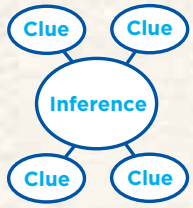
Comprehension

Genre

Informational Nonfiction
is a detailed composition that sets out to explain something by presenting facts about it.

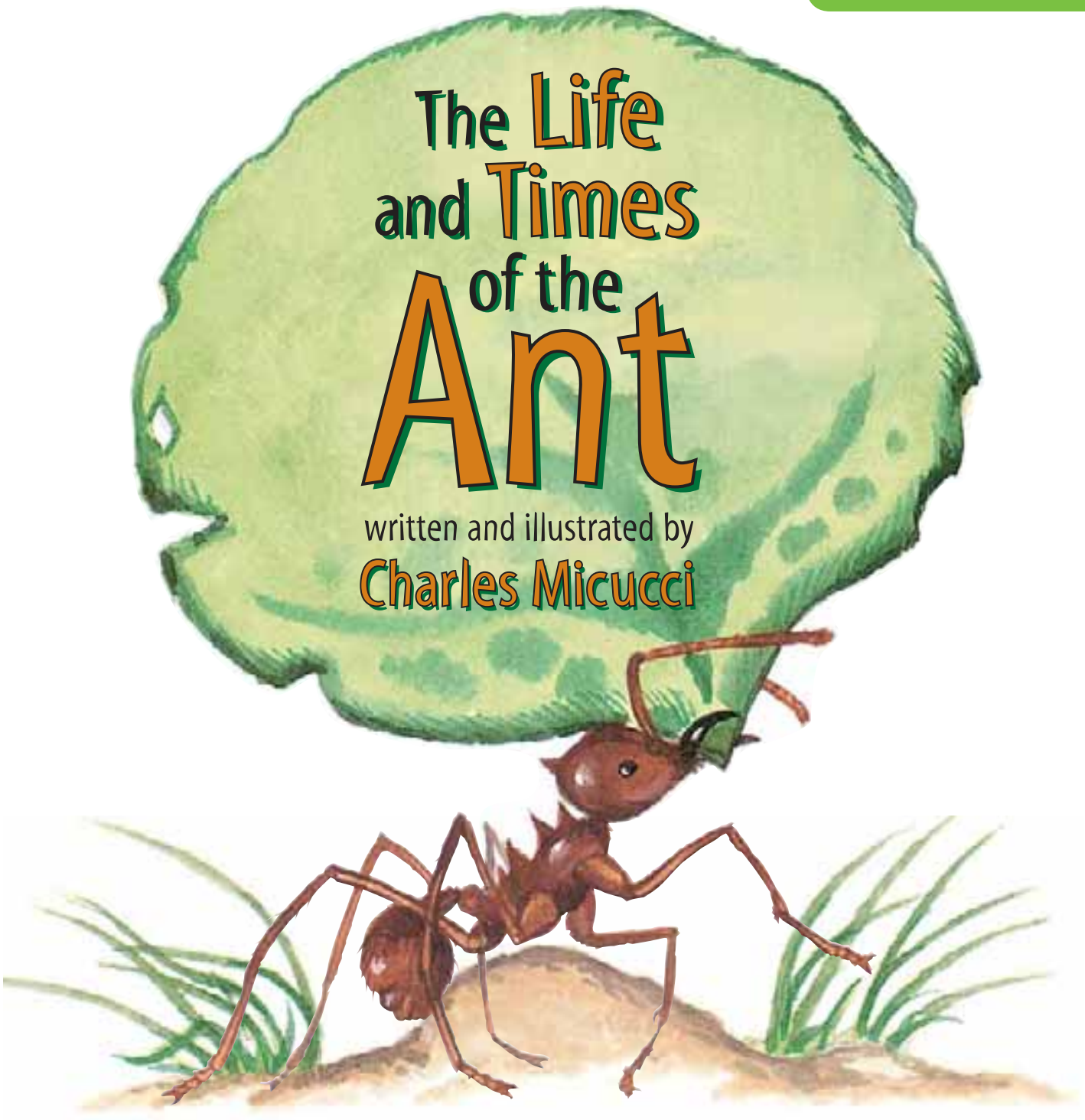
Analyze Text Structure

Description
As you read, fill in your Description Web.



Read to Find Out

What characteristics make an ant able to do the things it does?



Masters of the Earth

Ants are one of the world's most important insects. They plow more soil than beetles, eat more bugs than praying mantises, and outnumber many insects by 7 million to 1.

Tunneling out of jungles and forests and into back yards on every continent except Antarctica, ants ramble on as if they own the Earth. Perhaps they do.

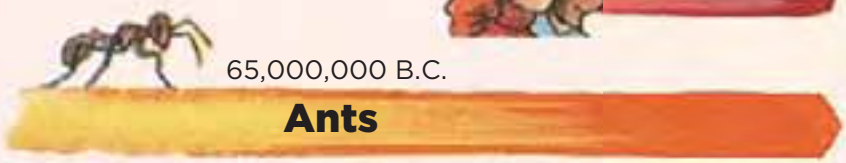
Ounce for ounce, an ant is one of the strongest animals on earth. An ant can lift a seed five times its weight, while an elephant can lift a log only one fifth of its weight.

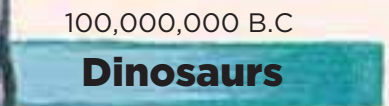
Each year, the world's ants dig up more than 16 billion tons of dirt— enough to fill 3 billion dump trucks.

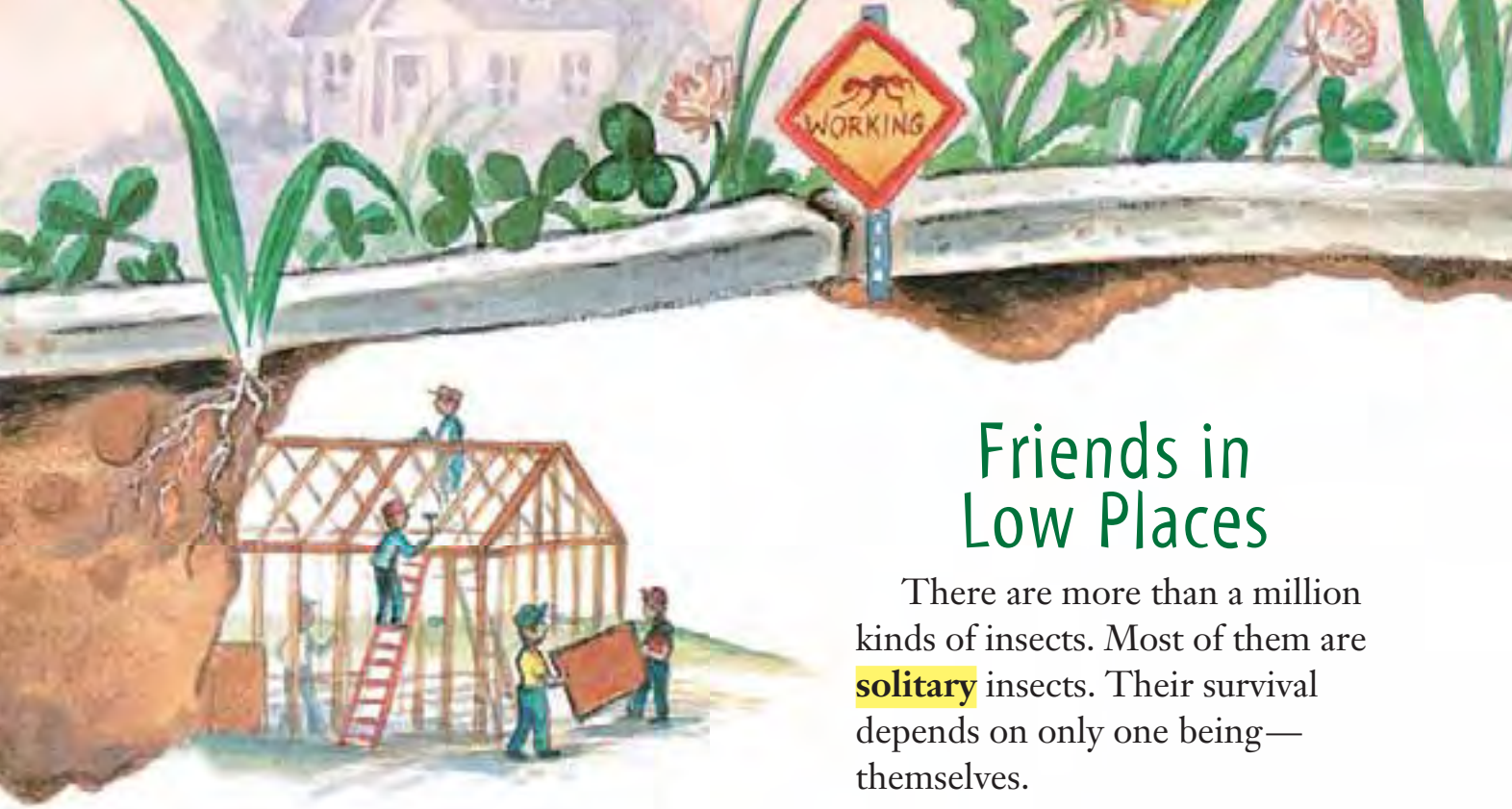
Ants are frequently compared with people because they live in social communities and work together to solve their problems.

Great Dynasties on Earth

Ants have been digging through dirt for more than 100 million years. Their dynasty stretches from the time of dinosaurs to today.







Friends in Low Places

There are more than a million kinds of insects. Most of them are **solitary** insects. Their survival depends on only one being—themselves.

An ant is different; it is a social insect. It cannot survive by itself for long periods of time. Ants need other ants to help build a nest, gather food, and protect themselves from enemies. This need for other ants is not a weakness but a strength that enables the ant to **overcome** its small size.

When an ant is threatened by a larger insect, it emits a scent called an alarm pheromone. Other ants smell the odor and rush to help.

Description

In the second paragraph of "Friends in Low Places," what details help describe how ants are different from other insects?

Ant Talk

Successful teamwork requires effective **communication**. Ants express themselves by using four senses.

Smell

Ants emit pheromones that other ants smell through their antennae. These scents warn of danger, say hello to friends, and inspire fellow ants to work harder.

Touch

Ants tap one another with their antennae to announce the discovery of food and to ask for food.

Taste

Ants exchange food with other ants mouth to mouth. These ant "kisses" are a way to share nutrition and chemicals that says "We're family."

Sound

When some ants are trapped in a cave-in, they rub the joint between their waist and abdomen to produce a squeaky sound that other ants "hear" through their legs.

Because it is dark underground, most ants do not rely on sight for communication. In fact, many ants can see only a couple of inches, and some army ants are blind.

The Ant Family

Ants live in social groups called colonies. A small colony may contain only 12 ants, while a large colony overflows with more than 7 million ants. Each colony has three types of ants: workers, male ants, and the queen ant.

Worker Ants

Most of the colony's ants are workers. They are all female, but they do not lay eggs. Although they are the smallest ants, they do all of the chores: clean the nest, gather food, and defend the colony. When you see an ant dragging a crumb of food, you are looking at a worker.

Male Ants

All males have wings and can be seen for only a few weeks in the summer. They mate with the queen but do no work in the colony.

Queen Ants

The queen ant lays eggs and is the mother of all the ants. Young queens have wings, but old queens do not. All queens have large abdomens to produce eggs. Some queens lay millions of eggs per year.

How an Ant Colony Starts

After a hot summer rain, a young queen takes off on her mating flight. The queen flies into a cloud of male ants and mates in the air.

Afterward, all the males die, and the queen returns to the earth. She breaks her wings off by rubbing them on the ground.

Then she digs a hole in the soft, moist earth and starts laying eggs. She will never leave the nest again.

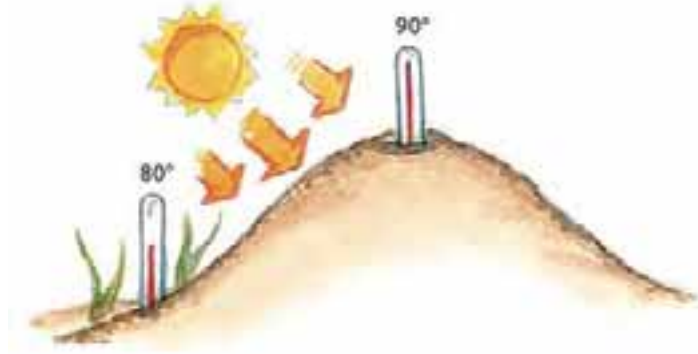
During the next three months, the eggs develop through four stages: egg, larva, pupa, and adult ant.

After they have hatched, the first workers assume the duties of the colony. They search for food and protect the queen. As the queen lays more eggs, the workers enlarge the nest.

Inside an Anthill

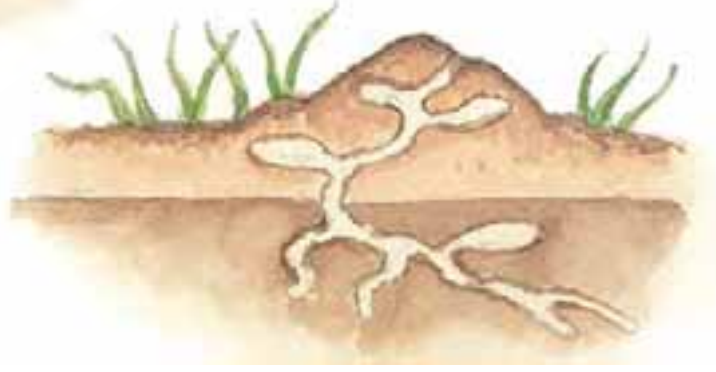
Most ants build their homes underground. Ants dig by scooping dirt with their mandibles (jaws). As they chew the dirt, it mixes with their saliva to form little bricks. Then they pack the little bricks together to reinforce the tunnels. Finally, the ants carry the excess dirt outside with their mandibles, and it gradually forms an anthill.

Beneath the anthill lies the ant nest. Small nests have only one chamber just inches below the surface, while large nests may have thousands of chambers and may be as deep as twenty feet. All nests provide shelter from the weather and a safe environment for the queen ant to lay eggs.

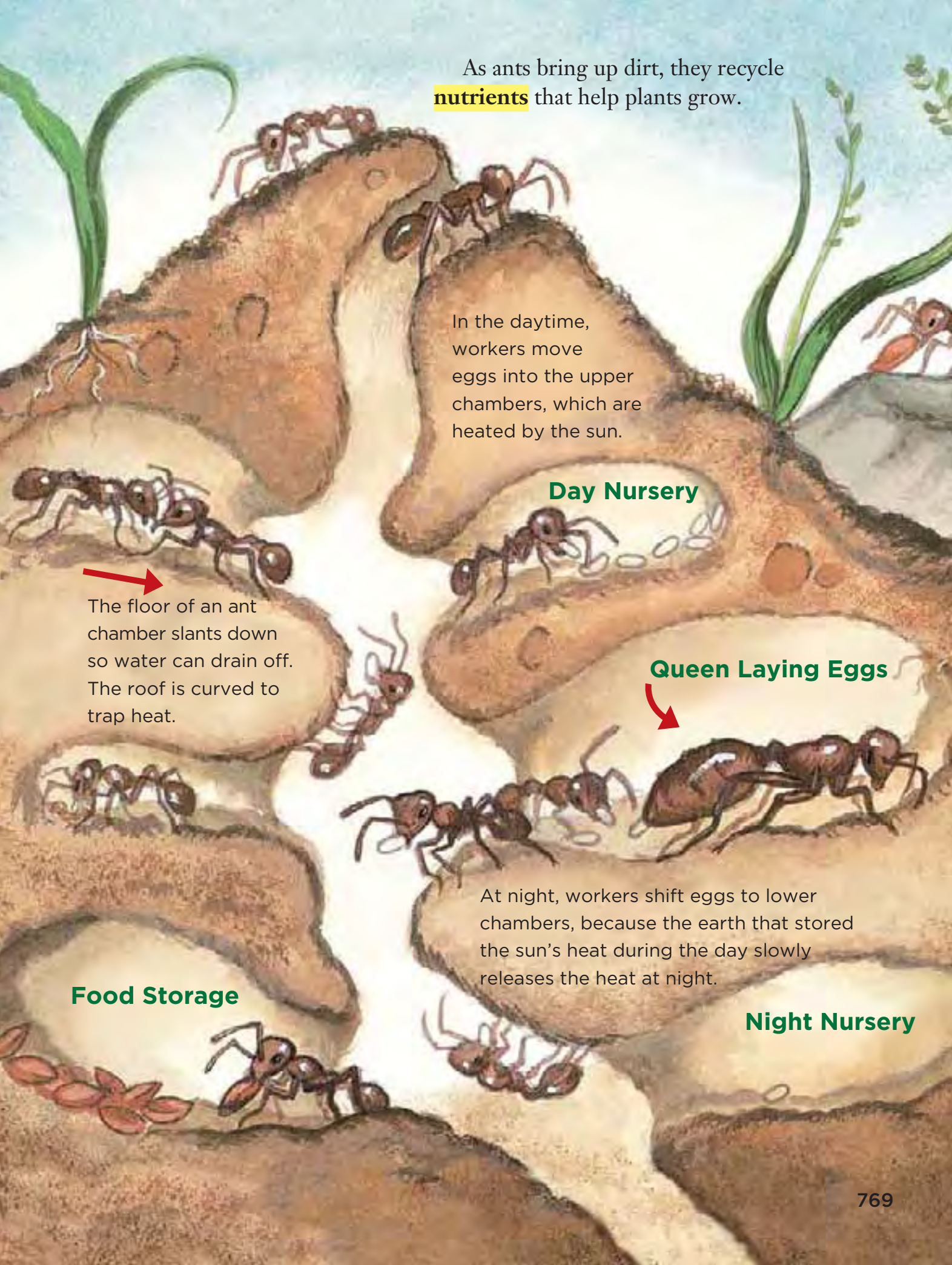


An anthill absorbs the sun's rays and transfers the heat down into the nest. An anthill can be ten degrees warmer than the surrounding area.

Ants often nest beneath a rock or log, which protects the nest and traps moisture in the dirt. Ants require moisture so that their bodies do not dry out.



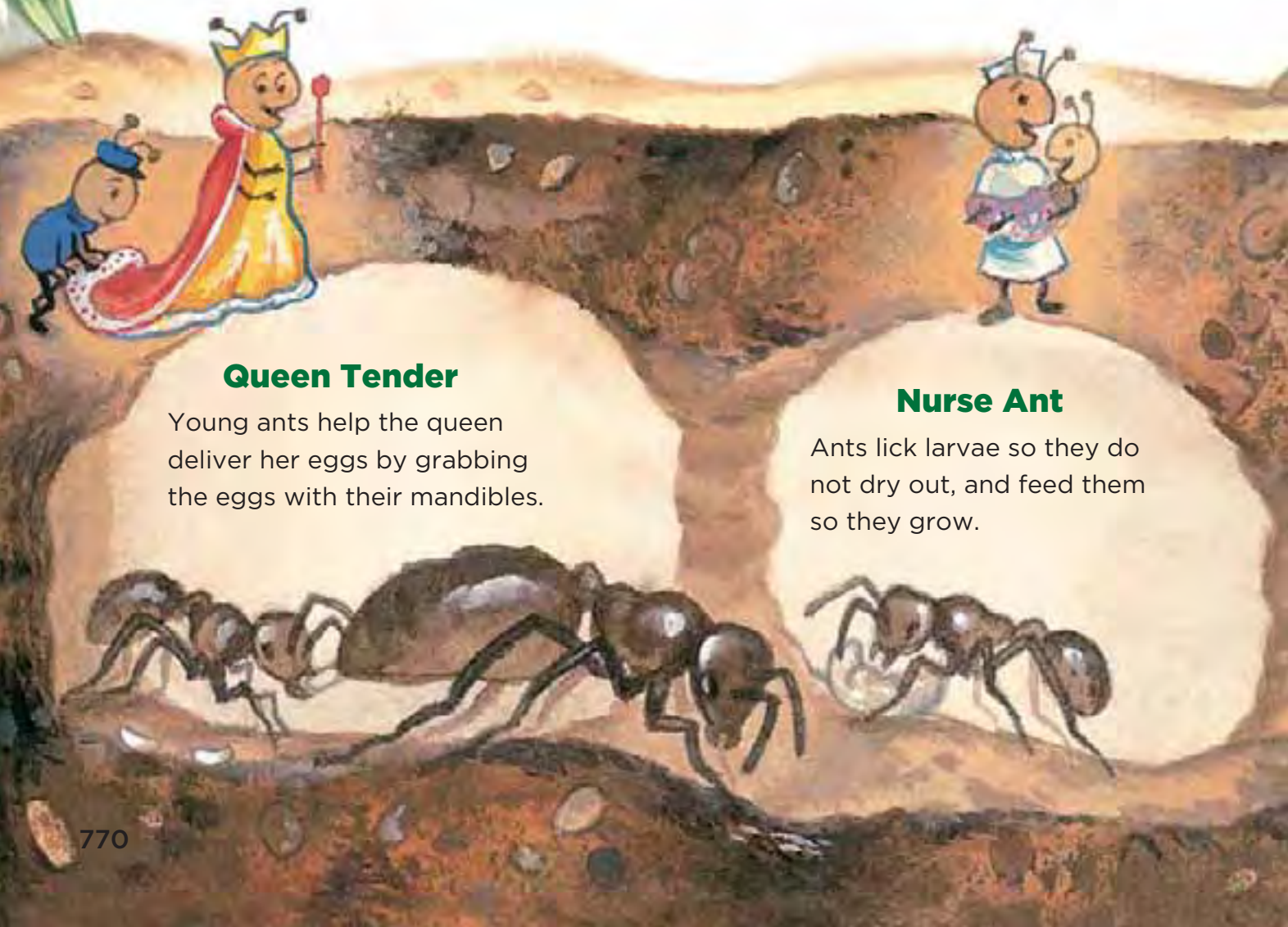
Ants dig their nests deep enough to reach damp dirt. As air dries out the nest, they dig new tunnels into the damp dirt.


As ants bring up dirt, they recycle nutrients that help plants grow.
In the daytime, workers move eggs into the upper chambers, which are heated by the sun.
Day Nursery
The floor of an ant chamber slants down so water can drain off. The roof is curved to trap heat.
Queen Laying Eggs
At night, workers shift eggs to lower chambers, because the earth that stored the sun's heat during the day slowly releases the heat at night.
Food Storage
Night Nursery

A Life of Work

Ants begin their working lives by cleaning themselves. In a couple of days they start sharing food and licking each other. These food exchanges bond the colony together. There is no boss ant, but active ants usually begin doing chores and then other ants join in.

Younger ants work in the nest — tending the queen ant, feeding larvae, and digging tunnels. After a couple of months, the ants leave the nest to search for food. There is no retirement; worn out or battle-scarred, ants work until they die.

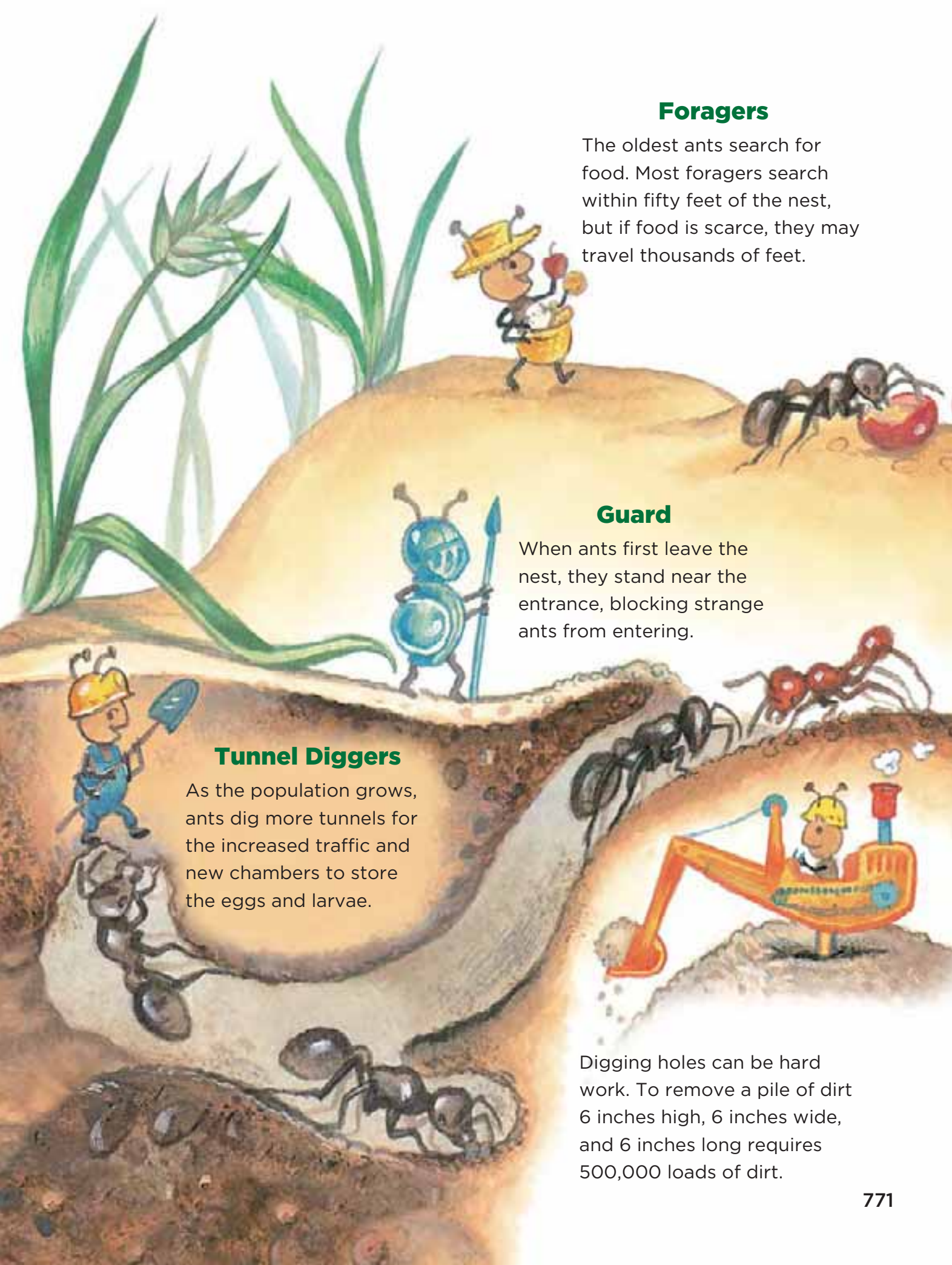


Queen Tender

Young ants help the queen deliver her eggs by grabbing the eggs with their mandibles.

Nurse Ant

Ants lick larvae so they do not dry out, and feed them so they grow.



Foragers

The oldest ants search for food. Most foragers search within fifty feet of the nest, but if food is scarce, they may travel thousands of feet.

Guard

When ants first leave the nest, they stand near the entrance, blocking strange ants from entering.

Tunnel Diggers

As the population grows, ants dig more tunnels for the increased traffic and new chambers to store the eggs and larvae.

Digging holes can be hard work. To remove a pile of dirt 6 inches high, 6 inches wide, and 6 inches long requires 500,000 loads of dirt.

Show Me the Way

Every warm day, foraging ants patrol the colony's **territory**. They are not just wandering; they are searching for food. When an ant finds food, she rushes back to the colony while laying a scent trail. It is the scent trail that leads the other ants to the food source.

Each forager moves out in a different direction. One of the ants discovers a cookie crumb. She **investigates** it with her antennae. Then she tries to drag it home, but it's too big.

So she rushes home to get help. Every couple of steps she bumps her abdomen against the ground and her scent gland releases an invisible vapor, which forms a scent trail.

Back inside the colony, the forager alerts other ants about the cookie by tapping them with her antennae. Suddenly, several ants rush out and follow the scent trail to the food.

Each of the new ants harvests part of the cookie and transports it back to the colony while laying a scent trail of her own.

Soon the vapors of the scent trail are so thick that many more ants join the harvest. As they return, the foraging ants share their feast with the ants inside the nest. Within twenty-four hours, every ant in the colony has tasted the cookie.

Harlow Shapley, an **astronomer** whose hobby was ants, tested their speed. He discovered that they run faster on hot days.

Temperature	78°F	85°F	92°
Speed (inches per second)	1	$1\frac{3}{8}$	$1\frac{5}{8}$

Description
How does this table help describe how ants run on hot days?

Tunneling Through Time

Ants evolved from wasps more than 100 million years ago. They have been dodging footsteps ever since. As dinosaurs thundered above ground, ants dug out a home below. The mighty dinosaurs are long gone, but the little ant has survived.

Today, myrmecologists search for the secrets of the ants' long existence and how those traits may benefit our society. They study ant fossils in **prehistoric** amber and observe the daily habits of ant colonies.

100,000,000 B.C.
Ants dug tunnels under dinosaurs.

90,000,000 B.C.
Two ants were sealed in amber. Millions of years later, the amber was found in New Jersey.

65,000,000 B.C.
Some scientists think a giant meteorite crashed into Earth, killing the dinosaurs. But ants, which could hide underground, survived the disaster.

2000 B.C.
Aborigines in Australia ate the honey of honeypot ants. Their modern descendants call these sweet ants *yarumpa*.

1500s–1800s
When Europeans conquered the Caribbean islands, their forts were frequently invaded by ants. They offered rewards and prayed to Saint Saturnin to stop the six-legged armies.

400 B.C.
Herodotus, a Greek historian, wrote about ants that mined gold. Today, some miners sift through anthills to learn what minerals lie underground.

A.D. 1200–1300
Chinese farmers used ants to keep their orange trees free of insect pests.

1687
Anton von Leeuwenhoek, who invented the microscope, discovered ant eggs and pupae.

1991
Bert Hölldobler and Edward O. Wilson, two myrmecologists, won the Pulitzer Prize for their book *The Ants*.

1859
The biologist Charles Darwin wrote about ant intelligence and teamwork in his classic work *The Origin of Species*.

1880
Germany passed a law protecting wood ants because they kept trees free of pests.

2000
Scientists applied ant behavior as a model for computer networks. Computer systems based on ant behavior rerouted around problems quicker than previous systems did.

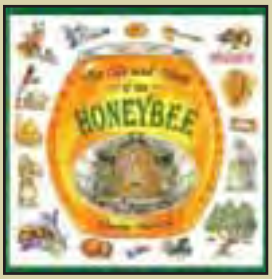
1890s–1930s
William Wheeler, one of America's first myrmecologists, traveled around the world collecting ants and ant fossils.

The tunnel of time continues for ants. Their hard work inspires people today, as it has for many centuries. Look down on a warm day and you will probably find an ant. Drop a piece of food . . . and an ant will probably find you.

The Life and Times of Charles Micucci

Charles Micucci often fills his nature books with amusing illustrations, just as he does in this selection. Once he even drew the planet Earth wearing red sneakers. Charles carefully researches his science topics. Sometimes he does experiments to help him write. When he was working on a book about apples, he planted 23 apple seeds and cared for them in his apartment.

Other books by Charles Micucci



LOG ON Find out more about Charles Micucci at **www.macmillanmh.com**

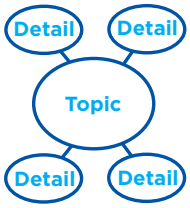
Author's Purpose

The Life and Times of the Ant is a work of informational nonfiction. What was Charles Micucci's purpose for writing it? What clues in the text or illustrations help you to know?

Comprehension Check

Summarize

Summarize *The Life and Times of the Ant.* **Include only the most important information in your summary.**



Think and Compare

1. **Use your Description Web to describe the inside of an anthill. Use story details in your descriptions. Analyze Text Structure: Description**

2. **Reread page 763 of** *The Life and Times of the Ant.* **Why do you think the author describes ants as "masters of the Earth"? Analyze**

3. **How could you use what you have learned about ants to overcome a problem? Explain your answer. Apply**

4. **How do ants keep nature in balance? Use details from the story to support your answer. Evaluate**

5. **Read "Amazing Ants" on pages 760–761. What did you learn about how ants get food that was not in** *The Life and Times of the Ant?* **Reading/Writing Across Texts**