the planet. They are forever breeding and need to reproduce rapidly because they have so many enemies.

Not all insects, however, have short life cycles.

11 (six)

12 There are two tiny wing buds, but they are hard to see.

13 (abdomen)



14 What does the word *molt* mean?



← **Show image 3A-9: Cicada and molted skin**

The cicada looks a little like a grasshopper and is thought to have the longest life cycle of any insect, ranging from two to seventeen years. The adult cicada lays her eggs on twigs. When the eggs hatch, the nymphs fall to the ground and burrow into the soil, searching for tree roots. They feed on the tree's sweet root sap. Cicadas undergo incomplete metamorphosis, so there is no pupal stage. The nymphs remain hidden beneath the ground, continuing to shed their exoskeletons.¹⁵ Once they are fully-grown, they make their way to the surface again, shed their skin one last time, and emerge as winged adults. For some reason, all of the cicadas in an area emerge at once either every thirteen years or every seventeen years.

15 [Point to the empty exoskeleton on the right side of the image.] What is the word that means to shed its exoskeleton?



← **Show image 3A-10: Swarm of cicadas**

When the cicadas all emerge, they fly everywhere, and their calls are very loud. When hundreds of flying insects swarm through the air, their loud buzzing noises and the snapping of their wings make quite a loud noise!

Next time, you will meet some other flying insects that may also travel in swarms. Can anyone guess what insects they might be? I'll give you a clue: Bzzzzzzz.....

Discussing the Read-Aloud

15 minutes

Comprehension Questions

10 minutes

If students have difficulty responding to questions, reread pertinent passages of the read-aloud and/or refer to specific images. If students give one-word answers and/or fail to use read-aloud or domain vocabulary in their responses, acknowledge correct responses by expanding the students' responses using richer and more complex language. Ask students to answer in complete sentences by having them restate the question in their responses.

1. *Literal* What word is used to describe the progression of events, or change, that occurs in an insect's development? (metamorphosis)

2. *Inferential* [Show Image Cards 6 (Complete Metamorphosis) and 7 (Incomplete Metamorphosis).] Some insects undergo a complete metamorphosis, whereas others undergo an incomplete metamorphosis. What stages are the same in both complete and incomplete metamorphoses? (egg, adult)
3. *Inferential* Is the change that takes place in the growth of human beings more like that of complete or incomplete metamorphosis? Why? (incomplete; Like insect nymphs, human infants resemble their adult parents from birth.)
4. *Inferential* Why do insects molt, or shed their exoskeletons? (to make way for new growth)
5. *Inferential* In which stage of development do insects often look like tiny worms? (larval stage; larvae)
6. *Inferential* In which season(s) of the year would you expect to see the most insects? Why? (Answers may vary, but should include the fact that many insects lay eggs that hatch in spring.)

[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.

7. *Evaluative Think Pair Share:* In today's read-aloud, you heard that beetle larvae are called grubs. From that information alone, can you tell whether beetles undergo complete or incomplete metamorphosis? How? (Yes, they must go through a complete metamorphosis because the terms larva and larvae, although similar to the nymph stage of incomplete metamorphosis, are only used to describe those insects undergoing a complete change in which the young do not resemble the adult insects.)
8. 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: Progression

5 minutes

1. In the read-aloud you heard, “Scientists call this *progression*, through four separate stages, a complete metamorphosis.”
2. Say the word *progression* with me.
3. A progression is a connected series of actions or events.
4. The progression of the phases of the moon from new moon to full moon and then back to new moon again happens in a regular pattern. [Students who have been in the Core Knowledge Language Arts program studied the phases of the moon in Grade 1 *Astronomy*.]
5. What other things can you think of go through a progression? Try to use the word *progression* when you tell about it. [Ask two or three students. If necessary, guide and/or rephrase the students’ responses: “_____ is a progression of . . . ”]
6. What’s the word we’ve been talking about?

Use a *Drawing* activity for follow-up. Directions: Draw a picture of something that happens in a progression. For example, you can draw a picture of the progression involved in making your favorite snack, or the progression of actions you take in the morning to get ready for school, or some other progression of events. When you have drawn your picture, write one sentence describing the steps in the progression you illustrated.



Complete Remainder of Lesson Later in the Day



Life Cycles of Insects

3_B

Extensions

20 minutes

On Stage

Tell students that they will have the opportunity to act out the stages of metamorphosis today.

Show students Image Cards 2 (Cockroach), 8 (Praying Mantis), 9 (Grasshopper), and 10 (Cricket).

Tell students that each of the insects pictured in this group of images undergoes incomplete metamorphosis. Review the three stages of incomplete metamorphosis: egg, nymph, and adult.

Show students Image Cards 1 (Butterfly), 11 (Moth), 12 (Fly), and 13 (Ant).

Tell students that each of the insects pictured in this group of images undergoes complete metamorphosis. Review the four stages of complete metamorphosis: egg, larva, pupa, adult.

Divide students into groups of three or four. Give each group an Image Card depicting one of the insects. Groups of three will receive a card with an insect undergoing incomplete metamorphosis (praying mantis, grasshopper, cricket, cockroach). Groups of four will receive a card with an insect undergoing complete metamorphosis (moth, butterfly, fly, ant). Working cooperatively with their group members, students will each represent a different stage of development for their given insect.

After students have had time to perform in their small groups, ask them to gather together again as a class. Then tell them that you are going to describe each developmental stage in one sentence. Ask students to regroup according to the part they played in the development of the insects (all eggs will be together, etc.).

Say:

“I am the first stage of development in all insects. I am laid by an adult and remain rather helpless, unable to move until I change forms.” (egg)

“I am the second stage of development, following the egg, and resemble my parent.” (nymph, for those undergoing incomplete metamorphosis)

“I am the second stage of development, following the egg, and do not look at all like my parent. Rather, I am wormlike in appearance.” (larva, for those undergoing complete metamorphosis)

“I am the third and final stage of development, following the nymph stage.” (adult, for those undergoing incomplete metamorphosis)

“I am the third, seemingly quiet, stage of development, following the larval stage.” (pupa, for those undergoing a complete metamorphosis)

“I am the fourth and final stage of development, following the pupal stage.” (adult, for those undergoing complete metamorphosis.)

Insects Journal

Have students look through trade books for pictures of insect life cycles. Have them draw a picture of the life cycle of one insect in their journals, and, based on what they heard in the read-aloud and in the On Stage Extension they just completed, have them determine whether their chosen life cycle is one of complete metamorphosis or incomplete metamorphosis.

Tell students they should write down any questions they have about the life cycles of insects. Have students work in pairs or small groups to look through trade books or other sources to search for answers to their questions.

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.



Social Insects: Bees and Wasps

4

✔ **Lesson Objectives**

Core Content Objectives

Students will:

- ✓ Explain that most insects live solitary lives, but some, such as honeybees and paper wasps, are social
- ✓ Distinguish between social and solitary insects
- ✓ Describe how all members of a social insect colony come from one queen
- ✓ Describe the roles of honeybee workers, drones, and queens
- ✓ Describe how honeybees communicate with one another through “dances”

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 connections among honeybee workers, drones, and queen bees (RI.2.3)
- ✓ Orally compare and contrast the nests of honeybees and wasps (RI.2.9)
- ✓ Plan, draft, and edit an informative text that presents information from “Social Insects: Bees and Wasps,” including an introduction to a topic, relevant facts, and a conclusion (W.2.2)
- ✓ Participate in a shared research project on bees and wasps (W.2.7)

- ✓ With assistance, categorize and organize facts and information from “Social Insects: Bees and Wasps” to learn more about bees and wasps (W.2.8)
- ✓ Generate questions and gather information from multiple sources to answer questions about bees and wasps (W.2.8)
- ✓ Add drawings to descriptions of bees and wasps to clarify ideas, thoughts, and feelings (SL.2.5)
- ✓ Identify new meanings for the word *comb* and apply them accurately (L.2.5a)
- ✓ Prior to listening to “Social Insects: Bees and Wasps,” identify orally what they know and have learned about social and solitary insects

Core Vocabulary

colonies, n. Communities of animals living close together, often sharing a physically connected structure like a beehive

Example: Scientists are concerned over the disappearance of some bee colonies.

Variation(s): colony

cooperate, v. To work together for the good of everyone or everything involved

Example: Students cooperate with their teachers and their classmates so that everyone can learn.

Variation(s): cooperates, cooperated, cooperating

drones, n. Male bees in social bee colonies whose job is to fertilize the queen

Example: The queen bee left her hive to mate with the drones before returning to the hive to lay her eggs.

Variation(s): drone

pollen, n. A fine, powdery substance produced within flowers, its transport from flower to flower being necessary for new flower seeds to grow


Example: Many fruit trees depend upon the honeybee to transport pollen to the tree so it will produce fruit.

Variation(s): none

societies, n. Groups of people or animals living together in organized communities

Example: Social ants live in societies called colonies.

Variation(s): society

<i>At a Glance</i>	Exercise	Materials	Minutes
<i>Introducing the Read-Aloud</i>	What Have We Already Learned?		10
	What Do We Know?		
	Purpose for Listening		
<i>Presenting the Read-Aloud</i>	Social Insects: Bees and Wasps	chart paper, chalkboard, or whiteboard	15
<i>Discussing the Read-Aloud</i>	Comprehension Questions		10
	Word Work: Cooperate	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
	Multiple Meaning Word Activity: Comb	Poster 2M (Comb)	



Social Insects: Bees and Wasps

4_A

Introducing the Read-Aloud

10 minutes

What Have We Already Learned?

Refer students to the title of the read-aloud—“Social Insects: Bees and Wasps.” Remind them of two vocabulary words they learned in the first lesson of this domain, *social* and *solitary*, and ask for volunteers to explain the difference between the two. (Social insects live in groups; solitary insects live alone.)

Tell students that not all bees and wasps are social insects; some are solitary. Today they will learn about the habits of the honeybee and the paper wasp, both very important social insects. Remind students that social insects must work together to survive.

What Do We Know?

Ask students if they know where honeybees and paper wasps live. (beehives/nests) Ask them to share whatever else they already know about honeybees (They sting; they help pollinate flowers; they collect flower nectar and produce honey.) and paper wasps. (They sting; they help pollinate flowers.)

Purpose for Listening

Tell students that they are going to learn about three types of honeybees and paper wasps: workers, drones, and the queen. Ask them to listen carefully to find out what jobs each type of bee must perform in order to survive.



Social Insects: Bees and Wasps

← Show image 4A-1: Honeybee

Buzzzzz Bzzzzz Oh! You startled me! I am so busy that I nearly forgot where I was. I'm a honeybee, and I'm delighted to be here to tell you a little bit about my everyday world.

1 What does *social* mean?

Honeybees are quite social.¹ Humans are social, too, which means that they live together in communities, or groups, instead of living alone. Social insects live in communities, too.

Most insects are solitary, living alone their entire lives. They are alone when they hatch from their eggs; they search for food alone; and they find their own shelter. There are thousands of different kinds of bees on the planet, and most of them live solitary lives. But honeybees are different. We live together in organized communities and depend upon one another to live, solving problems as a team. We gather and share food, build nests together, **cooperate**² to raise our young, and help protect one another from enemies.

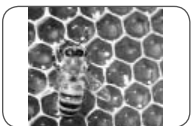
2 or work together



← Show image 4A-2: A natural hive in a tree; bees on the honeycomb; a commercial beehive box; bees swarming a hive box

Honeybee communities are called **colonies**. Our colonies are made up of twenty thousand or more bees. We like to make our nests, or beehives, in dark places. That's why you often see pictures of us buzzing about in the trunks of hollow trees.

People use beehive boxes to raise honeybees for honey. Perhaps you've seen these boxes in a field, orchard, or backyard.



← Show image 4A-3: Honeycomb

Wherever we nest, we build honeycombs. This amazing structure of layered cells is made from a waxy substance that we produce in our abdomens. Can you spot a pattern among the cells in this honeycomb?³ They are all six-sided.

3 [Pause for students' responses.]

What purpose do all of these cells serve? These cells are very important to our lives. Listen carefully and I'll tell you how they are important to the many jobs we perform. Remember, I told you we are very social insects—and very busy. There is lots of work to be done, and each bee in the colony has its own job to do.



← **Show image 4A-4: Queen bee surrounded by other bees**

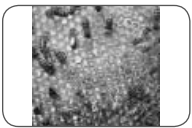
Every honeybee colony has a mother called the queen bee. The queen is always the largest bee in the hive, and she has only one job to do. She must lay eggs, lots and lots of eggs. She must produce more queens for other hives and make sure there are enough worker bees to do the work in her own hive.

The queen bee flies from the nest to mate with male bees called **drones**. Once a drone has mated with the queen bee, it has done its job and it dies. Drones cannot sting because they don't have stingers.

When the queen returns, she lays her eggs, sometimes more than one thousand eggs a day. Where do you think the queen bee lays all these eggs? Right! She returns to the comb to lay them there in the cells.⁴ The queen then pushes tiny eggs, no bigger than a pinhead, from her abdomen into the waxy cells of the honeycomb, one egg to each cell.⁵

4 The word *comb* here refers to the structure in which bees live and that contains six-sided cells. The word *comb* can also refer to the device that a person uses to make his or her hair neat and untangled.

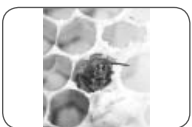
5 Which part of the insect's body is the abdomen? (the section at the end, farthest away from the head)



← **Show image 4A-5: Worker bees on honeycomb**

In just a few days the eggs hatch. The larvae get fed **pollen** by one of the hive's female worker bees.⁶ The larvae grow and eventually spin silky cocoons.

6 Pollen is a fine, powdery substance that is produced by flowers.



← **Show image 4A-6: Bee emerging from cocoon**

Worker bees quickly seal over the small waxy cells of the honeycomb, protecting the developing pupa inside each cocoon. Does this process sound familiar? It should. The bees are undergoing a change.⁷ When they emerge from their cocoons, they will chew their way out of the cells, emerging as full-grown adults.

7 In the previous read-aloud, you heard a word that means the changes an insect goes through during its life cycle. What is the word that refers to that change? (*metamorphosis*)

Most of the new adults are female worker bees. They only live for a few months, and they spend their whole lives working hard to keep the hive running well. They keep the hive clean. They serve as nurse bees, tending to the larvae. They make new cells and repair old ones, and they store nectar and pollen that others bring back to the hive. After several weeks working inside the hive, these hard-working females go outside to serve as guards, protecting the hive from enemies and bees from other hives. Each hive has its own special chemical scent, or smell, so it is easy to tell who doesn't belong in the hive.



← **Show image 4A-7: Worker bee collecting nectar and close-up of bee's mouthpart**

8 A forager is an animal that wanders over an area in search of food.

9 or sharp

Near the end of her life, a worker bee becomes a forager bee, collecting a sweet juice from flowers.⁸ This juice, or nectar, is used to make honey. Foraging worker bees have keen⁹ senses of smell and sight and very good memories. They may visit thousands of flowers each day to find the best nectar.



← **Show image 4A-8: Honeybee and figure eight dance pattern**

10 [Trace the figure eight in the image several times.]

11 Why might it be helpful to the other bees to know how good the source of nectar is?

When a bee discovers a particularly good source of nectar, it returns to the hive to share its information with other foragers. First, it lets the other foragers smell the pollen so that they can identify the type of flower. Then, it performs a complicated and special waggle dance. As it circles about in a pattern like a figure eight, it wags its abdomen as it moves through the middle of its dance.¹⁰ The bee's repeated movements, circling and wagging its abdomen, tell the others exactly how far away and in which direction from the sun the flowers are located. A bee that thinks she has found a really good flower patch does the waggle dance with lots of energy.¹¹

Where do you suppose the bees put the nectar when they return to the hive? They make the nectar into honey and store it in honey cells—the cells that are not being used for developing bees. The honey is an important food source for the bees.



← **Show image 4A-9: Bee covered with pollen**

While moving from flower to flower, worker bees rub up against a yellow powder called pollen. Honeybees will pack the pollen into baskets of hairs on their hind legs, and then they carry it with them. Pollen is used to feed the larvae, but this pollen is important stuff for another reason. Plants need pollen from other plants in order to make new seeds. This is called pollination. Honeybees are important because they carry the pollen between flowers of the same species, or kind.¹²

12 Who remembers what a species is?



← **Show image 4A-10: Paper wasp and honeybee**

I'd like to introduce you to a relative of mine. This is a paper wasp.¹³ Look closely at its body next to mine. What do we have in common? We each have a head. We each have a thorax with six legs, an abdomen, an exoskeleton, and wings. And, this particular wasp, the paper wasp, is a social insect, just like me. Some wasps are solitary, but the black and gold ones nearly always live in **societies**.¹⁴

13 [Point to the image on the left.]

14 Societies are groups of people or animals living together in organized communities. In our human society, people are organized in the ways they live and work.

Like honeybees, wasps live in large groups. What are these groups called? Yes, wasps live in colonies. Each colony has a leader, a female wasp who is bigger than all the other wasps and who spends most of her time laying eggs. Sound familiar? What is she called? Yes, the queen.



← **Show image 4A-11: Paper wasp nest**

Like honeybees, wasps build nests. They build them in many different places, usually in hidden, difficult-to-see places that are protected from rain and bad weather, such as under the eaves of houses or in protected areas on trees.¹⁵ Wasp nests have a very different look from beehives on the outside, but their paper-like structures are similar to ours on the inside.

15 This wasp nest is under the eave of a building—a protected place where the roof and the outside wall come together.



← **Show image 4A-12: Wasp queen forming nest**

We'll take a look at how paper wasps build their nests. The process begins with the queen. She finds plant fibers—dry

grasses, old boards, fence posts—and pulls them apart with her strong jaws. She softens the splintery pieces with saliva inside her mouth and chews them into a paste that looks and feels a little like paper. Then she sticks a dab of this paste to whatever surface she has chosen for her nest. The queen adds a tough stem to support the whole nest and begins attaching cone-like chambers to it. These clusters of six-sided chambers open downward to keep the rain out.



← **Show image 4A-13: Queen wasp placing eggs in nest**

As the queen forms each chamber, she deposits an egg in each one. The eggs develop into larvae. The queen wasp takes care of the first larvae herself. She leaves the nest to find food, capturing and chewing other insects into mush to feed her young. About two weeks after hatching, the larvae enter the pupa stage, spinning cocoons inside each cell and covering the cells with silk.



← **Show image 4A-14: Adult wasp emerging from cell**

These sealed cells break open a few weeks later and out come adult wasps with long legs, strong wings, and large eyes. Most of these newly hatched wasps are female workers who begin to take over the queen's work right away. They hunt for food and feed the larvae, clean and repair the cells, and guard the nest. Others fan the nest with beating wings, and some even spread water over the combs to keep the nests cool. While the workers enlarge the nest for more and more wasps, the queen goes back to laying eggs.



← **Show image 4A-15: Large paper wasp nest**

By summer's end, many of the workers have died. There are often two hundred fifty or more cells inside the wasp's papery nest. The wasps that do emerge at the end of summer are no longer female worker wasps. Instead, they are new queens and males. The new queens find shelter in protected places—in attic walls, inside logs, under bushes—where they hibernate all winter. When spring comes, the new queens come out from hiding and begin building nests for new colonies of wasps.

All wasps abandon their nests in fall, using them for one season only. When fall comes and the leaves drop from the trees, look up and see if you can spot one of their papery apartment houses dangling from under a roof or partially hidden behind a wall.

Next time you'll find out how some other social insects build their nests. Until then, be thinking about who they might be.

Discussing the Read-Aloud

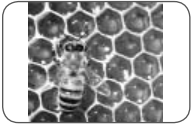
15 minutes

Comprehension Questions

10 minutes

If students have difficulty responding to questions, reread pertinent passages of the read-aloud and/or refer to specific images. If students give one-word answers and/or fail to use read-aloud or domain vocabulary in their responses, acknowledge correct responses by expanding the students' responses using richer and more complex language. Ask students to answer in complete sentences by having them restate the question in their responses.

1. *Literal* The queen bee has one job to perform. What is it? (She lays eggs.)
2. *Inferential* Are there more male or female bees in the hive? (female) Why? (The females are the worker bees and many more of them are needed to do the work of the hive.)
3. *Literal* What are the male bees called? (drones)
4. *Inferential* Are honeybees and paper wasps social or solitary insects? (social) How do you know they are social? (Both live in communities, or groups.) What are these groups called? (colonies)



← **Show image 4A-3: Honeycomb**



← **Show image 4A-11: Paper wasp nest**

5. *Evaluative* Both honeybees and wasps build nests for their colonies. Describe how the nests are the same and how they are different. (Same: Both have cells or chambers to hold the developing eggs. Different: Honeybees construct their honeycombs with wax from their abdomens, whereas wasps scavenge for building materials to build their papery nests. Wasps do not store honey in their nests.)
6. *Inferential* Why do honeybees perform the waggle dance? (It is a means of communication, letting their fellow foragers know where the best flower nectar can be found.)

[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.

9. *Evaluative Think Pair Share:* Which member(s) of the hive do you think are most important to the hive's survival? (Answers may vary. Be sure to discuss the cooperative nature of the hive—all roles are necessary and equally important but emphasize that all members of the colony come from the one queen.)
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: Cooperate

5 minutes

1. In the read-aloud you heard, “We gather and share food, build nests together, *cooperate* to raise our young, and help protect one another from enemies.”
2. Say the word *cooperate* with me.
3. *Cooperate* means to work together for the good of everyone involved.
4. My family and I all cooperate with each other to prepare our evening meal.
5. Tell me of a time you and your classmates had to cooperate with one another to accomplish something. Try to use the word *cooperate* when you tell about it. [Ask two or three students. If necessary, guide and/or rephrase the students’ responses: “One time my classmates and I had to cooperate was when . . .”]
6. What’s the word we’ve been talking about?

Use a *Drawing* activity for follow-up. Directions: Draw a picture of a time you had to cooperate with someone, or a time when you saw someone else cooperate with someone, to accomplish something. After you complete your drawing, write a sentence or two to describe your picture.

Have students share their drawings and writing. As students share, encourage them to use the word *cooperate*.



Complete Remainder of Lesson Later in the Day



Social Insects: Bees and Wasps

4B

Extensions

20 minutes

Insects Journal

Have students look through trade books for pictures of bees and wasps. Have them draw a picture of a bee and a picture of a wasp in their journals. Then, based on what they have learned, have them write one sentence for each insect reflecting something they have learned. Tell students that they should also write down any questions they may have about bees and/or wasps. 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.

↔ Multiple Meaning Word Activity: Comb

Multiple Choice: Comb

1. [Show Poster 2M (Comb).] In the read-aloud you heard, “She returns to the *comb* to lay [the eggs] there in the cells.” Here *comb* means a group of wax cells, each of which has six sides, that is built by honeybees. [Have a student point to the part of the poster that shows this meaning.] Can you count the six sides of the combs’ cells?
2. *Comb* can also mean a flat piece of plastic or metal with a row of thin teeth used for making hair neat. [Have a student point to the part of the poster that shows this meaning.]
3. Another meaning of *comb* refers to the soft part on top of the head of some birds, like this rooster. [Have a student point to the part of the poster that shows this meaning.]

4. Now with your neighbor, make a sentence for each meaning of *comb* and your neighbor can choose the correct picture on the poster. Remember to use complete sentences. For example, you could say, “I use this comb to keep my hair from being tangled.” And your neighbor should respond, “That’s ‘2’.” I will call on some of you to share your sentences. [Call on a few students to share their sentences.]



Pausing Point

PP

Note to Teacher

You should pause here and spend one day reviewing, reinforcing, or extending the material taught thus far.

You may have students do any combination of the activities listed below, but it is highly recommended you use the Mid-Domain Student Performance Task Assessment to assess students' knowledge of insects. The other activities may be done in any order. You may also choose to do an activity with the whole class or with a small group of students who would benefit from the particular activity.

Core Content Objectives Up to This Pausing Point

Students will:

- ✓ Explain that insects are the largest group of animals on Earth
- ✓ Explain that there are many different types of insects
- ✓ Explain that most insects live solitary lives, but some, such as honeybees, paper wasps, ants, and termites are social
- ✓ Explain that insects live in virtually every habitat on Earth, with the exception of the oceans
- ✓ Classify and identify particular insects as small, six-legged animals with three main body parts
- ✓ Identify and describe the three main 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
- ✓ Explain why spiders are not insects
- ✓ Describe the life cycles and the processes of complete and incomplete metamorphosis

- ✓ Describe how some insects look like miniature versions of adults when they are born from eggs
- ✓ Explain why some insects molt
- ✓ Describe how some insects go through four distinct stages of development, including egg, larva, pupa, and adult
- ✓ Distinguish between social and solitary insects
- ✓ Describe how all members of a social insect colony come from one queen
- ✓ Describe the roles of honeybee workers, drones, and queens
- ✓ Describe how honeybees communicate with one another through “dances”

Student Performance Task Assessment

10 Parts of an Insect (Instructional Master PP-1)

Look at this drawing of an insect. Using the word bank provided, label five parts of an insect: the abdomen, antenna, head, leg, and thorax.

Activities

Image Review

Show the Flip Book images from any read-aloud again, and have students retell information from the read-aloud using the images.

Image Card Review

Materials: Image Cards 1–13

In your hand, hold Image Cards 1–13 fanned out like a deck of cards. Ask a student to choose a card but to not show it to anyone else in the class. The student must then perform an action or give a clue about the picture s/he is holding. For example, for a card with a butterfly, the student could flap his or her arms and pretend to “fly” around the room. The rest of the class will guess the insect or object that is being described. Be sure to “wrap the language” around this activity, reminding students of key domain-related

vocabulary they have learned. Proceed to another card when the correct answer has been given.

Domain-Related Trade Book or Student Choice

Materials: Trade book

Read a trade book to review a particular insect or concept about insects; refer to the books listed in the Introduction. You may also choose to have the students select a read-aloud to be heard again.

Class Book

Materials: Drawing paper, drawing tools

Tell the class or a group of students that they are going to make a class book to help them remember what they have learned about insects thus far in this domain. Have students brainstorm important information about the different types, characteristics, and life cycles of insects, and which insects are solitary and social. Have each student choose one idea to draw a picture about, and ask him or her to write a caption for the picture. Bind the pages to make a class book to put in the class library for students to read again and again.

Riddles for Core Content

Ask the students riddles such as the following to review core content:

- Most insects begin their life cycle inside of me. What am I? (an egg)
- We help most insects to smell and feel. What are we? (antennae)
- We help most insects to fly, escape from predators, and look for food. What are we? (wings)
- All insects have six of us. What are we? (legs)
- I am the hard outer skeleton of all insects. What am I? (an exoskeleton)
- We are the three main body parts of insects. What are we? (head, thorax, and abdomen)

- We work and live together in communities with other insects. What are we? (social insects)
- We do things on our own and do not live and work in communities. What are we? (solitary insects)

You may wish to have students create their own riddles about insects to pose to the class, based on what they have learned thus far.

Drawing Insects

Materials: Drawing paper, drawing tools

Have students draw their favorite insect. Tell them to be sure to label the six legs and the three body parts: head, thorax, and abdomen. Allow students to share their drawings with the class. You may also ask students why a spider is not considered an insect, and why they would not draw a spider for this activity. (Spiders have eight legs, rather than six like insects have.)

Keeping Insects in the Classroom

Materials: Insects and their homes and food will vary.

You may wish to keep insects in the classroom for students to observe and care for. Many insects are interesting and will enhance the themes of this domain.

Note: Many insect species are available through science catalogues such as Carolina Biological Supply. Before deciding to keep or raise non-native species of insects, you may wish to consider that it is important they *not* be released into the environment, as they can disrupt the local ecosystem. You may wish to donate them to another classroom or to a local science museum.

Giant peppered roaches (*Archimandrita tessellata*) can be kept successfully for long periods of time. These are attractive, large (2” to 3”), and long-lived insects. They are not smelly, can be fed on apples and cat chow, and are easily handled by students. Walking sticks can be raised on oak leaves, roses, or romaine lettuce. Praying mantids are less hardy, and because they are predators, require more attention to keep them fed. Mealworms can be raised

in small containers and their life cycle observed. They are easy to feed on oats and potato slices, though the oat substrate and the potatoes need to be replaced periodically to prevent mold. You may be able to find Monarch butterfly caterpillars and watch the amazing and beautiful progression as each forms its chrysalis and then emerges as an adult Monarch. There are many enjoyable insects for students to observe. You may wish to do more research on keeping these insects or others in your classroom.

Insect Research

Materials: Insects Journals; trade books; other resources as needed

Have students check their Insects Journals to see if there are any questions they have about insects that have not been answered. Allow them to search through the trade books in the classroom book tub to look for answers. You may also wish to allow them to research using the Internet, library, and other available resources. Have students write in their journals any information that either answers a question or that they find interesting. As time allows, have students share what they find with the class.

Note: You may wish to extend this exercise by having students write and share a brief report about a specific insect.

Key Vocabulary Brainstorming

Materials: Chart paper, chalkboard, or whiteboard

Give students a key domain concept or vocabulary word such as *exoskeleton*. Have them brainstorm everything that comes to mind when they hear the word, such as *external skeleton*, *protective covering*, *waterproof*, etc. Record their responses on chart paper, a chalkboard, or a whiteboard for reference.

Insect Videos

You may wish to search YouTube, or purchase or rent videos about insects. Show portions of videos to support the concepts in this domain.

Insect Habitats

Have students discuss all of the different types of habitats where insects live. Emphasize that because there are so many different types of insects, they live in all kinds of places. Allow students to share stories of places where they have seen insects. Remind them that there are more insects than any other animal on Earth.

On Stage

Have students act out particular insects, and have the rest of the students guess which insect it is. You may wish to allow the student to give clues such as, “I’m a solitary insect,” or “I’m a very harmful insect,” etc.

Writing Prompts

Students may be given an additional writing prompt such as the following:

- My favorite insect is . . .
- One thing I don’t like about insects is . . .
- Some ways that insects are helpful are . . .
- Some ways that insects are harmful are . . .

Insect Hunt

Take the class outside to see how many insects they can find. Have students observe the insects and draw and/or write notes in their journals. You may also choose to bring insects back into the classroom to observe, perhaps under a microscope.



Social Insects: Ants and Termites

5

✔ **Lesson Objectives**

Core Content Objectives

Students will:

- ✓ Explain that most insects live solitary lives, but some, such as ants and termites, are social
- ✓ Distinguish between social and solitary insects
- ✓ Describe how all members of a social insect colony come from one queen
- ✓ Describe the social behavior of ants and ant colonies
- ✓ Describe the roles of worker ants, males, and queens

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 “Social Insects: Ants and Termites” gives to support the statement that ants are social insects (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 “Social Insects: Ants and Termites” (W.2.8)

- ✓ Generate questions and gather information from multiple sources to answer questions about ants and termites (W.2.8)
- ✓ Add drawings to descriptions of ants and termites to clarify ideas, thoughts, and feelings (SL.2.5)
- ✓ Use the antonyms *destructive* and *constructive* appropriately in oral language (L.2.5a)
- ✓ Prior to listening to “Social Insects: Ants and Termites,” identify orally what they know and have learned about insects

Core Vocabulary

aggressive, *adj.* Forceful or ready to attack

Example: The mother bear became aggressive, wanting to protect her cubs.

Variation(s): none

chambers, *n.* Empty, enclosed spaces; rooms

Example: Bees develop in separate chambers in a hive.

Variation(s): chamber

destructive, *adj.* Causing a large amount of damage or harm

Example: The destructive puppy chewed through the new sofa.

Variation(s): none

emit, *v.* To send out or give off


Example: Fire alarms emit a very loud noise so people will hear them easily.

Variation(s): emits, emitted, emitting

nurseries, *n.* Places to breed and care for young animals and plants

Example: Worker ants feed baby ants in separate chambers, or nurseries.

Variation(s): nursery

<i>At a Glance</i>	Exercise	Materials	Minutes
<i>Introducing the Read-Aloud</i>	What Have We Already Learned?		10
	Purpose for Listening		
<i>Presenting the Read-Aloud</i>	Social Insects: Ants and Termites	Image Card 14	15
<i>Discussing the Read-Aloud</i>	Comprehension Questions		10
	Word Work: Destructive		5
 Complete Remainder of the Lesson Later in the Day			
<i>Extensions</i>	Insects Journal	trade books; journals from previous lessons	20
	Writing a Fictional Narrative: Plan	Instructional Master 5B-1; journals from previous lessons; trade books; chart paper, chalkboard, or white board	
<i>Take-Home Material</i>	Family Letter	Instructional Master 5B-2	*



Social Insects: Ants and Termites

5_A

Introducing the Read-Aloud

10 minutes

What Have We Already Learned?

Remind students that they learned about the habits of honeybees and paper wasps in the previous read-aloud. Ask them whether honeybees and paper wasps are social or solitary insects. (social) Review some of the characteristics they learned about social insects:

- live together in organized communities called colonies
- depend upon and cooperate with one another: gathering food, caring for young, caring for queen
- have very specialized jobs.

Purpose for Listening

Tell students that they are going to learn about two more social insects today: ants and termites. Ask them to listen carefully to discover in what ways ants and termites are the same and how they are different from the other social insects they have learned about (honeybees and paper wasps).



Social Insects: Ants and Termites

← Show image 5A-1: Black garden ant

Hi there, everybody. Because I'm one of the most common insects on the planet, I'm sure you know that I'm an ant. But, did you realize how much my cousins and I look like a wasp? Take a close look.



← Show image 5A-2: Ant and wasp

See how slender, or thin, our waists are? Mine is unusually flexible, making it easy to bend and twist. Count my body parts. You'll see that I have three, just like all other insects—my head with its long antennae, my thorax, and my abdomen.¹

Here's something you might not know: I have two stomachs! Both are located in my abdomen, but one is for my own digestion and the other, called the crop, is just a storage bin where I keep food for other ants.

The fact that I store food for other ants should tell you something about me.² Ants are social insects. We raise and care for our young in ant colonies. There are many different kinds of ants with many different ways of life.

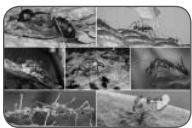
← Show image 5A-3: Collage of ants³

Carpenter ants build their nests in wood. Leafcutter ants grow fungus on the leaves they cut in vast, or very large, underground gardens.⁴ The **aggressive** weaver ants live in leaves they bind together in trees.⁵ The huge colonies of army ants travel in groups, eating everything in sight. Trap-jaw ants can jump distances of more than twelve inches!⁶ Harvester ants build huge nest mounds where they store seeds. Beware of the red fire ants—they sting!

I am a black garden ant, the type that you may see most often, so that is the kind of ant I am going to tell you about today. Like many other ants, we live in underground tunnels, or passageways.

1 [Have student volunteers point to those parts of the insect in the image.]

2 What does this tell you about ants?

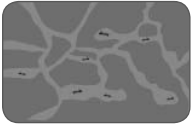


3 [Point to each ant as you read about it, going from left to right on each line, top to bottom.]

4 A fungus is a type of living organism—not a plant or animal. Mushrooms form as part of one kind of fungus.

5 The word *aggressive* means forceful or ready to attack.

6 [Demonstrate the width of twelve inches with your hands.]



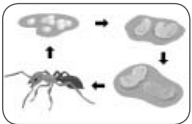
← **Show image 5A-4: Underground ant tunnels with chambers**

Bees have honeycombs, paper wasps have paper nests, and we have tunnels—miles and miles of tunnels, full of little **chambers**, or rooms—hundreds of very dark chambers. A colony may have as few as twelve ants or as many as a million or more. The center of an ant colony's life is this nest of tunnels.



← **Show image 5A-5: Winged queen ant**

An ant colony begins with the queen. A young queen is born in one colony but leaves that colony to start her own. Her wings carry her into the air to find a mate. Once she mates, she sheds her wings and immediately finds a nesting place underground. There she builds a chamber and seals herself inside to lay her eggs.



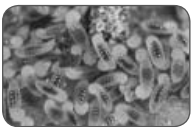
← **Show image 5A-6: Stages of development: egg, larva, pupa, emerging adult**

When ant larvae hatch, the queen cares for the first brood herself, feeding them with her own saliva as they change from wormlike larvae into pupae and, finally, adults.⁷ The queen does not leave the nest this whole time, getting nutrition from her now-useless wing muscles in order to survive.

Ants undergo a complete metamorphosis.⁸ Most of the eggs develop into small female worker ants that begin their lifetime of hard work by gathering food for the queen, making sure she is well fed. The queen will never leave the nest again, living there for ten to twenty years, perhaps even longer. As the mother of the colony, she has her own special chamber. Her only job from this point on is to lay eggs.

7 The word *hatch* in this sentence means to come out of an egg. The word *hatch* can also mean an opening in the deck of a ship or in the floor, wall, or roof of a building.

8 What is a metamorphosis? (a change) Can you name the four stages in complete metamorphosis? (egg, larva, pupa, adult)



← **Show image 5A-7: Worker ants feeding larvae**

The worker ants carry the eggs from the queen's chamber into **nurseries** where they keep the eggs clean and moist by licking them until they hatch.⁹ Then they carry the larvae into separate chambers to feed them.

Black ants eat other insects, any crumbs that we can find, and the honeydew of aphids.¹⁰ We chew the food up well and put it in

9 Nurseries are places to breed and care for young animals and plants.

10 [Show Image Card 14 (Ants Tending Aphids).] Honeydew is a sugary liquid made by the aphids. The ants collect the honeydew and protect the aphids from predators.

a pouch in our mouths where the liquid is squeezed out of it. We spit out the solid parts and swallow the liquid. Remember, we have two stomachs, one being a crop for storing food, so worker ants come back to the nest with crops full of food for the young.



11 You learned the word *molt* in a previous lesson. What does it mean when insects molt? (They shed their skins to grow.)

← **Show image 5A-8: Ant pupae**

As they grow, the larvae molt a few times and after a few weeks they spin cocoons.¹¹ The worker ants move these newly formed pupae into much drier chambers where they rest until they are ready to gnaw their way out into the world.

As social insects, ants cooperate in many ways. When these new workers emerge, some will help care for the queen and larvae, and some will build and repair the tunnels, but others will guard the nest.



12 or give off

← **Show image 5A-9: Soldier ant guarding a nest**

These guards, called soldier ants, have larger heads and jaws than the other ants, and they place their bodies across the entrance to the nest to defend the colony. All ants, including soldier ants, **emit**¹² chemical signals that other ants smell with their antennae. Soldier ants use these signals to warn the colony of danger. This is one way that ants communicate, or share information.



← **Show image 5A-10: Ants communicating**

Another way ants communicate is through touch. If an ant is hungry, it taps a food gatherer lightly with its antennae to let it know that it would like to eat.

They exchange the food mouth-to-mouth in what looks like little kisses. When food is shared, the ants also share and pass along some chemical information important for the entire colony. If one of us ants gets trapped when the soil around us caves in, we produce a squeaky sound by rubbing joints together and other ants “hear” the cry for help through their legs.



← **Show image 5A-11: Termites and cockroach**

Before I leave, I want to introduce you to another social insect that some people mistakenly call white ants. Do you think these look like ants? They're not. They are termites. Termites are more closely related to cockroaches and yet they do not have hard exoskeletons. They are soft-bodied and nearly blind. They would not survive as solitary insects on their own, but they are very successful social insects.

There are several differences between termites and the other social insects you have learned about—honeybees, paper wasps, and ants. Termites do not go through as many stages of development.¹³ They skip the pupa stage so their metamorphosis is incomplete.

13 What is it called when insects go through a progression of changes? (metamorphosis)



← **Show image 5A-12: Termite queen**

The termite society is a bit different as well. Both a king and a queen rule termite colonies. They start a colony together. The queen is the most important member of the colony, sometimes laying six or seven thousand eggs a day. She is so well protected by the countless numbers of worker termites that it is almost impossible to find her within the colony. Just in case something should happen to the royal couple, termite colonies include substitute kings and queens as well.



← **Show image 5A-13: Termite soldiers**

Termite workers perform similar jobs to the worker ants, but the job of guarding the colony rests with a small number of soldiers, equipped with strong legs and long powerful jaws. Unlike honeybees, paper wasps, and ants, where all the workers are female, in the termite colonies, both male and female workers are important members of the society.



← **Show image 5A-14: Termites chewing on wood**

Termites' favorite food is wood. They can be very **destructive** if they choose to eat through the walls of a house!¹⁴ Depending on where they live, some termite species eat insects, waste materials, and fungus. They build their temperature-controlled nests underground, inside fallen trees, in timber, and in tree branches.

14 *Destructive* refers to something that causes a large amount of damage or harm.



15 [Point to the image on the left.]

16 [Point to the image on the right.]

17 [Point out the man standing next to the termite mound to give students a sense of the height of the mound.]

← **Show image 5A-15: Termite nest in a tree and termite mound**

Does this nest look a bit like a wasp nest?¹⁵ I think so. It's made of chewed wood and saliva like the wasp nest, but with added mud and soil.

Some termites build mounds above ground to house their colonies.¹⁶ These towering mud structures are hard as rock and some are as tall as a two-story house.¹⁷ Lots of teamwork goes into building these mounds with incredible air-conditioning systems to keep the chambers cool in very hot climates.

Next time you'll hear from an insect that glows in the dark. Until then, be thinking about who that might be.

Discussing the Read-Aloud

15 minutes

Comprehension Questions

10 minutes

If students have difficulty responding to questions, reread pertinent passages of the read-aloud and/or refer to specific images. If students give one-word answers and/or fail to use read-aloud or domain vocabulary in their responses, acknowledge correct responses by expanding the students' responses using richer and more complex language. Ask students to answer in complete sentences by having them restate the question in their responses.

1. *Literal* Are ants and termites social or solitary insects? (social)
2. *Inferential* The author of this read-aloud made the statement that ants are social insects. What reasons, or facts, did the author give to support this statement? (Ants live and work together cooperatively in colonies with specialized jobs.)
3. *Literal* Which ant in the colony is the one from which all other ants come? (the queen)
4. *Literal* Where do ants build their nests? (in underground tunnels)
5. *Literal* Queen bees and wasps lay their eggs in cells within their nests. Where do ant queens lay their eggs? (They build a special chamber in the underground tunnel and seal themselves inside to lay the eggs.)

6. *Inferential* How often does the queen ant leave her nest? (never; After she mates, she loses her wings. She lays eggs within the same nest, never leaving for the remainder of her life—ten, twenty, or more years.) How is this different from the queen wasp? (The queen wasp retains her wings and leaves her nest each season, beginning a new colony after a winter of hibernation.)
7. *Inferential* Both honeybees and ants have clever ways of carrying food back to their nests. What are they? (Honeybees' hairy legs act like baskets to carry pollen; ants have an extra stomach, or crop, for storage.)
8. *Evaluative* Name some ways that termites are different from ants. (Termites have incomplete metamorphosis, whereas ants are complete; termites have multiple kings and queens, whereas ants have only one queen; male termites serve the hive in many ways, whereas the only role of a male ant is to mate with the queen.)

[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:* Many people stack firewood on their wooden porches so that it is handy to transport into the house to make fires when it is cold outside. Given what you know about the termite's eating habits, do you think that is a good idea? 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 remaining questions.]

Word Work: Destructive

5 minutes

1. In the read-aloud you heard, “[Termites] can be very *destructive* if they choose to eat through the walls of a house!”
2. Say the word *destructive* with me.
3. If something is destructive, it causes great damage or harm.
4. Hurricanes can be very destructive storms.
5. Can you think of something that is destructive? Try to use the word *destructive* when you tell about it. [Ask two or three students. If necessary, guide and/or rephrase the students’ responses: “_____ is destructive.”]
6. What’s the word we’ve been talking about?

Use an *Antonyms* activity for follow-up. Directions: A word that is an antonym of *destructive*, or that means the opposite of *destructive*, is the word *constructive*. *Constructive* refers to something that is helpful or is making something better. I am going to describe some scenarios. If what I describe is an example of something that is destructive, or causes harm, say, “That is destructive.” If what I describe is an example of something that is constructive, or that is helpful, say, “That is constructive.”

1. The engineers built a new bridge over the river. (That is constructive.)
2. I helped my little sister learn to tie her shoe. (That is constructive.)
3. The puppy chewed through my mother’s new shoes. (That is destructive.)
4. The ocean wave destroyed the sand castle I built on the beach. (That is destructive.)
5. We helped plant flowers in the garden. (That is constructive.)



Complete Remainder of Lesson Later in the Day



Social Insects: Ants and Termites

5_B

Extensions

20 minutes

Insects Journal

Have students look through the trade books for pictures of ants and termites. Have them draw a picture of an ant and a picture of a termite in their journals. Then, based on what they have learned, have them write one sentence for each insect that tells something they have learned. Tell students that they should also write down any questions they may have about ants and/or termites. 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: Plan (Instructional Master 5B-1)

Tell students that they are going to write an informational narrative, or story, from the perspective of an insect. This narrative, or story, will be narrated by an insect, like the read-alouds have been, and it will contain accurate information about the insects in the story (also like the read-alouds).

Using their journals, have students review the insects they have learned about so far. You may also wish to have them review some of the trade books from the classroom book tub. Tell students that they are also going to learn about grasshoppers, crickets, and beetles, and that they may choose to write a story from the perspective of one of these insects, even though they are not in their journals yet.

Give each student a copy of Instructional Master 5B-1. Tell students that they are going to use this worksheet to plan their informational narrative. (Remind students that when they studied *The Ancient Greek Civilization* domain, they experienced the writing process of planning, drafting, and editing as they wrote a fictional narrative together as a class.) You may choose to model the stages of this writing process as needed.

After reviewing their journals, have students choose one type of insect and write it on the second blank of the title line. Then have them think of a name for their insect and write it on the first blank of the title line.

You may wish to ask the following content questions to encourage the brainstorming process:

- Is your insect a solitary insect or a social insect?
- Does your insect go through incomplete metamorphosis or complete metamorphosis?
- Does your insect have wings?
- What type of mouth does your insect have?

You may wish to ask the following questions to help students organize their story:

- What is the setting of your story?
- Who are the characters?
- What is the plot? (What do you want to happen?)

Have students brainstorm ideas for their insect stories and write words and phrases on their worksheets in the appropriate boxes. You may choose to model brainstorming by choosing your own title and writing down your ideas on chart paper, a chalkboard, or a whiteboard. You may wish to have students work together in groups to allow them to give and receive feedback.

Tell students that they will continue their writing with the draft step the next time you meet.

Take-Home Material

Family Letter

Send home Instructional Master 5B-2.



Insects That Glow and Sing

6

✔ Lesson Objectives

Core Content Objectives

Students will:

- ✓ Classify and identify insects as small six-legged animals with three 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
- ✓ Compare and contrast grasshoppers and crickets

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:

- ✓ 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 “Insects That Glow and Sing” (W.2.8)
- ✓ Generate questions and gather information from multiple sources to answer questions about insects (W.2.8)
- ✓ Add drawings to descriptions of fireflies, grasshoppers, and crickets to clarify ideas, thoughts, and feelings (SL.2.5)

- ✓ Use the antonyms *transparent* and *opaque* appropriately in oral language (L.2.5a)
- ✓ Prior to listening to “Insects That Glow and Sing,” identify orally what they know and have learned about insects
- ✓ Use adverbs correctly in oral language

Core Vocabulary

bioluminescence, n. Light given off by some plants and animals, such as fireflies, caused by a biochemical reaction

Example: The night sky was filled with the bioluminescence of dancing fireflies.

Variation(s): none

forelegs, n. The front legs of a four-legged animal

Example: Since kangaroos hop, they use their forelegs more for balancing than they do for walking.

Variation(s): foreleg

lanterns, n. Lights that have a covering, usually made of glass

Example: The campers all carried lanterns as they went from tent to tent.

Variation(s): lantern

transparent, adj. A clear material that allows objects behind it to be seen


Example: The bird bumped into the transparent window, thinking that it was flying onto the porch.

Variation(s): none

tymbals, n. Thin skins that help produce sounds in some insects

Example: Vibrating tymbals are responsible for the cicadas’ piercing sounds on a summer’s night.

Variation(s): tymbal

<i>At a Glance</i>	Exercise	Materials	Minutes
<i>Introducing the Read-Aloud</i>	What Have We Already Learned?		10
	Purpose for Listening		
<i>Presenting the Read-Aloud</i>	Insects That Glow and Sing		15
<i>Discussing the Read-Aloud</i>	Comprehension Questions		10
	Word Work: Transparent		5
 Complete Remainder of the Lesson Later in the Day			
<i>Extensions</i>	Insects Journal	trade books; journals from previous lessons	20
	Syntactic Awareness Activities: Adverbs		
	Writing an Informational Narrative: Draft	Instructional Masters 5B-1, 6B-1; journals from previous lessons; trade books (optional)	



Insects That Glow and Sing

6A

Introducing the Read-Aloud

10 minutes

What Have We Already Learned?

Ask students to name the common characteristics of all insects. (six-legs; three body parts of head, thorax, and abdomen; an exoskeleton; two antennae; and sometimes wings) Ask students how ants communicate, or share information, with one another. (antennae—sensory parts for smell and touch) Tell students they are going to learn how some other insects communicate.

Tell students that today’s read-aloud is called “Insects That Glow and Sing.” The insects they will learn about today communicate by glowing in the dark and singing to one another.

Purpose for Listening

Tell students that they are going to learn about fireflies, grasshoppers, and crickets. Tell them that grasshoppers and crickets depend upon good hearing to communicate with one another, but that they do not hear with ears on the sides of their heads like we do. Ask students to listen carefully to find out where the hearing organs are located on grasshoppers and where they are located on crickets.



Insects That Glow and Sing

← Show image 6A-1: Firefly with well-illuminated light

Can you blink, boys and girls? So can I. Does your abdomen light up when you blink? No? Are you sure? How can you tell? If you're blinking, perhaps you just can't see. Turn to your neighbor and ask him or her to watch your abdomen while you blink. Did it glow? No? Well, I'm not really surprised. If humans were able to produce their own light, they might never have invented the electric light bulb. We fireflies have been around long before electricity or even candles. Our light organs, called **lanterns**, are located in our **transparent**, or see-through, abdomens.¹

1 Lanterns are lights that have a covering over the source of the light, usually made of glass.



← Show image 6A-2: Fireflies lighting up a forest

When humans first discovered us lighting up the forests, they were amazed by how much light we produced. In ancient China and Japan, people collected us in transparent jars and used us as lanterns to find their way in the dark.² They named us fireflies. But we are not flies at all, and our light—unlike a fire—is cold.

2 What does *transparent* mean?

“Cold light” is the way your ancestors explained our beautiful, magical light. Scientists now know that chemical reactions create the light, and they describe this process with a much bigger word. They call it **bioluminescence**. Can you say that? *Bio* means living and *lumin* means light. I think that's a good name for it, don't you? We are living lights!



← Show image 6A-3: Bioluminescence in the ocean

Other animals and plants glow, or light up like tiny electric bulbs, but most of them live in the ocean. Certain types of squid, jellyfish, corals, and even sharks glow beneath the water. Plants such as algae in the ocean can also glow on the surface of the water. At times, this bioluminescence is so bright that it looks as if someone flipped a light switch beneath the water.

It's less common to find land animals that glow, or give off light. I've told you that we are called fireflies, but do any of you call us by another name? We're also called lightning bugs. But we are neither flies nor bugs. We are beetles—another group of insects. Take a close look and see.



← **Show image 6A-4: Lightning bug**

3 [Have student volunteers point to these body parts in the image.]

Like all insects, we have three body parts (head, thorax, and abdomen); six legs; two antennae; an exoskeleton; and, like most insects, two pairs of wings.³



← **Show image 6A-5: Firefly larvae**

4 What is a complete metamorphosis? (a change that is so big that the insect looks completely different after)

We undergo a complete metamorphosis—changing from egg to larva to pupa to adult.⁴ Some of our eggs and larvae even glow! Have you ever heard of a glowworm? Glowworms are also misnamed. They are not worms at all.⁵ The larvae of fireflies and other insects are often called glowworms because they live on the ground like worms do, and they glow in the dark.

5 At what stage do insects look like worms?

← **Show image 6A-6: Firefly bioluminescence**



In order for any animals to survive, they must reproduce, or have babies. That means we must all work hard to attract mates. Fireflies glow when they are seeking mates. The males fly through the dark, flashing very specific signals to females who sit patiently and wait for them. Our yellowish-green lights stand out against the night sky as we signal one another with special codes. When a female recognizes a male's code as being from the same species,⁶ she flashes the same code back to him and the male lands beside her.

6 or type

Have you ever noticed how some fireflies flash close to the ground with one pattern, but others seem to be higher in the air with a different flash pattern at a slightly later time of night? These are males of different species attracting their own females. Watch us next summer and you will see what I mean.



← **Show image 6A-7: Grasshopper**⁷

7 [Ask students who has been narrating the read-aloud up to this point. (a firefly) Then ask, based on the image, who they think will be narrating now.]

8 What is the firefly's light organ called? (a lantern)

9 Of course, it may take many years of studying grasshopper sounds to be able to tell them apart.



← **Show image 6A-8: Grasshopper's tympanum**

10 [Point to the abdomen in the image. The tympanum is located near where the thorax and abdomen come together, close to where the muscular hind legs attach to the thorax.]



← **Show image 6A-9: Grasshopper's wings**

11 [Point to the wings as you read this paragraph.]

Hi there. I bet you're surprised to see me today. I'm not bioluminescent. I don't glow, but I do sing. That's what I want to talk to you about today—other ways that insects communicate, or share information.

Fireflies are silent communicators, flashing their glowing lights back and forth.⁸ How do you communicate with one another? You talk, don't you? And what do you use to talk? Your mouths, of course! Although we insects use mouths for eating, just like you, we have no vocal cords, or voice boxes, so we don't use them for talking and singing. Even so, we grasshoppers can be a noisy bunch. Have you ever heard grasshoppers sing on a summer day? You won't hear any words, but you will definitely hear a chorus of sounds. Just like birds, each type of grasshopper produces a different song. If you listen closely, you can tell what type of grasshopper is singing by its song.⁹

Nearly all grasshoppers have two pairs of wings, but we seldom use them for flying because we spend so much of our lives low to the ground. Male grasshoppers use their wings for communicating with one another. Female grasshoppers do not sing, but they listen very carefully. They hear our sounds with tympanum, eardrums on the side of their abdomens.¹⁰

Grasshoppers, locusts, and crickets all make sounds by rubbing body parts together, sometimes two wings and sometimes a leg and a wing.

To make sounds, I lift my wings and rub the front wings together.¹¹ The vein composed of many tiny teeth on the bottom of one wing rubs against the sharp edge, or scraper, on the top of the other wing. It is a little like rubbing your fingers along the teeth of a comb. As the two parts rub together, the wings vibrate, moving back and forth rapidly to produce the sounds that you hear.



← **Show image 6A-10: Katydid**

You may be familiar with my cousin, the katydid. Katydids have long antennae, just like me. As they rub their front wings together, it sounds like they are calling out “Katy did, Katy did.” Their high-pitched calls become faster and faster as the outside temperature rises. Some people even say that you can tell how hot it is by the number of times per second a katydid chirps. If katydids live in your part of the world and you are patient enough, you may want to try counting the number of chirps you hear every five seconds. Add thirty nine to that number and you may have an accurate reading of the temperature, depending on the species of katydid you are hearing.



← **Show image 6A-11: Cricket cage and cricket**

In some Asian countries, in a tradition that has been practiced for thousands of years, male crickets have been kept in cages as singing pets. Do you know where the ears of a cricket are located? You may remember that female grasshoppers hear with special parts on their abdomens, but crickets have “ears” on their **forelegs**.¹² Both places must seem a little strange to you since your ears are on the sides of your head.

12 The front legs of animals are called forelegs.

Before I leave today, I want to introduce you to another singing insect. These insects are often mistaken for grasshoppers and crickets because they look a lot like us.



← **Show image 6A-12: Cicada**

Does anyone remember what this insect is called? This is a cicada [si-KAY-duh]. Cicadas are related to aphids, leafhoppers, and spittlebugs. Unlike grasshoppers and crickets, many cicadas have strong wings and are fast fliers.

Male cicadas produce incredibly loud songs, but they do not use their legs and wings to make those sounds.



← **Show image 6A-13: Cicada with tymbals labeled**

13 To *vibrate* means to move back and forth very fast.

Look closely at the abdomen of a cicada. On its underside, close to the thorax, a cicada has a pair of sound-producing organs called **tymbals**. These ribbed membranes are a little like the skin of a drum. The cicada uses its muscles to vibrate these drum-like organs.¹³ The tymbals pop and click as they move in and out. Their sound is amplified, or made louder, inside the mostly hollow abdomen, acting like a drum and creating a loud buzzing song. The shrill sound of hundreds or thousands of cicadas singing together on a warm summer evening may be very, very loud.

Grasshoppers, crickets, and cicadas all use sound to communicate in much the same way that fireflies use their lights. Males attract females for the purpose of mating, making sure that these winged insects will continue to survive.

Next time you gather to discuss insects, you will learn about the largest group of insects on Earth. Can anyone guess what that might be?

Discussing the Read-Aloud

15 minutes

Comprehension Questions

10 minutes

1. *Literal* How do fireflies communicate with one another? (by flashing their lanterns, or lights)
2. *Literal* In what body part is the firefly's lantern located? (the abdomen)
3. *Literal* In which section of the grasshopper are the hearing organs located—the head, the thorax, or the abdomen? (abdomen)
4. *Inferential* The female grasshoppers use their tympanum, or eardrums on the sides of their abdomens, to listen to the male grasshoppers. Why do the males sing to the females? (They are communicating that they want to mate with them.)

5. *Inferential* How do the male grasshoppers make their singing sounds? (They rub body parts together, sometimes wings and sometimes legs and wings together.)
6. *Literal* Where are a cricket's hearing organs located—its abdomen, forelegs, or wings? (on its forelegs)
7. *Inferential* You heard in the read-aloud about a tradition in some Asian countries where crickets are kept in cages. Is it males or females that are caged? Why are they caged? (male; so people can hear them sing)
8. *Inferential* Do grasshoppers, crickets, and fireflies all have exoskeletons? How do you know? (Yes, they are all insects and all insects have exoskeletons.)

[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.

9. *Evaluative Think Pair Share:* You learned about an insect today that is called both a firefly and a lightning bug. Which do you think is the better name? Why? (Answers may vary, but discuss the fact that they are neither fly nor bug.)
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: Transparent

5 minutes

1. In the read-aloud you heard, “Our light organs, called lanterns, are located in our *transparent*, or see-through, abdomens.”
2. Say the word *transparent* with me.
3. *Transparent* refers to a clear material through which you can see objects.
4. Windows in buildings are made of transparent glass, allowing us to view whatever is outside the window.
5. Look around the room for a transparent object. Tell me what you see and how you know it is transparent. Use the word *transparent* when you tell about it. [Ask two or three students. If necessary, guide and/or rephrase the students’ responses: “The _____ is transparent because it”]
6. What’s the word we’ve been talking about?

Use an *Antonyms* activity for follow-up. Directions: The opposite of, or antonym of, *transparent* is *opaque*, which means you cannot see through it. I am going to name some objects. If you can see through the object, say, “That is transparent.” If you cannot see through the object, say, “That is opaque.”

1. a clear drinking glass filled with water (That is transparent.)
2. a solid wooden pencil (That is opaque.)
3. a piece of plastic wrap (That is transparent.)
4. a window (That is transparent.)
5. a desk (That is opaque.)



Complete Remainder of Lesson Later in the Day



Insects That Glow and Sing

6_B

Extensions

20 minutes

Insects Journal

Have students look through various trade books in the classroom book tub for trade books about fireflies, grasshoppers, and crickets. Have them draw a picture of a firefly, grasshopper, and/or cricket in their journals and write one sentence about something they learned from today's read-aloud. Tell students that they should also write down any questions they may have about fireflies, grasshoppers, and crickets, and have them look through the book tub 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. You may also wish to find a video recording about one of the insects you heard about, or an audio recording of katydid, cricket, or cicada sounds to play for students.

As students share their drawings and sentences with the class, expand upon their vocabulary using richer and more complex language, including, if possible, any read-aloud vocabulary.

↔ Syntactic Awareness Activity: Adverbs

The purpose of these syntactic activities is to help students understand the direct connection between grammatical structures and the meaning of text. These syntactic activities should be used in conjunction with the complex text presented in the read-alouds.

Note: There may be variations in the sentences created by your class. Allow for these variations, and restate students' sentences so that they are grammatical.

1. We know that many verbs are action words. Today we will practice using adverbs, which are words that are used to describe verbs.



← **Show image 6A-9: Grasshopper's wings**

2. This is an image of a grasshopper. What do grasshoppers do? (Grasshoppers sing.)
3. *Sing* is an action word. What words could we use to describe how grasshoppers sing? (*loudly, softly, etc.*) Grasshoppers sing loudly. Grasshoppers sing softly.
4. The words that describe how grasshoppers sing are called adverbs. Adverbs are words that describe verbs, or action words.
5. In the read-aloud you heard that grasshoppers' wings move rapidly to make sounds.
6. What do grasshoppers' wings do? (move) What word is used to describe how the wings move in this sentence? (*rapidly, which means quickly*)
7. *Rapidly* is the adverb that is used to describe how grasshoppers' wings move.
8. [Have students repeat clapping motions after you as they describe the clapping using adverbs, such as *clap quickly, clap slowly, clap loudly, etc.*] We can use adverbs to describe how we move, too. Listen to how I clap, and repeat it after me. What words, or adverbs, could we use to describe how we are clapping?
9. Now you try! First, one partner should move a certain way so that the other partner can repeat it. Then, work together to describe the movement. What are these describing words called? (adverbs)

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

Give each student their copy of Instructional Master 5B-1, and tell them that they are going to begin writing their informational narrative, or story, about the insect they have chosen. Ask: “Is the insect in your story a solitary insect or a social insect? How do you know?”

Have students review their titles and brainstorming worksheets to see if there is anything they would like to change. You may wish to have students work together in groups to allow them to give and receive feedback.

Once students have decided on a title and basic story, give each student a copy of Instructional Master 6B-1, and have him/her write five sentences in the rectangular boxes. Remind students that the first sentence should be an introductory sentence. Remind students that the last sentence should be a concluding sentence. Also, remind students to use capital letters at the beginning of their sentences and the correct punctuation at the end of each sentence.

Tell students that if they do not finish their drafts today, they may continue to write their narratives the next time you meet.



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

7
A

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.



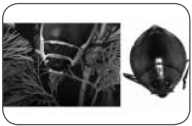
← **Show image 7A-7: Namibian desert beetles**

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)

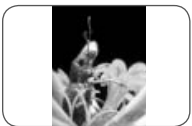


← **Show image 7A-8: Diving beetle and whirligig beetle**

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**

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.

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



← **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**

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.

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



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

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.

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.]

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



Armored Tanks of the Insect World

7
B

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.



Friend or Foe?

8

✔ **Lesson Objectives**

Core Content Objectives

Students will:

- ✓ Explain that insects are the largest group of animals on Earth
- ✓ Explain that there are many different types of insects
- ✓ Identify ways in which insects can be helpful to people
- ✓ Identify ways in which insects can be harmful to people

Language Arts Objectives

Students will:

- ✓ Identify the main topic of “Friend or Foe?” (RI.2.2)
- ✓ Describe the connections between actions taken by humans and the extinction of some insects (RL.2.3)
- ✓ 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)
- ✓ With guidance and support from adults and peers, focus on the topic of insects and strengthen writing as needed by revising and editing (W.2.5)
- ✓ Use the antonyms *foe* and *friend* appropriately in oral language (L.2.5a)
- ✓ Identify new meanings for the word *bug* and apply them accurately (L.2.5a)

Core Vocabulary

entomologist, n. One who studies insects

Example: The entomologist traveled to rainforests worldwide to compare the kinds of insects living in each one.

Variation(s): entomologists

extinction, n. The dying out of a species until it no longer exists

Example: Some scientists believe that the extinction of the dinosaurs occurred many millions of years ago.

Variation(s): none

foe, n. Enemy or opponent

Example: The Athenians and Spartans of ancient Greece fought together against their foe, the Persian Empire.

Variation(s): foes

pesticides, n. Substances used to destroy insects that threaten the life or health of plants and animals


Example: Some people prefer to eat organic plants because they are not sprayed with chemical pesticides.

Variation(s): pesticide

pollinators, n. Insects that carry pollen from one plant to another, a necessary act for new plant growth

Example: Bees and butterflies are both important pollinators, collecting pollen from one plant and depositing it on another.

Variation(s): pollinator

<i>At a Glance</i>	Exercise	Materials	Minutes
Introducing the Read-Aloud	Essential Background Terms or Information		10
	Purpose for Listening		
Presenting the Read-Aloud	Friend or Foe?	Image Cards 16, 17	15
Discussing the Read-Aloud	Comprehension Questions	Image Cards 18, 19	10
	Word Work: Foe		5
 Complete Remainder of the Lesson Later in the Day			
Extensions	Multiple Meaning Word Activity: Bug	Poster 4M (Bug)	20
	Writing an Informational Narrative: Edit	Instructional Masters 5B-1, 6B-1, 6B-2; [This exercise requires advance preparation.]	



Friend or Foe?

8_A

Introducing the Read-Aloud

10 minutes

Essential Background Information or Terms

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.

Purpose for Listening

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



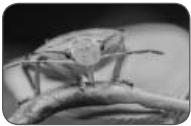
Friend or Foe?

← 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.]



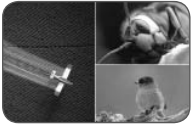
← Show image 8A-4: Close-up of ladybug

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)**

- 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**

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

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

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.

- 7 [Pause for students to share.]

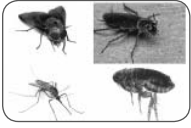
- 8 Pollinators are insects that carry pollen from one plant to another to enable plants to grow and produce flowers or fruit.



← **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*.

13 [Point to the image on the right.]



that feed on those insects are affected when they can no longer find enough food. Also, people build homes in the desert¹³ and not only destroy animal habitats, but also very quickly use up all the water that the desert insects need to survive.

← **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.



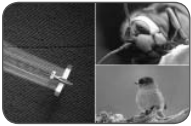
← **Show image 8A-16: Looking at trees and looking at flowers**

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.

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?

8_B

Extensions

20 minutes

↔ Multiple Meaning Word Activity: Bug

Sentence in Context: Bug

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. [Have students hold up one, two, or three fingers to indicate which image on the poster shows this meaning.]
2. *Bug* also has other meanings. The word *bug* can mean to bother or annoy someone. [Have students hold up one, two, or three fingers to indicate which image on the poster shows this meaning.]
3. *Bug* also has other meanings. The word *bug* can mean a mild illness, such as a cold, that can be passed from one person to another. [Have students hold up one, two, or three fingers to indicate which image on the poster shows this meaning.]
4. Now with your neighbor, make a sentence for each meaning of *bug*. Remember to use complete sentences. I will call on some of you to share your sentences. [Call on a few students to share their sentences.]

Writing an Informational Narrative: Edit (Instructional Masters 5B-1, 6B-1, 6B-2)

Give each student their copies of Instructional Masters 5B-1 and 6B-1, and tell them that they are going to continue working on their insect narratives. You may wish to have students work in groups to allow them to give and receive feedback. Have students check that they have said everything they needed or wanted to say about their character(s), setting(s), and plot.

After students have completed their narratives, 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. Use Instructional Master 1B-2 as a checklist for students to edit their informational narratives. This checklist includes the basic items for students to review, such as using punctuation at the end of each sentence, commas between items in a list, and capital letters at the beginning of each sentence. In addition, the checklist includes additional lines on which you may also include specific writing concepts students are currently learning.

As time allows, have students share their narratives with the class. Allow students to share any mistakes they see, what they like about what has been written, and what changes they may suggest. After editing, rewrite the paragraph onto a piece of lined paper. You may also wish to have students share their fictional narratives in the Culminating Activities.



Domain Review

DR

Note to Teacher

You should spend one day reviewing and reinforcing the material in this domain. You may have students do any combination of the activities provided, in either whole-group or small-group settings.

Core Content Objectives Addressed in This Domain

Students will:

- ✓ Explain that insects are the largest group of animals on Earth
- ✓ Explain that there are many different types of insects
- ✓ Explain that most insects live solitary lives, but some, such as honeybees, paper wasps, ants, and termites are social
- ✓ Explain that insects live in virtually every habitat on Earth, with the exception of the oceans
- ✓ Classify and identify particular insects as small, six-legged animals with three main body parts
- ✓ Identify and describe the three main 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
- ✓ Explain why spiders are not insects
- ✓ Describe the life cycles and the processes of complete and incomplete metamorphosis
- ✓ Describe how some insects look like miniature versions of adults when they are born from eggs
- ✓ Explain why some insects molt
- ✓ Describe how some insects go through four distinct stages of development, including egg, larva, pupa, and adult

- ✓ Distinguish between social and solitary insects
- ✓ Describe how all members of a social insect colony come from one queen
- ✓ Describe the roles of honeybee workers, drones, and queens
- ✓ Describe how honeybees communicate with one another through “dances”
- ✓ Describe the social behavior of ants and ant colonies
- ✓ Describe the roles of worker ants, males, and queens
- ✓ Compare and contrast grasshoppers and crickets
- ✓ Identify ways in which insects can be helpful to people
- ✓ Identify ways in which insects can be harmful to people

Activities

Image Review

Show the Flip Book images from any read-aloud, and have students retell the information from the read-aloud using the images.

Image Card Review

Materials: Image Cards 1–19

In your hand, hold Image Cards 1–19 fanned out like a deck of cards. Ask a student to choose a card but to not show it to anyone else in the class. The student must then perform an action or give a clue about the picture s/he is holding. For example, for the ladybug, a student may pretend to eat other insects or act out flying around with two pairs of wings. The rest of the class will guess what insect or object is being described. Proceed to another card when the correct answer has been given.

Key Vocabulary Brainstorming

Materials: Chart paper, chalkboard, or whiteboard

Give students a key domain concept or vocabulary word such as *colonies*. Have them brainstorm everything that comes to

mind when they hear the word, such as *social*, *ants*, *honeybees*, etc. Record their responses on chart paper, a chalkboard, or a whiteboard for reference.

Riddles for Core Content

Ask students riddles such as the following to review core content:

- I am the process by which most newborn insects change into their adult forms. What am I called? (metamorphosis)
- We are the two types of metamorphosis. What are we? (complete and incomplete metamorphosis)
- I am the name for the caterpillar stage in the process of complete metamorphosis. What am I? (larva)
- I am the name for the chrysalis or cocoon stage in the process of complete metamorphosis. What am I? (pupa)
- We are the four stages in the life cycle of an insect that undergoes complete metamorphosis. What are we? (egg, larva, pupa, adult)
- I am the female that produces all of the eggs for a social colony, allowing the colony to survive. What am I? (the queen)
- We are the male bees that live in a honeybee colony. What are we? (the drones)

You may wish to have students create their own riddles about insects to pose to the class, based on what they have learned.

Class Book

Materials: Drawing paper, drawing tools

Tell the class or a group of students that they are going to add to the class book they started previously to help them remember what they have learned about insects in this domain. Have students brainstorm important information about the characteristics and life cycles of insects, including complete and incomplete metamorphosis, which insects are solitary and which are social, and how insects are helpful and/or harmful. Have each student choose one idea to draw a picture of, and ask him or her

to write a caption for the picture. Bind the pages to make a class book to put in the class library for students to read again and again.

Compare/Contrast

Materials: Chart paper, chalkboard, or whiteboard

Tell students that there are many things to compare and contrast in the read-alouds they have heard. Remind students that to *compare* means to tell how things are similar and to *contrast* is to tell how things are different. Have students choose a topic from the following list to compare/contrast using a Venn diagram or three-column chart. You may do this individually or as a class.

- complete and incomplete metamorphosis
- ants and bees
- honeybee hives and paper wasp nests

You may wish to extend this activity by using the chart as a prewriting tool and having students write two sentences, one describing similarities and the other describing differences.



Domain Assessment

DA

This domain assessment evaluates each student's retention of domain and academic vocabulary words and the core content targeted in *Insects*. The results should guide review and remediation the following day.

There are two parts to this assessment. You may choose to do the parts in more than one sitting if you feel this is more appropriate for your students. Part I (vocabulary assessment) is divided into two sections: the first assesses domain-related vocabulary, and the second assesses academic vocabulary. Part II of the assessment addresses the core content targeted in *Insects*.

10 Part I (Instructional Master DA-1)

Directions: I am going to say a sentence using a word you have heard in the read-alouds. First, I will say the word, and then I will use it in a sentence. If I use the word correctly in my sentence, circle the smiling face. If I do not use the word correctly in my sentence, circle the frowning face. I will say each sentence two times. Let's do number one together.

1. **Host:** An animal or a plant can be a host to other living things. (smiling face)
2. **Social:** Social insects are ones that live by themselves. (frowning face)
3. **Solitary:** Solitary insects are the ones that live by themselves. (smiling face)
4. **Antennae:** An insect's antennae are located on its head and are used by the insect to get information about its surroundings. (smiling face)
5. **Exoskeletons:** Insects' exoskeletons are located on the inside of their bodies, just like a person's skeleton. (frowning face)

6. **Metamorphosis:** The change an insect goes through from egg, to larva, to pupa, to adult is called metamorphosis. (smiling face)
7. **Molt:** Insects molt their skin so they can grow. (smiling face)
8. **Pollen:** Pollen is the part of the insect's body that is farthest from its head. (frowning face)
9. **Bioluminescence:** Fireflies communicate with one another with bioluminescence, or by having their abdomens light up. (smiling face)
10. **Entomologist:** An entomologist is a type of bug similar to a beetle. (frowning face)

Directions: I am going to read more sentences using other words you have heard in the read-alouds. If I use the word correctly in my sentence, circle the smiling face. If I do not use the word correctly in my sentence, circle the frowning face. I will say each sentence two times.

11. **Microscopic:** Something that is microscopic is very, very large. (frowning face)
12. **Cooperate:** When people cooperate, they work together to accomplish something. (smiling face)
13. **Destructive:** If something is destructive, it is helpful and tries to make things better. (frowning face)
14. **Transparent:** A window is transparent, which means you can see through it. (smiling face)
15. **Foe:** A foe is an enemy or an opponent. (smiling face)

10 Part II (Instructional Master DA-2)

Directions: I am going to read some statements about insects. If the statement is correct, circle the smiling face. If the statement is not correct, circle the frowning face.

1. Insects live in every habitat on Earth, except in the oceans. (smiling face)
2. Insects have eight legs and five main body parts. (frowning face)

3. Insects have skeletons on the inside of their bodies like we do. (frowning face)
4. Honeybees and paper wasps are solitary insects. (frowning face)
5. All members of a social insect colony come from one queen. (smiling face)
6. Spiders are insects. (frowning face)
7. Insects use their antennae to smell and feel. (smiling face)
8. Complete metamorphosis has four stages, and incomplete metamorphosis has three stages. (smiling face)
9. When people spray pesticides or cut down insects' habitats, they are helping insects. (frowning face)
10. Crickets communicate with one another by the blinking lights on their abdomens. (frowning face)



Culminating Activities

CA

Note to Teacher

Please use this final day to address class results of the Domain Assessment. Based on the results of the Domain Assessment and students' Tens scores, you may wish to use this class time to provide remediation opportunities that target specific areas of weakness for individual students, small groups, or the whole class.

Alternatively, you may also choose to use this class time to extend or enrich students' experience with domain knowledge. A number of enrichment activities are provided below in order to provide students with opportunities to enliven their experiences with domain concepts

Remediation

You may choose to regroup students according to particular areas of weakness, as indicated from Domain Assessment results and students' Tens scores.

Remediation opportunities include:

- targeting Review Activities
- revisiting lesson Extensions
- rereading and discussing select read-alouds
- reading the corresponding lesson in the *Supplemental Guide*, if available

Enrichment

Domain-Related Trade Book or Student Choice

Materials: Trade book

Read a trade book to review a particular insect or concept about insects; refer to the books listed in the Introduction. You may also choose to have the students select a read-aloud to be heard again.

Drawing Insects

Materials: Drawing paper, drawing tools

Have students draw their favorite insect. Tell them to be sure to draw six legs and label the three body parts: head, thorax, and abdomen. Allow students to share their drawings with the class.

Insect Research

Materials: Insects Journals, trade books, other resources as needed

Have students check their Insects Journals to see if there are any questions they have about insects that have not been answered. Allow them to search through the trade books in the classroom book tub to look for answers. You may also wish to allow them to research using online and/or library resources. Have students write in their journals any information that either answers a question or that they find interesting. As time allows, have students share what they find with the class.

✈ Above and Beyond: You may wish to extend this exercise by having students write and share a brief report about a specific insect.

On Stage

Have students pretend to be particular insects, and have the rest of the class guess which insect is being portrayed. You may wish to allow the student to give clues such as, “I’m a social insect,” or “I’m a very helpful insect,” etc.

Listen to Music

Materials: Recordings of music and sound effects

Have students listen to “Flight of the Bumblebee,” by Nikolai Rimsky-Korsakov, and ask them why they think this song has this title. Sing “The Ants Go Marching” and other fun songs about insects. You may also wish to play recordings of chirping crickets and other insect sounds.

Writing Prompts

Students may be given an additional writing prompt such as the following:

- My favorite read-aloud about insects is . . .
- Some social insects that I know of are . . .
- Some solitary insects that I know of are . . .
- The difference between complete and incomplete metamorphosis is . . .

How Insects Help Us

Materials: Silk; honey; beeswax candle; foods from plants pollinated by bees

Bring in some silk fabric, honey, or a beeswax candle to show students products that are made possible because of insects. You may also wish to bring in samples of apples, pears, tomatoes, cucumbers, almonds, and chocolate to show students the variety of plant products pollinated by bees.

Note: Be sure to follow your school's policy regarding food distribution and allergies

Observing Metamorphosis

Materials: Butterfly kit

Allow students to observe the four stages of a butterfly's metamorphosis: egg, caterpillar, chrysalis, and adult. Have students draw and/or write notes in their journals about the experience.

Observing Social Insects

Take your class on a trip to visit a museum that has a beehive, or set up an ant colony in your classroom. Have students observe the insects' social behavior and draw and/or write notes in their journals.

Insect Hunt

Take your class outside to see how many insects they can find. Have students observe the insects and draw and/or write notes in their journals. You may also choose to bring insects back into the classroom to observe, perhaps under a microscope.

For Teacher Reference Only:
Copies of *Tell It Again! Workbook*





Dear Family Member,

Over the next few days, your child will be learning about the world of insects, the largest group of animals on Earth. Below are some suggestions for activities that you can do at home to reinforce your child's learning about insects.

1. Insect Hunt

Talk about where you may find insects at home and on outings together. Look for them together; it may be fun to go out after dark with a flashlight when some insects come out to feed. Which insects live in the area in which you live? Where and why?

2. Examining Insects Closely

If possible, search YouTube or rent videos/DVDs about insects. Watch them with your child and discover interesting facts together.

3. Words to Use

Below is a list of some of the words that your child will be using at school. Try to use these words as they come up in everyday speech with your child.

- *Social*—Olivia's birthday party was the biggest social event of the week.
- *Solitary*—Reading to oneself is a fun way to spend solitary time.
- *Cooperate*—Please cooperate by helping to fold the laundry before we go for a walk.
- *Microscopic*—The germs that cause a virus like the common cold are microscopic.

4. Draw an Insect Colony

Have your child draw a picture of an ant or bee colony and then tell you about it. Ask your child to identify the different members of the colony and tell you how they cooperate through performing different roles.

5. Read Aloud Each Day

It is very important that you read to your child each day. The local library has many books on insects, and a list of books and other resources relevant to this topic is attached to this letter.

Be sure to let your child know how much you enjoy hearing about what s/he has learned at school.



Recommended Trade Books for Insects

Trade Book List

1. *About Insects*, by Cathryn Sill and illustrated by John Sill (Peachtree Publishers Ltd., 2003) ISBN 978-1561452323
2. *Ant Cities*, by Arthur Dorros (HarperCollins Publishers, 1987) ISBN 978-0064450799
3. *Are You a Bee?*, by Judy Allen and Tudor Humphries (Kingfisher, 2001) ISBN 978-0753458044
4. *Are You a Butterfly?*, by Judy Allen and Tudor Humphries (Kingfisher, 2003) ISBN 978-0753456088
5. *Are You a Dragonfly?*, by Judy Allen and Tudor Humphries (Kingfisher, 2001) ISBN 978-0753458051
6. *Are You a Grasshopper?*, by Judy Allen and Tudor Humphries (Kingfisher, 2002) ISBN 978-0753458051
7. *Are You a Ladybug?*, by Judy Allen and Tudor Humphries (Kingfisher, 2000) ISBN 978-0753456033
8. *Are You an Ant?*, by Judy Allen and Tudor Humphries (Kingfisher, 2002) ISBN 978-0753458037
9. *Bee Life*, by Lynette Evans (Insight Editions, 2013) ISBN 978-1608871988
10. *Beetles*, by Cheryl Coughlan (Capstone Press, 1999) ISBN 978-0736802352
11. *Bugs are Insects*, by Anne Rockwell and illustrated by Steve Jenkins (HarperCollins Publishers, 2001) ISBN 978-0064452038
12. *Children's Guide to Insects and Spiders*, by Jinny Johnson (Simon & Schuster, 1996) ISBN 978-0689811630
13. *Chirping Crickets*, by Melvin Berger and illustrated by Megan Lloyd (HarperCollins Publishers, 1998) ISBN 978-0064451802

14. *Clara Caterpillar*, by Pamela Duncan Edwards (HarperTrophy, 2001) ISBN 978-0064436915
15. *Crickets*, by Cheryl Coughlan (Capstone Press, 1999) ISBN 978-0736882088
16. *The Dragonfly Door*, by John Adams and illustrated by Barbara L. Gibson (Feather Rock Books, Inc., 2007) ISBN 978-1934066126
17. *Eliza and the Dragonfly*, by Susie Caldwell Rinehart and illustrated by Anisa Claire Hovemann (Dawn Publications, 2004) ISBN 978-1584690597
18. *From Caterpillar to Butterfly*, by Deborah Heiligman and illustrated by Bari Weissman (HarperCollins Publishers, 1996) ISBN 978-0064451291
19. *Grasshopper on the Road*, by Arnold Lobel (HarperCollins Publishers, 1978) ISBN 978-0064440943
20. *Grasshoppers*, by Margaret Hall (Capstone Press, 2005) ISBN 978-0736850964
21. *Helpful and Harmful Insects*, by Molly Aloian and Bobbie Kalman (Crabtree Publishing Company, 2005) ISBN 978-0778723752
22. *Hey Little Ant*, by Phillip and Hannah Hoose illustrated by Debbie Tilley (Tricycle Press, 1998) ISBN 978-1883672546
23. *Honey in a Hive*, by Anne Rockwell and illustrated by S.D. Schindler (HarperCollins Publishers, 2005) ISBN 978-0064452045
24. *The Honey Makers*, by Gail Gibbons (Mulberry Books, 1997) ISBN 978-0688175313
25. *Honeybees*, by Joyce Milton and illustrated by Pete Mueller (Grosset & Dunlap, 2003) ISBN 978-0448428468
26. *How to Hide a Butterfly*, by Ruth Heller (Grosset & Dunlap, 1992) ISBN 978-0448404776
27. *Hurry and the Monarch*, by Antoine Ó Flatharta illustrated Meilo So (Dragonfly Books, 2009) ISBN 978-0385737197
28. *Insects: Six-Legged Animals*, by Suzanne Slade and Rosiland Solomon (Picture Window Books, 2010) ISBN 978-1404855243

29. *The Insect Book*, by Connie Zakowski (Rainbow Books, Inc., 1997) ISBN 978-1568250373
30. *Insect Bodies*, by Molly Aloian and Bobbie Kalman (Crabtree Publishing Company, 2005) ISBN 978-0778723745
31. *Insect Life Cycles*, by Molly Aloian and Bobbie Kalman (Crabtree Publishing Company, 2005) ISBN 978-0778776239
32. *Inside an Ant Colony*, by Allan Fowler (Children's Press, 1998) ISBN 978-0516263656
33. *The Life and Times of the Ant*, by Charles Micucci (Houghton Mifflin, 2003) ISBN 978-0618689491
34. *The Life and Times of the Honeybee*, by Charles Micucci (Houghton Mifflin, 1995) ISBN 978-0395861394
35. *The Life Cycle of a Butterfly*, by Bobbie Kalman (Crabtree Publishing Company, 2002) ISBN 978-0778706809
36. *The Life Cycle of a Honeybee*, by Bobbie Kalman (Crabtree Publishing Company, 2004) ISBN 978-0778706946
37. *The Life Cycle of an Ant*, by Bobbie Kalman and Hadley Dyer (Crabtree Publishing Company, 2006) ISBN 978-0778707004
38. *The Magic School Bus: Inside a Beehive*, by Joanna Cole and Bruce Degen (Scholastic, 1996) ISBN 978-0590257213
39. *Monarch Butterfly*, by David M. Schwartz and photography by Dwight Kuhn (Creative Teaching Press, Inc., 1999) ISBN 978-1574715798
40. *Monarch Butterfly*, by Gail Gibbons (Holiday House, 1989) ISBN 978-0823409099
41. *A Monarch Butterfly's Life*, by John Himmelman (Children's Press, 1999) ISBN 978-0516265377
42. *Old Cricket*, by Lisa Wheeler and illustrated by Ponder Goembel (Aladdin Paperbacks, 2003) ISBN 978-1416918554
43. *On Beyond Bugs!*, by Tish Rabe and illustrated by Aristides Ruiz (Random House, 1999) ISBN 978-0679873037

44. *Sarah's Story*, by Harley Bill and illustrated by Eve Aldridge (Tricycle Press, 1996) ISBN 978-1582461786
45. *The Very Quiet Cricket*, by Eric Carle (Penguin Group, 1990) ISBN 978-0399218859
46. *Where Butterflies Grow*, by Joanne Ryder and illustrated by Lynne Cherry (Puffin Books, 1989) ISBN 978-0140558586
47. *A World Without Bees*, by Kenneth Peters and illustrated by Sonya Opal (Ken W. Peters, 2011) ISBN 978-0986615818
48. *Joyful Noise: Poems for Two Voices*, by Paul Fleischman (HarperCollins, 1988) ISBN 978-0060218522

Websites and Other Resources

Student Resources

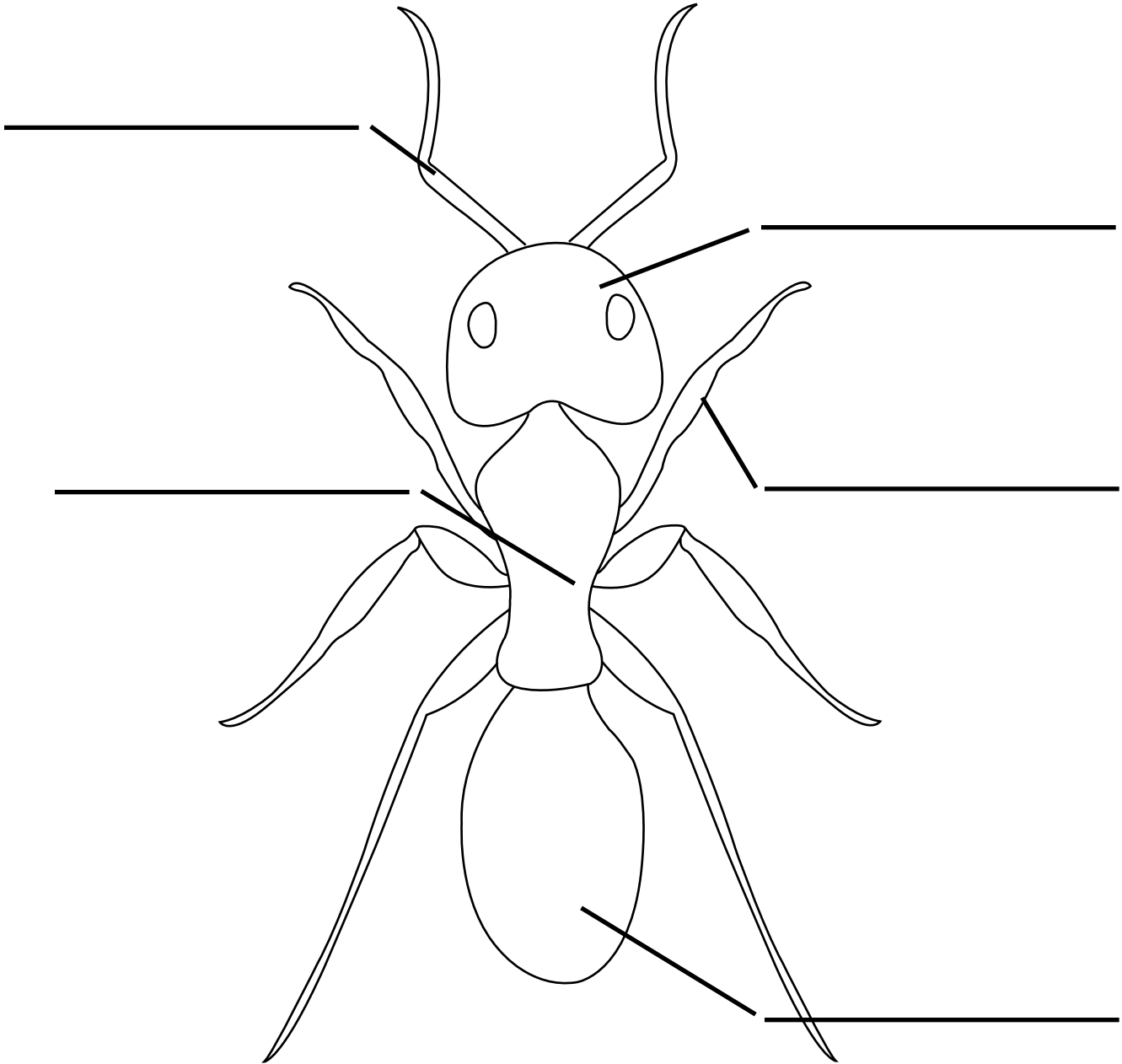
1. **Insect and Bug Word Search**
http://www.primarygames.com/science/insects/games/word_search/search.htm
2. **Insect Riddles**
http://www.bugs.com/kids_corner/insect_riddles.asp
3. **San Diego Zoo Insect Page (for students)**
<http://kids.sandiegozoo.org/animals/insects>
4. **University of Michigan Wasps, Bees, and Ants**
<http://www.biokids.umich.edu/critters/Hymenoptera/pictures>

Family Resources

5. **Honeybee Mystery**
<http://kids.nationalgeographic.com/kids/stories/animalsnature/honey-bee-mystery>
6. **Insects**
<http://www.insects.org>
7. **San Diego Zoo Insect Page (for teachers)**
<http://www.sandiegozoo.org/animalbytes/a-insects.html>

There are numerous places, both on-line and at science supply stores, to purchase live and/or preserved insect specimens for use in classroom observations.

Abdomen	Antenna	Head	Leg	Thorax
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Directions: Label the parts of this ant using the word bank provided.

Abdomen	Antenna	Head	Leg	Thorax
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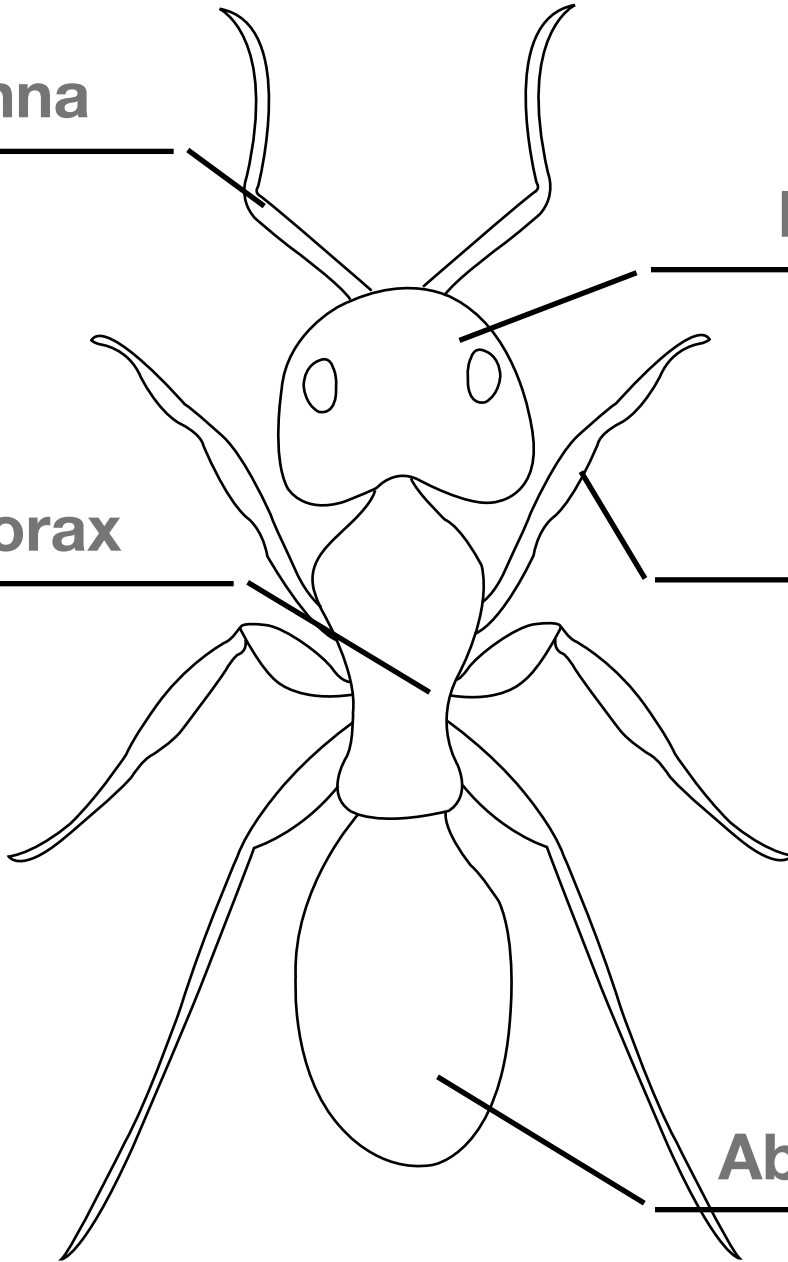
Antenna

Head

Thorax

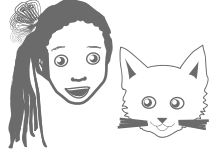

Leg

Abdomen



Directions: Label the parts of this ant using the word bank provided.

Write the type of insect you have chosen to write your informational narrative about on the second blank of the title line. Write your insect's name on the first blank. In the "Character(s)" box, write any words or phrases you can use to describe your insect. Use the other boxes to describe the setting(s) and the plot. Also, use the "Characters" box to describe additional characters in your story.

Name	Insect
<p>Character(s)</p> 	<p>Setting(s)</p> 
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Plot</p>	<p>Beginning</p>
	<p>Middle</p>
	<p>End</p>



Dear Family Member,

I hope your child is enjoying learning about the fascinating world of insects. Over the next few days s/he will learn more about how insects communicate with one another, as well as ways in which insects are both helpful and harmful to our planet. Below are some suggestions for activities that you can do at home to reinforce your child's learning about insects.

1. What's a Bug?

Your child will learn that "all bugs are insects, but not all insects are bugs." Ask him/her to explain why. Then, try to use the word *insect* instead of *bug* when talking to your child about common household creepy-crawlers.

2. Examining Insects Closely

If possible, search YouTube or rent videos/DVDs about insects. Watch them with your child and discover interesting facts together.

3. Words to Use

Below is a list of some of the words that your child will be using at school. Try to use these words as they come up in everyday speech with your child.

- *Destructive*—Some hurricanes can be very destructive.
- *Transparent*—We looked through the transparent door to see if it was raining.
- *Pesticides*—Pesticides are sometimes used to destroy insects that are harmful or cause damage.
- *Entomologist*—An entomologist is a person who studies bugs.

4. Read Aloud Each Day

It is very important that you read to your child each day. Please refer to the list of books and other resources sent home with the previous family letter, recommending resources related to insects.

Be sure to let your child know how much you enjoy hearing about what s/he has learned at school.

Directions: Write the introductory sentence for your paragraph in the first rectangle. Write the three middle sentences in the second, third, and fourth rectangles. Write your concluding sentence in the fifth rectangle.

Directions: Listen to your teacher's directions about this checklist. Then look at your writing to see if you have ended each sentence with the correct punctuation, put commas between items in a list, and started each sentence with a capital letter. Your teacher will let you know if there are other things you should look for in your writing.



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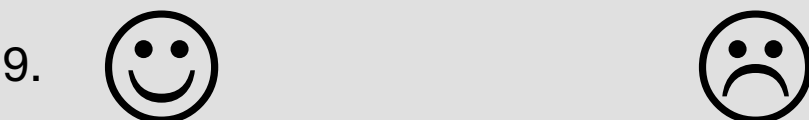
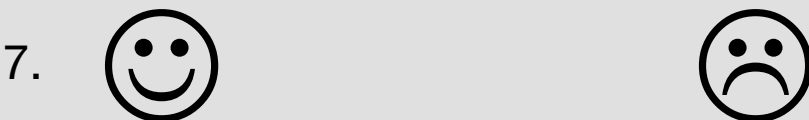
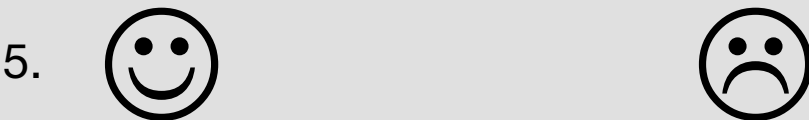
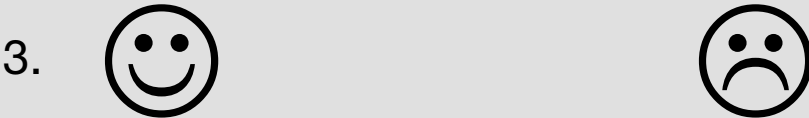
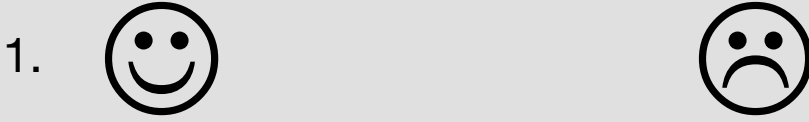
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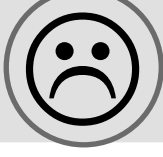




Directions: Listen carefully to the words and sentences read by your teacher. If the sentence uses the word correctly, circle the smiling face. If the sentence uses the word incorrectly, circle the frowning face.





Directions: Listen carefully to the words and sentences read by your teacher. If the sentence uses the word correctly, circle the smiling face. If the sentence uses the word incorrectly, circle the frowning face.

1.		
2.		
3.		
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11.  
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15.  

Directions: Your teacher is going to read some statements about insects. If the statement is true, circle the smiling face. If the statement is false, circle the frowning face.



Directions: Your teacher is going to read some statements about insects. If the statement is true, circle the smiling face. If the statement is false, circle the frowning face.

1.



2.



3.



4.



5.



6.



7.



8.



9.



10.



Tens Recording Chart

Use this grid to record Tens scores. Refer to the Tens Conversion Chart that follows.

Name							

Tens Conversion Chart

		Number Correct																				
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Number of Questions	1	0	10																			
	2	0	5	10																		
	3	0	3	7	10																	
	4	0	3	5	8	10																
	5	0	2	4	6	8	10															
	6	0	2	3	5	7	8	10														
	7	0	1	3	4	6	7	9	10													
	8	0	1	3	4	5	6	8	9	10												
	9	0	1	2	3	4	6	7	8	9	10											
	10	0	1	2	3	4	5	6	7	8	9	10										
	11	0	1	2	3	4	5	5	6	7	8	9	10									
	12	0	1	2	3	3	4	5	6	7	8	8	9	10								
	13	0	1	2	2	3	4	5	5	6	7	8	8	9	10							
	14	0	1	1	2	3	4	4	5	6	6	7	8	9	9	10						
	15	0	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10					
	16	0	1	1	2	3	3	4	4	5	6	6	7	8	8	9	9	10				
	17	0	1	1	2	2	3	4	4	5	6	6	7	7	8	8	9	9	10			
	18	0	1	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	9	10		
	19	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	
	20	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10

Simply find the number of correct answers the student produced along the top of the chart and the number of total questions on the worksheet or activity along the left side. Then find the cell where the column and the row converge. This indicates the Tens score. By using the Tens Conversion Chart, you can easily convert any raw score, from 0 to 20, into a Tens score.

Please note that the Tens Conversion Chart was created to be used with assessments that have a defined number of items (such as written assessments). However, teachers are encouraged to use the Tens system to record informal observations as well. Observational Tens scores are based on your observations during class. It is suggested that you use the following basic rubric for recording observational Tens scores.

9–10	Student appears to have excellent understanding
7–8	Student appears to have good understanding
5–6	Student appears to have basic understanding
3–4	Student appears to be having difficulty understanding
1–2	Student appears to be having great difficulty understanding
0	Student appears to have no understanding/does not participate

CORE KNOWLEDGE LANGUAGE ARTS

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SCHOOLS

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Insects

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