

# KIDZANTS™



## FIRE ANT CURRICULUM FOR YOUTH STUDENT FUN BOOK





# KIDZANTS<sup>TM</sup>

## STUDENT FUN BOOK

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# INVADERS BY SEA

## SNAPSHOTS

- Red imported fire ants came from Brazil and Argentina.
- They came to the United States on a boat.
- They cannot live in places that have very cold weather.



## THE BIG PICTURE

Red imported fire ants are not **native** to Texas or the United States. They are native to Brazil and Argentina in South America. Experts believe that red imported fire ants were **imported** into our country in the late 1920s. They came on a boat from Brazil that landed in Mobile, Alabama. The boat was loaded with products to sell in the United States.

As the boat was being unloaded, the dock workers removed some soil that was stored in the **hold** of the ship. The hold is the inside of the lower part of a ship or airplane where cargo is stored.

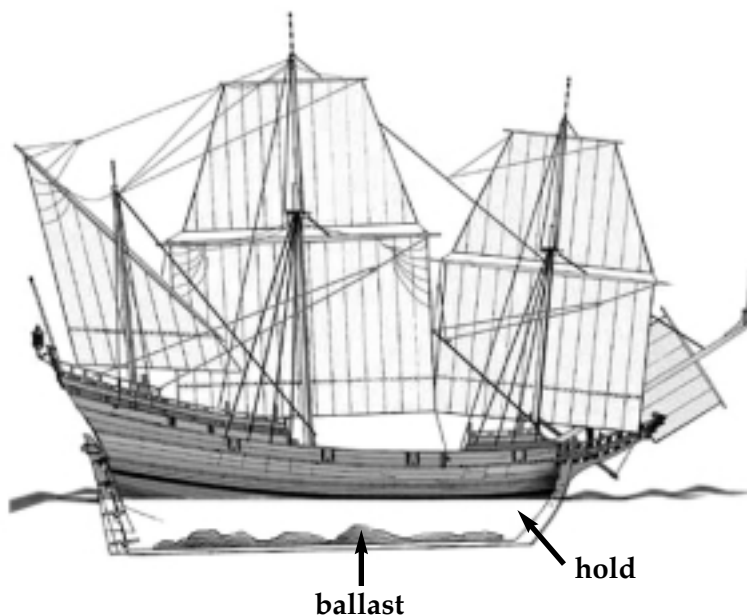
The soil was used for **ballast**. Ballast is heavy material that is placed in the hold of a ship to make it more stable. The ballast was dumped out at the port in Mobile. The workers didn't know it, but red imported fire ants were living in the soil that was dumped out of the ship.

Since the accidental introduction of the red imported fire ant, these pests have moved into many parts of the southern United States and in a few areas of southern California.

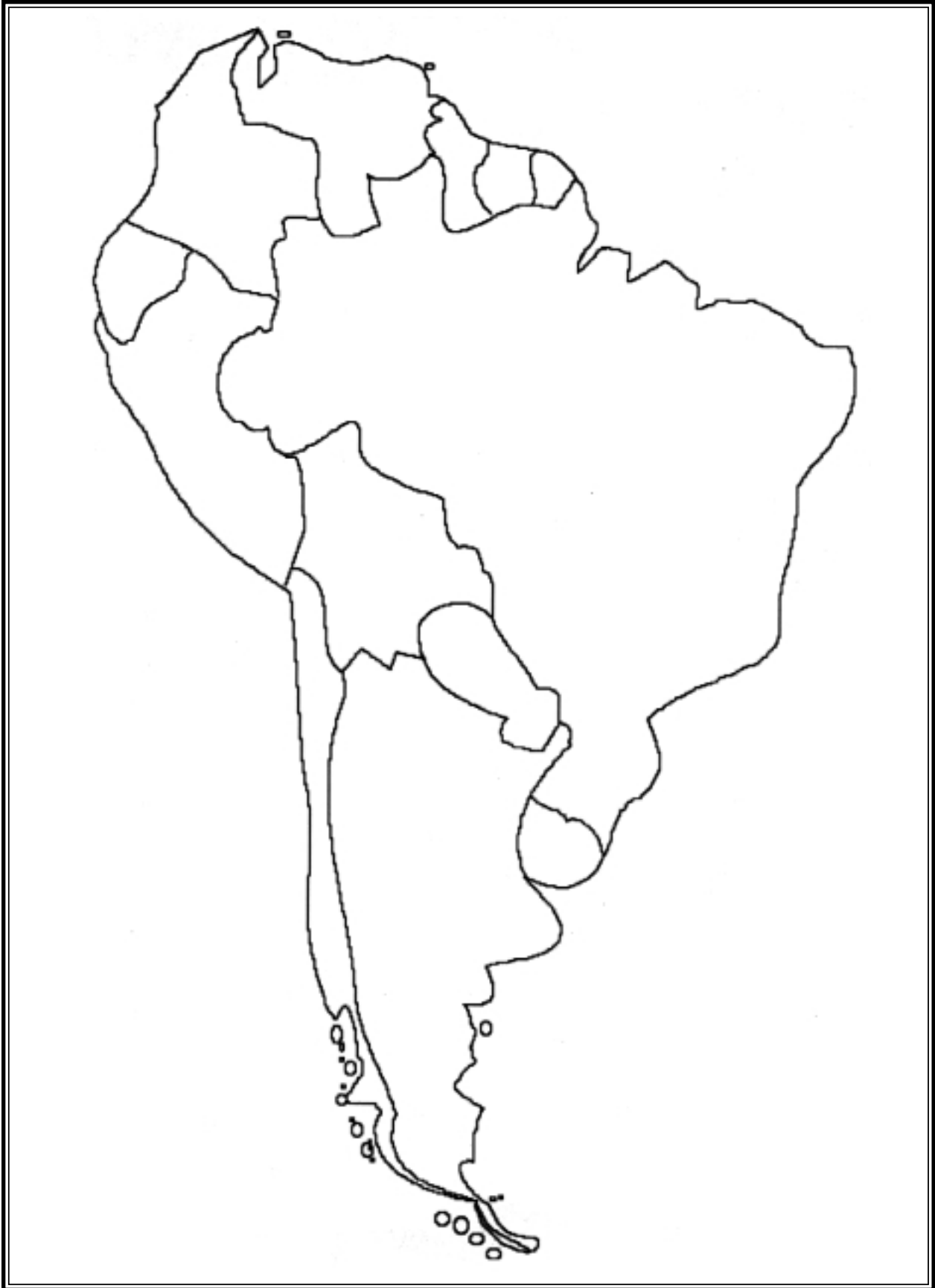
Fire ants cannot live well in areas that have very cold weather. Places where the temperatures drop down to 15 °F in the winter may have only a few or no fire ants at all.

### WORDS TO KNOW

- ballast
- hold (noun)
- imported
- native



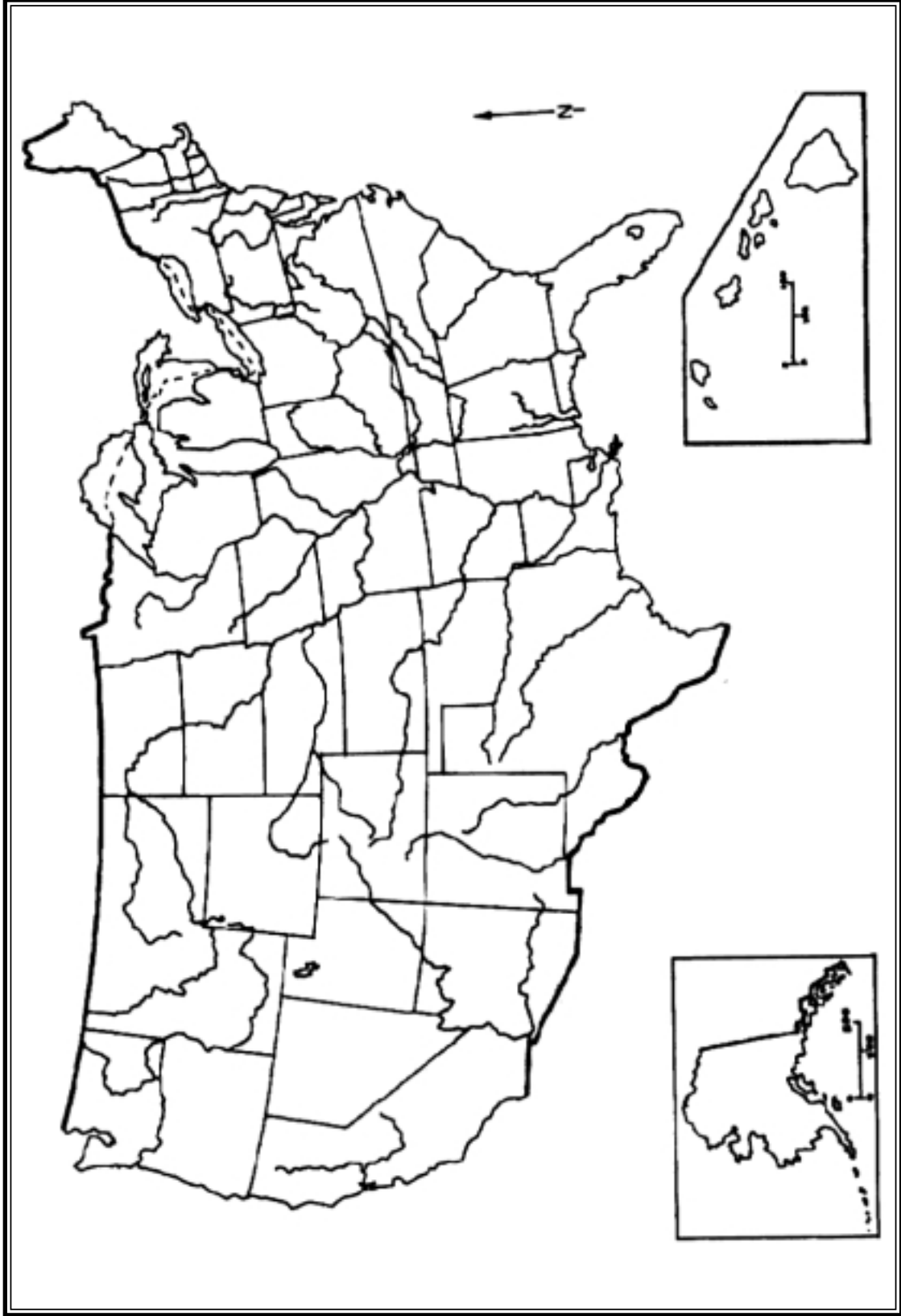
# SOUTH AMERICA



Color in the area where the red imported fire ant originated.



# UNITED STATES



Color in the areas where the red imported fire ant now lives.





## SNAPSHOTS

- An ant's body has three main parts: head, thorax and abdomen.
- The head is where the ant's eyes, mouthparts and antennae are located.  
Ants cannot see well.
- The thorax is the ant's center section where its six legs and sometimes its wings are attached.
- The abdomen is the section on the opposite side from the head. It is where the ant's digestive organs, stinger and petiole are.



## THE BIG PICTURE

How can you distinguish an ant from other insects? How can you tell one species of ant from another? One way is by looking at the insects' body parts.

In some ways, ants are like most other insects: their bodies have three sections, and they have two antennae and three pairs of legs. Knowing these body parts can help you **identify** specific insects.

The ant's body sections are the head, **thorax** and **abdomen**.

**Head:** In people, all activities of the body are controlled by the brain, which is located in the head. Unlike humans, ants do not have a brain that is only in their heads. Instead they have little clumps of nerves in each region of their body that help control the activities in that area. For example: leg movements are controlled by nerves in the thorax; antenna movement is controlled by nerves in the head; and stinging is controlled in the abdomen.

Most ants have poor eyesight. Generally they can only detect changes between light and darkness. Instead of using just their eyes, ants also use their antennae to "smell" food, to sense their surroundings and to communicate with other ants.

Ants have chewing mouthparts. They use their mouthparts to break food into smaller pieces that they can easily carry to their nest. Ants don't eat the solid part of foods; they only sip the liquids from the food particles.

**Thorax:** The center section of the ant's body is the thorax. This is where the legs are attached. Although most ants have no wings, mature ant colonies produce some males and females that have wings. These ants are called "reproductives." They fly from the nest to begin their own nests somewhere else. If an ant has wings, they are attached to the thorax.

**Abdomen:** This ant body section contains the digestive organs and the stinger. (Note: Not all kinds, or **species**, of ants have a stinger.)

The thorax and the abdomen are connected by a thin "waist" that makes up the first part of the abdomen. This first section of the abdomen or "waist" is called the **petiole**. Petioles can have one or two swellings, or nodes. Sometimes you can count the number of nodes on an ant's petiole to help you figure out what kind of ant it is. For example, the fire ant has two nodes.

Many ants are nearly the same color, so you can't tell the different species apart just by looking at the **coloration**. But you can look for other ant characteristics, however, to determine the specific identity of an ant. Some ants have hairy bodies; some have smooth bodies; and some have ridges, spines or dimples on their bodies.

### WORDS TO KNOW

- abdomen
- coloration
- identify
- petiole
- species
- thorax

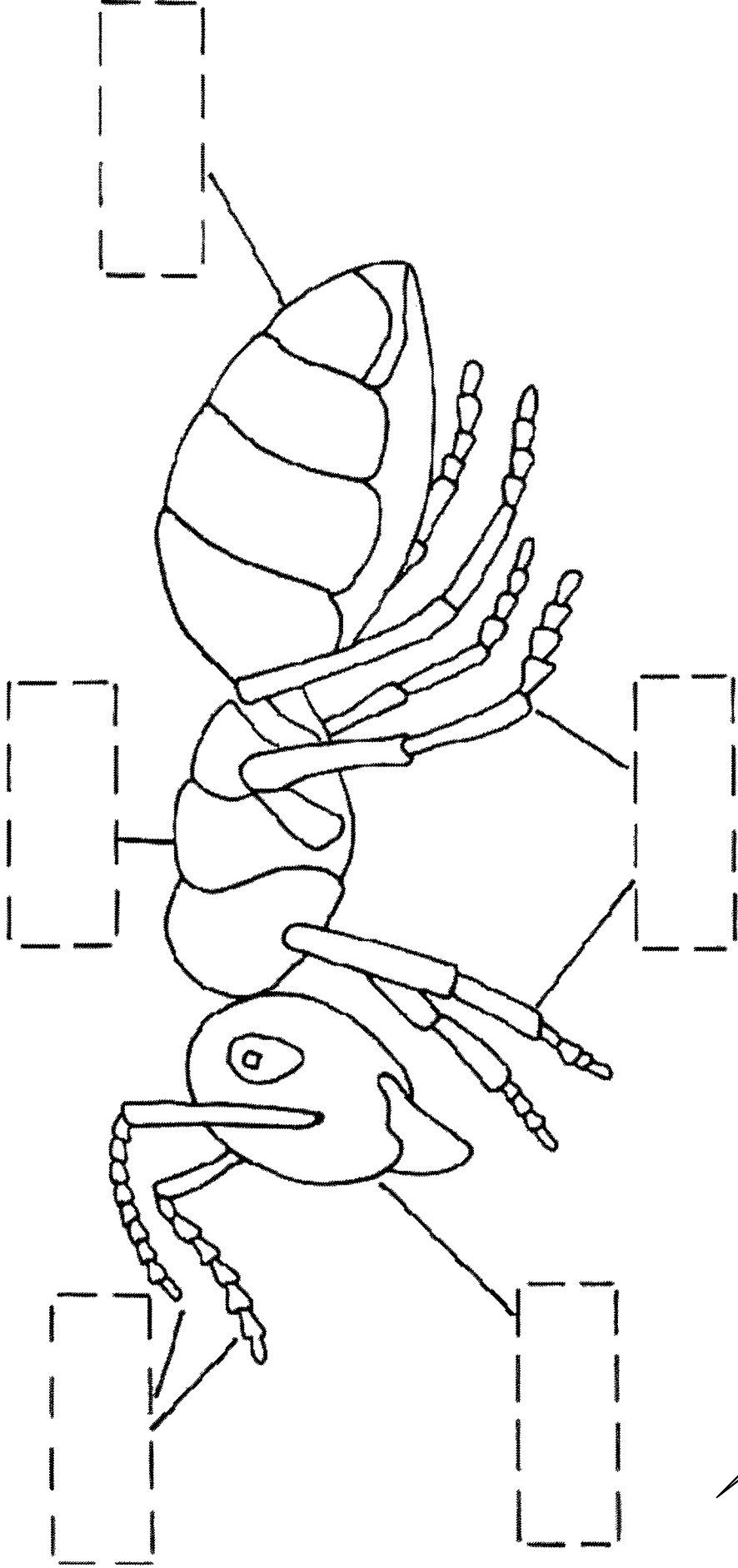




Name \_\_\_\_\_ Date \_\_\_\_\_

# PARTS OF AN ANT

Cut out the labels. Glue them in the correct places. You may also color your ant.



head	thorax	abdomen	antennae	legs
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# LIVING LA VIDA DEL FIRE ANT

## SNAPSHOTS

- Ant colonies include eggs, larvae, pupae, workers, reproductives and queens.
- The job duties of workers include caring for the young, maintaining or repairing the mound, protecting the colony and finding food.
- Nuptial (mating) flights are taken by reproductives, which are also called alates. After a rainfall, a cloud of male alates flies up and waits for the females. After mating, the queens fly to the ground to begin the mounds.
- There are two types of fire ant colonies in Texas: monogynous (one queen) and polygynous (many queens).
- Different kinds of ants in a colony have different jobs.



## THE BIG PICTURE

Colonies of the red imported fire ant (scientific name: *Solenopsis invicta*) have many members including **brood** (which includes eggs, **larvae** and **pupae**), workers, winged males, winged females and one or more reproductive (able to lay eggs) queens.

All worker ants are sterile females, which means that the females can't reproduce – they can't produce baby ants. Worker fire ants are also **polymorphic**, which means that they come in many sizes.

The kind of jobs the workers have is determined by how old they are and, to a much lesser degree, by how big they are. The younger workers must care for the developing brood; middle-aged workers maintain and protect the colony; and the oldest workers forage for food.

Ants that can reproduce are called **alates**. They have wings. There are usually more alates in a fire ant colony in the late spring and early summer, but some of them can be found at any time of the year.

### WORDS TO KNOW

- alates
- brood
- instars
- larvae
- mating
- molt
- oviposit
- polymorphic
- pupae
- *Solenopsis invicta*
- trophallaxis

## HOW TO TELL THE DIFFERENCE

In a fire ant colony, you can easily distinguish the male from the female alates – the males are much smaller and shiny black, and they have a small head. Although both alate males and females can be found in the same colony, as a general rule, one form will be dominant. That is, most of them will be male, or most of them will be female.

The **mating** flight is also called the nuptial flight. Nuptial flights occur most often in the middle of the morning 1 or 2 days after a rainfall if the weather is warm (temperature above 72 °F) and there's not much wind. The males fly out first and wait in the air for the females.

Then the female alates leave the mound, fly into the cloud of waiting males and mate with them in the air. After **mating**, the males die and the newly mated females shed their now useless wings and begin searching for good nesting sites.

## STARTING THE MOUND

Once the new fire ant queen finds a nesting site, she excavates, or digs out, a small room about 1 or 2 inches underground. The room is called a brood cell.



Often, more than one new queen will live in the same cell. But if the colony will be monogynous (that is, having just one queen), only one of those queens will survive. In Texas, most fire ant colonies are polygynous (having many queens), so more than one queen may survive and occupy a cell.

A queen does not forage for food. When the colony is first beginning, she relies on her fat reserves and the energy she gets from absorbing her wing muscles. Once the first workers are ready, they start feeding her, maintaining the colony and foraging for food.

## LAYING EGGS

At first, the new queen **oviposits** (lays) 10 to 15 eggs. These eggs will hatch into larvae about 7 to 10 days later. The queen feeds the larvae through **trophallaxis**, which is a mouth-to-mouth exchange of foods between the adults and larvae of some insect species. It is like what happens when a mother bird feeds its babies.



## LARVAE

The larvae are white. They look like very small grubs except they have no legs. They develop through four stages called **instars**, growing bigger and bigger in each stage. Between stages, the larvae **molt**, or shed their "skin."

In mature fire ant colonies, the oldest larvae (the last instar) are fed solid food by the worker ants. They digest the food and make from it a nutritious liquid that the workers eat and pass to the queen through trophallaxis. In new fire ant colonies, all larvae are fed liquid foods produced by the queen until there are workers to forage for food.

## PUPAE

In about 6 to 10 days, the last larval stage pupates, or changes into a pupa. Unlike butterflies, ants do not spin a cocoon. Instead, the larva sheds its outer skin. Under the skin is the pupa, an ant-like form that gradually turns from white to brown. Pupae do not eat. They slowly develop into an adult ant.

The pupae develop into very small workers in about 10 to 15 days. These workers, called minims, open the brood cell to the outside world and begin foraging or hunting for food to feed the queen.

Meanwhile, the queen continues to lay eggs. She can live for up to 7 years and can produce an average of 800 eggs a day throughout her life.

## ADULTS

Fire ant larvae develop into different kinds of adults, depending on their size as larvae. If the larvae are relatively small, they will develop into worker ants. If they are larger larvae, they will develop into queens and males (known as "reproductives"). All worker ants in the colony are sterile females. The stinger is what the queen uses to oviposit, or lay eggs.

Within 30 days, the larger workers emerge and the colony begins to grow. Workers emerge every day. Within 6 months, several thousand workers can occupy the colony and you can easily notice their mound.

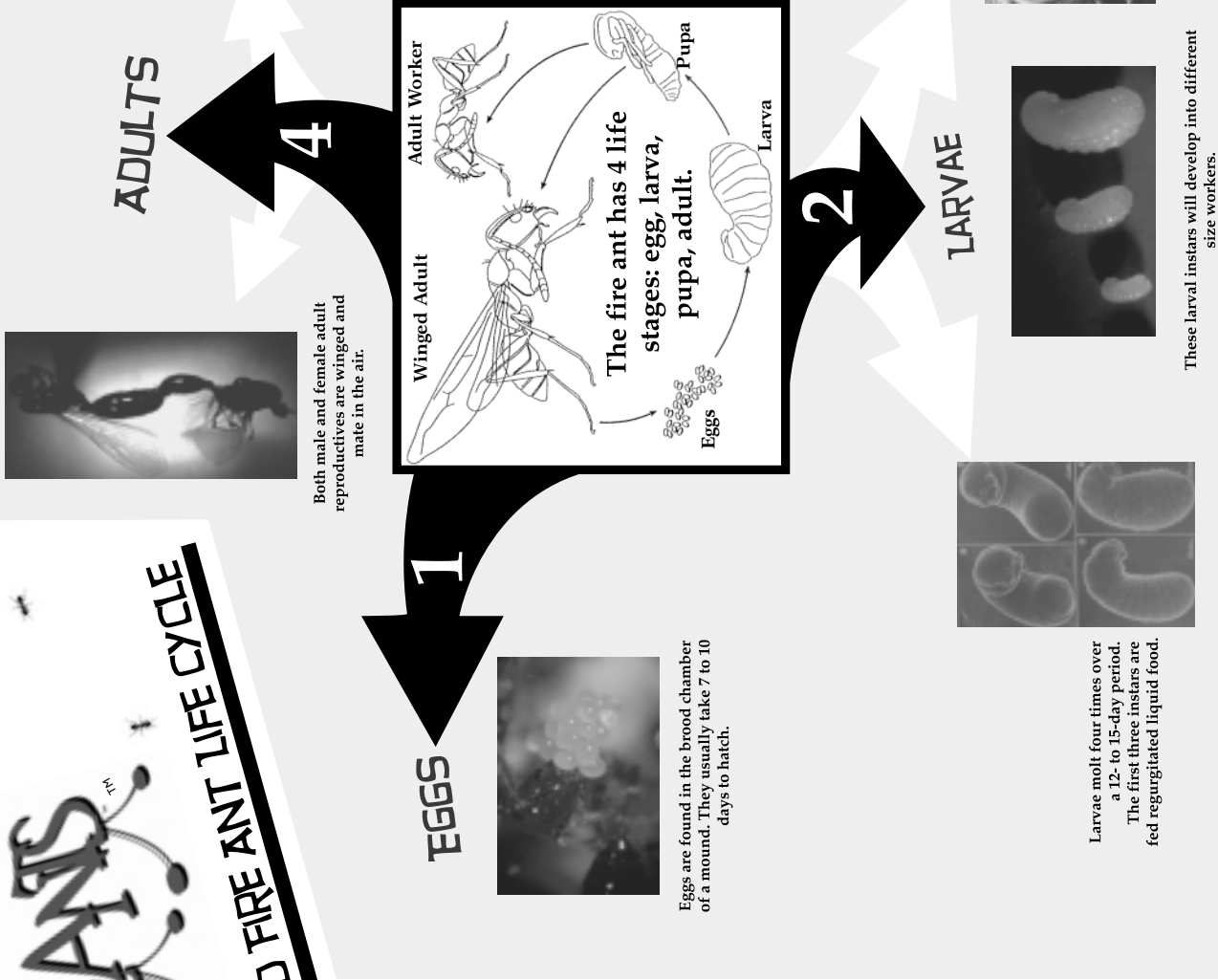
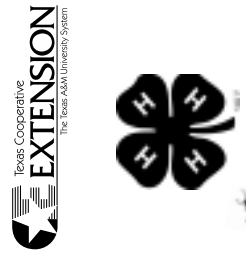
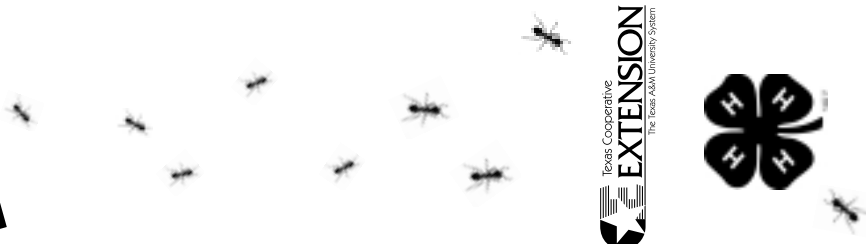
As the colony matures, you also can more easily see that the workers are of different sizes. The largest workers in a fire ant colony can be as much as 10 times the size of the smallest workers.

When it is mature, a monogynous (one queen only) fire ant colony can have more than 250,000 fire ants. A polygynous (many queens) fire ant mound can have more than 500,000 fire ants.



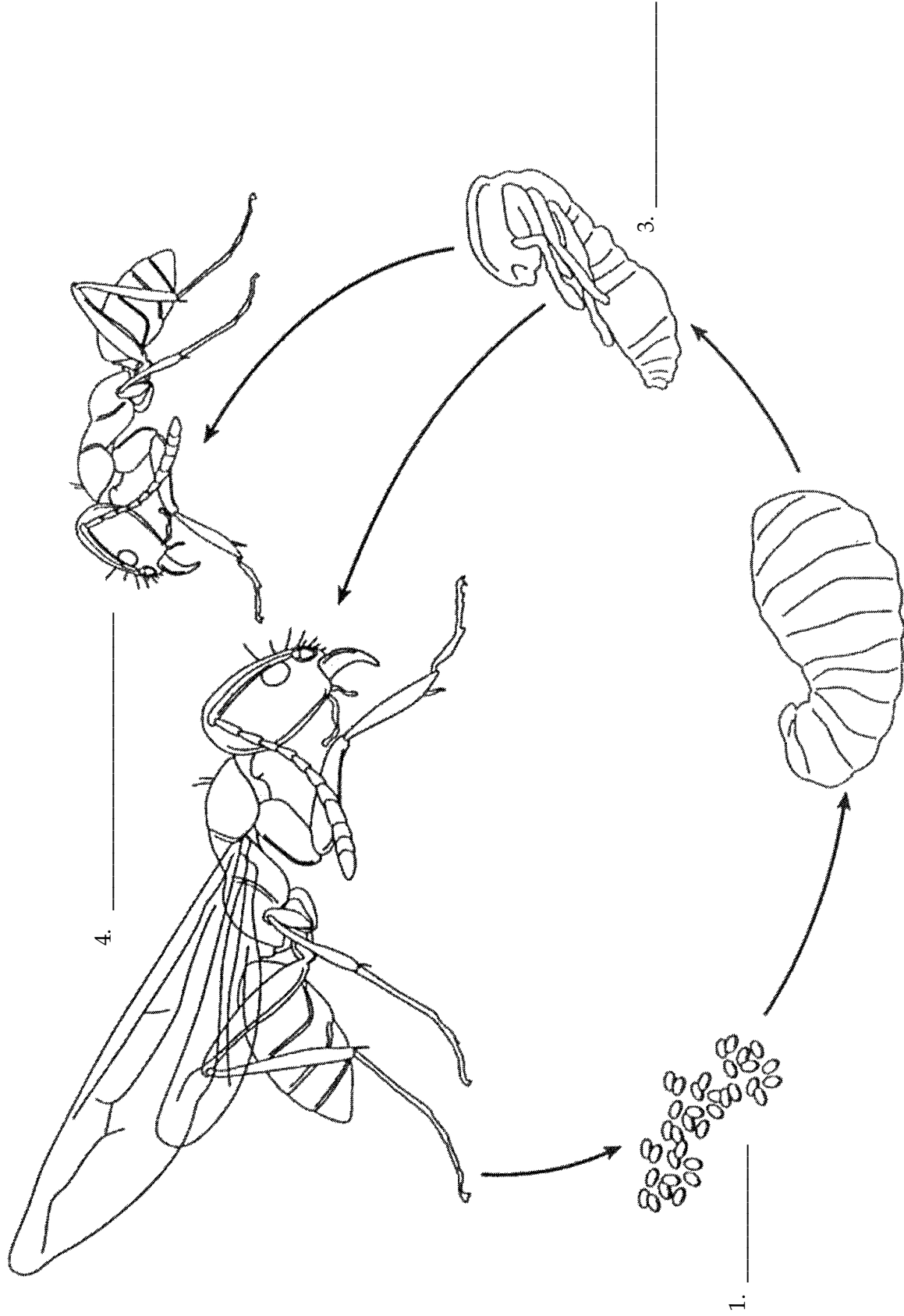
# KIDZANTS™

## RED IMPORTED FIRE ANT LIFE CYCLE





# ANT LIFE CYCLE



Fill in the names of the four stages of the ant's life cycle.

# MOUND, SWEET MOUND

LESSON 4

## SNAPSHOTS

- A mature fire ant colony lives underground in a mound, which is a dome of dug-up soil.
- Fire ants often move their brood around in the mound to keep them warm or cool enough and to have enough moisture.
- Fire ants sometimes move if their mound is disturbed or if bad conditions, such as floods, occur.



## THE BIG PICTURE

One way to identify a fire ant is to see where it is living. Fire ants live in earthen nests called mounds, which are **conical** (shaped like cones) and are made of dug-up soil.

The mound begins as a small cell, like a small room, a few inches deep in the ground. There the newly mated queen seals herself in to begin the colony. As workers are born, they begin to tunnel into the surrounding soil. They dig out many chambers that connect with each other.

As the workers make chambers and tunnels, they **excavate** (dig up) soil and move it above ground. The soil on top of the ground is used to form many more chambers and tunnels.

A fire ant colony is mature when it is about 1 year old. At that time, the mound is about 12 to 15 inches across and about 10 inches tall. The size and shape of the mound can vary some, depending on the type of soil it is in.

The surface (top) of a fire ant mound usually has a slight crust of harder soil that protects the mound. Inside, the mound is filled with tunnels and chambers. These chambers form a cone that extends from 1 to 3 feet into the ground. Some tunnels may extend downward for 5 or more feet.

Most fire ant mounds have no visible entrance or exit holes except during the time that the mating flights are taken. At mating time, the workers open many holes on top of the mound. They close the holes promptly afterward.

## TUNNELS

Fire ant workers leave and enter the mound using side tunnels built just under the soil surface, about 1 to 4 inches underground. They **radiate**, or extend, several yards in many directions from the mound. Smaller tunnels may branch off from the main tunnel.

Along the tunnels are openings that lead to the surface. Fire ants use these openings when they are feeding or looking for food. Some people have found fire ant openings as far as 132 feet from the mound! Tunnels also extend from the bottom of the fire ant mound down to the nearest water table. The water table is an underground area where water can be found.

## MOVING THE QUEEN AND BROOD

Fire ants cannot control how warm or moist their mound is. Instead, they continually move the brood (eggs, larvae and pupae) and queen to the most suitable location in the mound.

Early in the mornings during summer, the brood and queen are usually near the top of the mound, on the sunny side where it is warm and moist. As the sun heats and dries out the mound, the brood and queen are moved deeper into the mound. During a drought, fire ants may remain deep in the ground for a long time.

### WORDS TO KNOW

- conical
- excavate
- radiate



During the hot, dry days of late summer and early fall, fire ants do not make new mounds or repair their older mounds. But as soon as rains and good weather return, the fire ants begin working again on their mounds. Then the mounds become quite noticeable.

Although fire ants spend much time and energy setting up and maintaining their mound, the mound is not permanent. If the mound is disturbed, they will often move and build a new one several feet to many yards away.

Sometimes fire ants move for no apparent reason. Other times, they move because the conditions are not right, such when there is too much shade or too many pesticides, predators or diseases. On the other hand, sometimes the mounds are disturbed repeatedly (such as being mowed over) and they still do not move.



Although mounds are important to fire ant colonies, fire ants do not have to live in a mound to survive. Fire ants can nest in many kinds of sites if the areas are dark, protected and have enough moisture and food. Some of those sites include rotten logs, walls of buildings, in the soil under sidewalks and roads, in automobiles and in dried cow manure. Fire ants are very adaptable.

### **BE CAREFUL!**

**Do not think of fire ants as pets!** Worker fire ants will sting, and the sting will hurt! Please watch where you put your hands and where you walk.

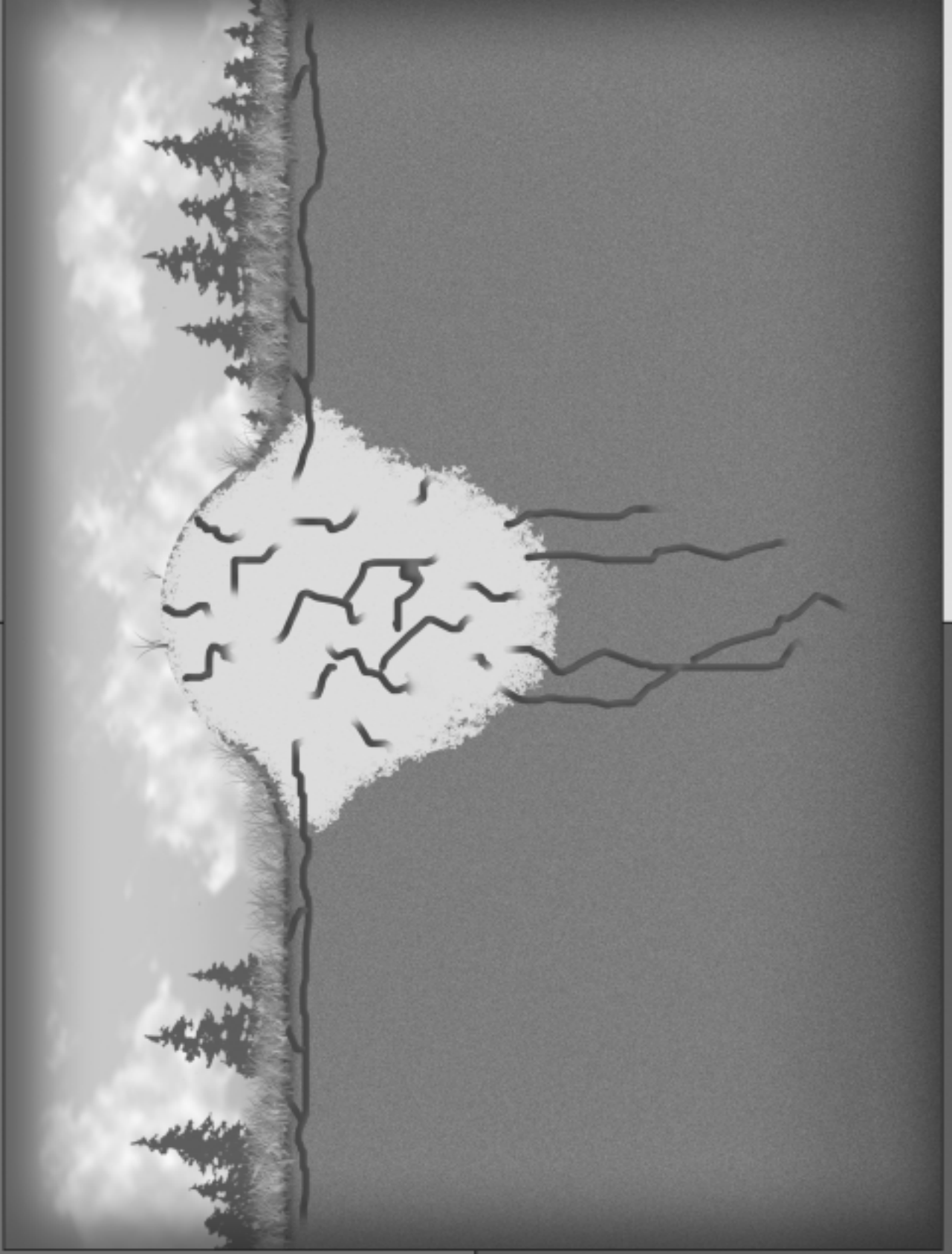
**First aid for fire ant stings:** If you are stung by a fire ant, you might feel a burning and itching sensation. To make it stop stinging so much, you might spray on an insect bite product that contains benzocaine or other ingredients that reduce pain.

In a day or two, a white pustule may form. Don't break it open — if you do, the area can be easily infected. You may need treat it with a first aid product to protect against infection. You may also have permanent scar.

If a sting causes severe chest pain, nausea, severe sweating, loss of breath, serious swelling, or slurred speech, tell an adult immediately so you can be taken to an emergency medical facility right away.

If you think you might be allergic to fire ant stings, be even more careful to avoid them.

# FIRE ANT MOUND





## SNAPSHOTS

- Fire ants eat many different types of foods.
- There are some kinds of foods that fire ants avoid.
- In the spring and early fall, fire ants look for foods that have more protein.
- In the summer and winter, fire ants search for foods with more sugars.
- Although fire ants need plenty of moisture, they do not like to be flooded.



## THE BIG PICTURE

Fire ants are **omnivorous**, which means they eat any sort of food, including plants and animals. Fire ants feed on insects and other **arthropods** as well as small birds, **mammals**, **amphibians** and **reptiles**. These foods give fire ants the **protein** they need for the queen to be able to produce eggs and for young ants to develop.

Fire ants also feed on oily seeds such as pecans, peanuts and sunflowers. These seeds help give fire ants the fat and protein they need.

Other fire ant food includes the **honeydew** produced by leaf-sucking insects such as aphids, mealybugs and scale insects. Honeydew is made of sugars and water. It provides quick energy for all members of the colony.

Fire ants have also been known to eat seed pods, tubers (roots) and fruits. They tend to avoid foods that contain chocolate, molasses and citrus. Some people believe that these foods contain substances that are unattractive or maybe poisonous to the ants.

Fire ants must have plenty of water. Sometimes they will dig tunnels down to the **water table** to bring water to the colony.

Fire ants need foods that contain much protein all through the year, but they especially need them in the spring and early fall. During hot, dry summers or cold winters, fire ants seek out sources of sugar for energy. During these stressful times, they also produce fewer eggs and offspring so they can conserve energy.

### WORDS TO KNOW

- amphibian
- arthropod
- food chain
- food web
- honeydew
- mammal
- omnivorous
- protein
- reptile
- water table

## FOOD CHAIN AND FOOD WEB

In the insect **food chain**, fire ants are at the top. A food chain is a series of organisms in an area in which each member feeds on the organisms in the next lower level. An example of a food chain is fox — rabbit — grass. The grass is eaten by the rabbit, which is eaten by the fox. Fire ants are predators of all types of insects and smaller organisms.

On the other hand, very few insects eat fire ants, so fire ants are not an important part of the **food web**. A food web includes all the individual food chains in an area. Although dragonflies may eat a few winged fire ants as they leave their mounds, and armadillos may eat a few of the developing brood inside the mound, very few animals eat fire ants.

Fire ants prefer to live in open, sunny areas. They need the sun's energy to keep warm and to help the developing ants grow. Fire ants do not like shade. They almost never build their mounds under trees or in wooded areas unless there is plenty of sunlight on the ground for several hours a day.



Fire ants also prefer to build their mounds in soils that stick together, such as clay or loam. The soil must have plenty of moisture to keep the mound cooler in summer and help hold it together.

Fire ants do not like to be flooded. If their mound is flooded during a rain-storm or other high-water situation, all of the ants will cling together and form a living “raft” to protect the queen (or queens) and the developing offspring. Once this floating raft of ants hits a tree, rock or other dry object, all the ants climb onto it and wait for the water to go down.

After rains, fire ant mounds suddenly appear in sunny areas. The ant colonies build taller mounds to live above ground out of the very wet soil underneath.

Fire ants may be more active on warm, cloudy days than on hot, clear days. The best temperatures for fire ant activities range from 70 °F to 95 °F. If the surface of the soil is hotter than 95 °F, fire ants will remain in the ground until the soil cools. During the summer, fire ants may not come out during the day, but instead they forage for food at night.

## **BE CAREFUL!**

**Do not think of fire ants as pets!** Worker fire ants will sting, and the sting will hurt! Please watch where you put your hands and where you walk.

**First aid for fire ant stings:** If you are stung by a fire ant, you might feel a burning and itching sensation. To make it stop stinging so much, you might spray on an insect bite product that contains benzocaine or other ingredients that reduce pain.

In a day or two, a white pustule may form. Don’t break it open — if you do, the area can be easily infected. You may need treat it with a first aid product to protect against infection. You may also have permanent scar.

If a sting causes severe chest pain, nausea, severe sweating, loss of breath, serious swelling, or slurred speech, tell an adult immediately so you can be taken to an emergency medical facility right away.

If you think you might be allergic to fire ant stings, be extra careful to avoid them.





# FIRE ANTS AND BIG-HEADED ANTS AND CRAZY ANTS — OH, MY!

## SNAPSHOTS

- There are many kinds of ants in Texas. Some are native and some are imported from other areas.
- Ants provide many benefits to the environment.
- Ants also can damage our homes and landscapes.



## THE BIG PICTURE

More than 210 different types, or species, of ants are native to Texas. This number does not include red imported fire ants because they are not native to Texas. Several ant species are common, while others go mostly unnoticed.

Some of the commonly seen ants (including red imported fire ants) are pests in and around homes. Others are seen in lawns and other places, but they are not considered pests. Most ant species are **beneficial** because they **aerate** the soil, which allows air and water to more easily reach the roots of plants. Ants also feed on a wide variety of foods most of which are other insects, including pest insects.

Some ants can be harmful when they live in our houses or cause damage to our homes or landscapes. These include sugar ants, crazy ants, carpenter ants and fire ants. Texas leafcutter ants actually cut leaves off of trees and other plants and carry the pieces back into their nests. They use the leaves to grow **fungus**, which they eat.

It is important to know which ants are helpful and which ants have the **potential** to be pests. Some of these ants even “help” humans by battling fire ants in “ant to ant” combat. In areas with few imported fire ants, native ants can **flourish** and keep fire ant populations low. Areas that have an **infestation** of many fire ants have very few, if any, other species of ants beside fire ants.

The most common types of ants we see outdoors are big-headed ants, little black ants, false honey ants, pavement ants, acrobat ants, carpenter ants, crazy ants, red harvester ants, Texas leafcutter ants, native fire ants and red imported fire ants. To identify the different kinds of ants, it’s helpful to use a chart in which the ant’s characteristics are arranged in pairs. This kind of chart is called a **dichotomous key**.

Of the above species, pavement ants, little black ants, crazy ants and native fire ants are known to be successful **competitors** with imported fire ants. In other words, areas where these types of ants live contain much fewer red imported fire ants than others, on average. Areas with many red imported fire ants will have very few of these “competitor” ants. If given the opportunity, these “competitor” ants can kill very small colonies of red imported fire ants.

### WORDS TO KNOW

- aerate
- beneficial
- competitors
- dichotomous key
- flourish
- fungus
- infestation
- potential



## BE CAREFUL!

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If you who think you might be allergic to fire ant stings, be extra careful to avoid them.





# GLOSSARY



<b>abdomen</b>	the hind part of the body in insects
<b>aerate</b>	to supply with air or expose to the circulation of air
<b>alates</b>	winged, reproductive forms of some insects
<b>amphibian</b>	any of a class of cold-blooded animals (such as frogs and newts) that have backbones, that hatch and live in water as larvae with gills, and that have air-breathing lungs as adults
<b>arthropod</b>	any of a group of animals without backbones (such as insects and spiders) having a segmented body, jointed limbs, and an outer shell that is shed periodically
<b>ballast</b>	heavy material that is placed in the hold of a ship or gondola of a balloon to make it more stable
<b>beneficial</b>	producing or promoting a favorable result; advantageous
<b>brood</b>	the young of certain animals
<b>coloration</b>	an arrangement of colors
<b>competitor</b>	something that competes with another, as in sports or business; a rival
<b>conical</b>	of, relating to, or shaped like a cone
<b>dichotomous key</b>	a chart used to identify organisms that consists of characteristics that are arranged in twos
<b>excavate</b>	to remove by digging or scooping out
<b>flourish</b>	to grow well or luxuriantly; thrive
<b>food chain</b>	a series of organisms in a community in which each organism uses the next, usually lower, member as a food source
<b>food web</b>	all the food chains in an area
<b>fungus</b>	any of a major group of flowerless plants (such as molds, mildews and mushrooms) that do not have chlorophyll and are parasites that live on dead or decaying organic matter
<b>hold (noun)</b>	the lower interior part of a ship or airplane where cargo is stored
<b>honeydew</b>	a sweet sticky substance excreted by various insects, especially aphids, on the leaves of plants
<b>identify</b>	to establish the set of characteristics by which a thing is recognized or known
<b>import</b>	to bring or carry in from an outside source, especially to bring in (goods or materials) from a foreign country for trade or sale
<b>infestation</b>	a group of organisms in numbers large enough to be harmful, threatening or obnoxious

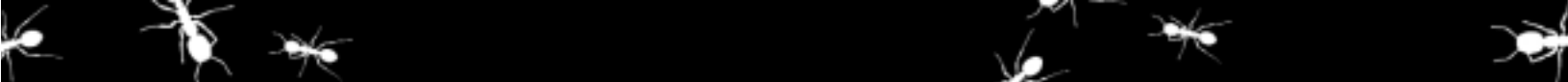


<b>instar</b>	a stage of an insect or other arthropod between molts
<b>larva</b>	a young, wingless, often wormlike form (such as a grub or caterpillar) that hatches from the egg of many insects
<b>mammal</b>	any of a class of warm-blooded vertebrates that include human beings and all other animals that feed their young the milk produced by mammary glands and have the skin usually more or less covered with hair.
<b>mate</b>	to pair (animals) for breeding
<b>molt</b>	to shed periodically part or all of a coat or an outer covering, such as feathers or skin, which is then replaced by new growth
<b>monogynous</b>	in the case of fire ant colonies, a colony containing only one queen that is producing offspring
<b>native</b>	originating, growing or produced in a certain place or region
<b>nuptial</b>	of, relating to, or occurring during the mating season
<b>omnivorous</b>	eating both animal and vegetable foods
<b>oviposit</b>	to lay eggs
<b>petiole</b>	a slender, stalk-like part, such as what connects the thorax and abdomen in certain insects
<b>polygynous</b>	in the case of fire ant colonies, a colony containing multiple queens that are producing offspring
<b>polymorphic</b>	the presence of different forms, stages or types in individuals of the same species
<b>potential</b>	the ability of something to develop or become actual
<b>protein</b>	a complex group of organic molecules that are the basic components of all living cells
<b>pupa</b>	the nonfeeding stage between the larva and adult in the metamorphosis of some insects, during which the larva typically changes completely inside a protective cocoon or hardened case
<b>radiate</b>	to extend like rays in straight lines from or toward a center
<b>reptile</b>	any of a group of cold-blooded air-breathing vertebrates (such as snakes, lizards, turtles and alligators) that usually lay eggs and have skin covered with scales or bony plates
<i>Solenopsis invicta</i>	a species of fire ant that was accidentally brought to the United States from South America
<b>species</b>	a category of living things that can produce fertile offspring
<b>thorax</b>	the second or middle region of the body of some insects
<b>trophallaxis</b>	the mouth-to-mouth exchange of food between adults and larvae of some insects
<b>water table</b>	the level below which the ground is completely soaked with water









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