

Social Insects: Bees and Wasps



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

Introducing the Read-Aloud

10 minutes

5 minutes

5 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.)

Vocabulary Preview5 minutes

Honeycomb

Show image 4A-3: Honeycomb

1. In today's read-aloud, you will hear about where honeybees keep their honey and where a queen honeybee lays her eggs. It is called a *honeycomb*.

- 2. Say the word *honeycomb* with me three times.
- 3. A honeycomb is a structure made by bees in their hive. It is made up of many six-sided wax cells in which honey is stored and eggs are laid.
- 4. Worker bees work quickly to build the cells of the honeycomb.

Show image 4A-5: Worker bees on honeycomb

5. [If available, pass around a jar of honey with a piece of honeycomb inside.] Describe the honeycomb in this image. What color is it? What shapes do you see? What does the texture of the honeycomb seem to be? What do you think the bees are doing?

Wasp

Show image 4A-10: Paper wasp and honeybee

- 1. In today's read-aloud, you will hear about a relative of the honeybee called a paper *wasp*. [Point out the honeybee on the right and the wasp on the left.]
- 2. Say the word *wasp* with me three times.
- 3. A paper wasp is a thin, black and yellow flying insect that can sting you. Paper wasps live in large groups and build nests.
- 4. My father carefully removed the nest that the paper wasps built over the door to our house.
- 5. What differences do you notice between a paper wasp and a honeybee? (A honeybee is fuzzy and thicker; a paper wasp is shiny, smooth, and thinner.)

Show image 4A-11: Paper wasp nest

Paper wasps also build nests. What do you notice is similar or different between a paper wasp's nest and a honeybee's honeycomb? (They both have cells or chambers that have six sides. The cells of the honeycomb are made of wax; the cells of a wasp's nest look like cardboard or paper. A honeycomb is golden in color, and a wasp's nest is grey.)





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.

Presenting the Read-Aloud



1 What does social mean?

2 or work together





Social Insects: Bees and Wasps

Show image 4A-1: Honeybee

Buzzzz Bzzzz 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.

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.

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.]



- 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)



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



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*) 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 <u>comb</u> 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

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.

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.



- 8 A forager is an animal that wanders over an area in search of food.
- 9 or sharp



- 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?

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

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

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 waggling 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.



12 Who remembers what a species is? (A species is a group of plants or animals that are alike.)



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.



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-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

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

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.

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.)
- 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)
- 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: Cooperate5 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 Making Choices activity for follow-up.

Directions: I will name a behavior of an insect. If the behavior I name is an example of how insects cooperate, say, "They cooperate." If the behavior I name is not an example of how insects cooperate, say, "They do not cooperate."

- Honeybees protect one another from enemies.
- Queen bees deposit her eggs into the cells all by herself.
- Honeybees do a dance to tell each other where to find good nectar.
- Queen wasps take care of their first larvae by themselves.
- Caterpillars spin their own cocoon.
- Wasps live together in colonies and work together to hunt for food.

Complete Remainder of Lesson Later in the Day



Social Insects: Bees and Wasps



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Extensions

20 minutes

S minutes 5 minutes

Multiple Choice: Comb

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

- 1. [Show Poster 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. Which picture on the poster shows this meaning of *comb*? Can you count the six sides of the comb's cells?
- 2. *Comb* can also mean a plastic or metal tool with a row of thin teeth used for making hair neat. Which picture shows this meaning of *comb*?
- 3. Another meaning of *comb* refers to the soft part on top of the head of some birds, like this rooster. Which picture shows this kind of *comb*?
- 4. Now that we have gone over the different meanings for *comb*, quiz your partner on these different meanings. Remember to use complete sentences. For example, you could say, "I use a comb to keep my hair from being tangled." And your parnter should respond, "That's '2.'"

Syntactic Awareness Activity

Adverbs

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

- We know that many verbs are action words. Does anyone remember what type of word describes a verb? [Pause for students to respond.]
 Words that describe verbs are called *adverbs*.
- 2. In today's read-aloud, you heard that most bees and wasps are solitary, or live alone, but honeybees and paper wasps are social insects, and live in large groups.
- 3. What does solitary mean? (Solitary means living and acting alone.)

If an insect is solitary, we can say that it acts alone, or *independently*. *Independently* is an adverb that describes something that is done alone, or by oneself, without the help of others. For example, a spider spins its web independently, or by itself.

- What does social mean? (Social means living and interacting with others.)
 If an insect is social, we can say that it acts *socially*. Socially is an adverb that describes something that is done with others. For example, the dogs play together socially at the park.
- What is the adverb that is used to describe something that is done alone, without the help of others? (independently) What is the adverb that is used to describe something that is done with others? (socially)
- 6. I am going to name some actions. If the action I name is done independently, keep your arms to yourself and say, "That is done independently." If the action I name is done socially, link arms with your neighbor and say, "That is done socially."

- Honeybees build hives together and share food.
- The queen bee lays her eggs on her own.
- My sister does her homework without anyone's help.
- Children play with each other on the playground.
- Students read books together.
- What are the words that describe action words called? (adverbs)

➡	Vocabulary	Instructional Activity	5 minutes

Word Work: Societies

- 1. In the read-aloud you heard that although some wasps are solitary, the black and gold wasps live in *societies*.
- 2. Say the word *societies* with me three times.
- 3. Societies are groups of either people or animals, living together in organized communities.
- Social ants live in societies called colonies.
 Societies care for the health and safety of their people.
- 5. Tell your partner something that describes our society. Is our society big or small? Does our society have crowded neighborhoods or a lot of open space? What kinds of celebrations does our society have? Use the word *society* when you tell about it.
- 6. What's the word we've been talking about?

Use a *Terms* activity for follow up. Directions: I am going to say two characteristics. Choose the characteristic that describes societies. Use the word *societies* in a complete sentence in your answers.

- one person or many people? (Societies have many people.)
- organized or not organized? (Societies are organized.)
- made up of animals, people, or either? (Societies can be made up of either animals or people.)
- Members cooperate and work together, or members work alone? (In societies, members cooperate/work together.)

Insects Journal (Instructional Master 4B-1) 20 minutes

- Have students look through trade books for pictures of bees and wasps. Have them draw a picture of a bee and/or a picture of a wasp in their journal. Then, have them write one or two sentences about honeybees and/or paper wasps based on something they have learned from the read-aloud. Tell students that they should also write down any questions they may have about bees and/or wasps on the back of the page.
- Have students share their drawings, sentences, and questions with their partner or home-language peers. Encourage them to expand upon their vocabulary using richer and more complex language, including, if possible, any read-aloud vocabulary.
- Above and Beyond: 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.

Domain-Related Trade Book20 minutes

- Refer to the list of recommended trade books in the Introduction at the front of this *Supplemental Guide*, and choose one trade book about honeybees to read aloud to the class. [Suggested trade books are numbered: Items 23–25, 34, 38 and 47 in the trade book list.]
- Explain to students that the person who wrote the book is called the author. Tell students the name of the author. Explain to students that the person who makes the pictures for the book is called an illustrator. Tell students the name of the illustrator. Show students where they can find this information on the cover of the book or on the title page.
- As you read, use the same strategies that you have been using when reading the read-aloud selections—pause and ask occasional questions; rapidly clarify critical vocabulary within the context of the read-aloud; etc.
- After you finish reading the trade book aloud, lead students in a discussion as to how the story or information in this book relates to the read-alouds in this domain.

• Provide students with drawing paper, drawing tools, and writing tools. Have students draw one detail or idea from the trade book that is new or different from the read-aloud they heard. Ask students to label their pictures or write a sentence to go along with their drawings. Have students share their drawings and writing with their partner or with home-language peers.