



GEO SAFARI®

EI-5145
EI-5146
Ages 5+

Ant Factory™ and Mini Ant Factory™ Activity Guide



 Like us
for sneak peeks
and giveaways!

 Tell us what you think!
Your opinion counts. Visit us online at
www.educationalinsights.com
to review this product.

RISQUE D'ÉTOUFFEMENT. Petites pièces.
Interdit aux enfants en dessous de 3 ans.
ERSTICKUNGSGEFAHR. Kleine Teile. Nicht geeignet
für Kinder unter 3 Jahren.
PELIGRO. No conveniente para niños menores de 3 años por
ser susceptible de producir piezas pequeñas que pueden ser ingeridas.

Developed in Southern California by Educational Insights.
© Educational Insights, Gardena, CA (U.S.A.). All rights reserved.
Learning Resources Ltd., Bergen Way, King's Lynn, Norfolk,
PE30 2JG, UK. Please retain this information. Made in China.
www.educationalinsights.com



 **WARNING:**
CHOKING HAZARD—Small parts.
Not for children under three (3) years.





Thank you for becoming an Educational Insights customer and for purchasing **Ant Factory**. We hope you have fun using **Ant Factory** to explore the exciting world of ants. Please take a few minutes to become familiar with **Ant Factory**.

TABLE OF CONTENTS

| | |
|-------------------------------------|----|
| Ant Factory..... | 3 |
| Setting Up Ant Factory Habitat..... | 4 |
| Ant Answers..... | 7 |
| Ant Care..... | 8 |
| Why Study Ants? | 10 |
| Ant Discoveries..... | 11 |
| Ant Journal..... | 13 |
| Ant Activities..... | 15 |
| An Ant From the Outside In..... | 18 |
| An Ant From the Inside Out..... | 19 |
| The Life of an Ant..... | 20 |

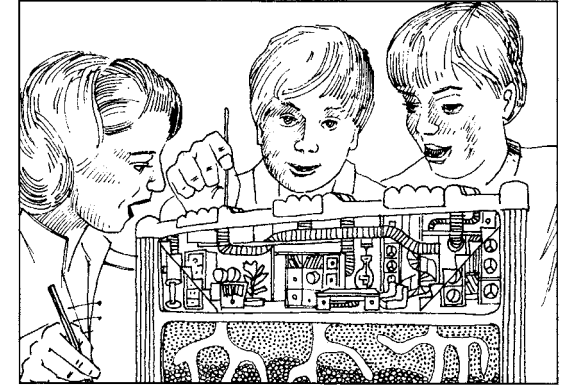
CAUTION

Do not touch these ants. Ants bite and sting. The sting may be painful and cause swelling, especially for those allergic to stinging insects.



ANT FACTORY

One of life’s most rewarding experiences is owning, observing, and caring for animals. Ant Factory makes the upkeep and maintenance of one type of animal—ants—easy and enjoyable. With Ant Factory, you will observe many wonders of nature. Watch a group of ants build an intricate system of tunnels, arranging a beautiful sand scene in the process. Observe how ants react to different types of food. Ant Factory will provide thousands of hours of unforgettable entertainment.



Ant Factory includes:

- Ant Factory or Mini Ant Factory habitat
- Ant Factory guide
- Two foot pads
- One rake/tunnel starter
- One dropper
- One Ant Certificate

You will need to supply:

- Sand (approximately 2 cups)

You can buy sand at a hardware store, pet store, or plant nursery. Or, collect sand from the beach or sandbox. Do NOT use clay or soil. If there are large pebbles mixed in with the sand, they may cause a problem for the ants; use a sieve to separate them out first. Light-colored sand will let you see the ants better than dark-colored sand.



The Ant Factory guide gives detailed instructions for assembly of your Ant Factory habitat and for ant care. It also includes a wealth of information about ant research, journal keeping, ant experiments, ant physiology, and the various lifestyles of the ant. You will find ants fascinating to observe. Fill out and send your Ant Certificate along with the required money for postage and handling, and you will receive a vial of ants, *Pogonomyrmex californicus* or *Pogonomyrmex occidentalis*.

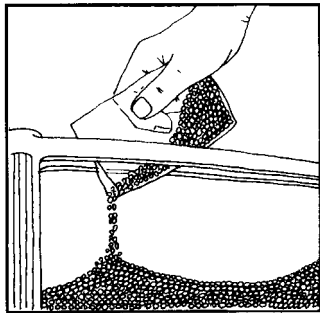
While you are waiting for the ants, be sure to acquire some sand so you are ready when the ants arrive!



SETTING UP ANT FACTORY HABITAT

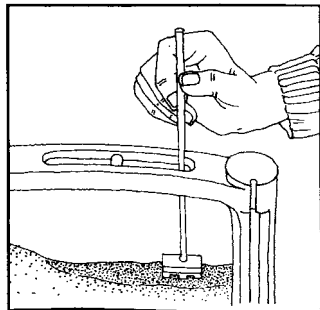
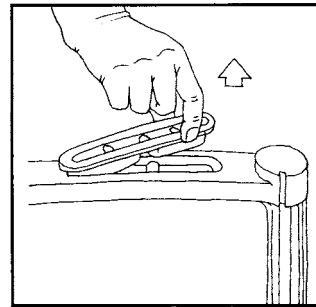
When the ants arrive, follow these instructions.

1. Turn the Ant Factory frame upside-down.
2. Pop the covers off the bottom of the frame.

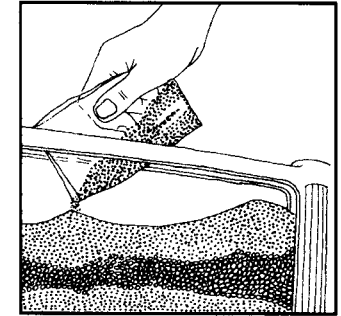
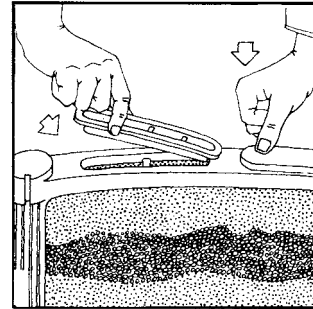


3. Carefully pour sand through the opening. You may want to pour in only enough to make a thin layer and save some for another layer further along.

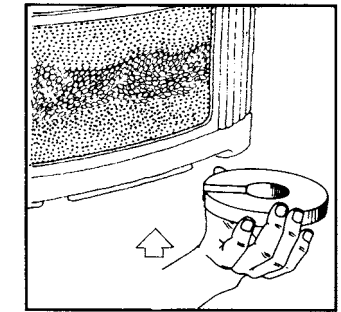
4. Rake the sand flat with the rake/tunnel starter.



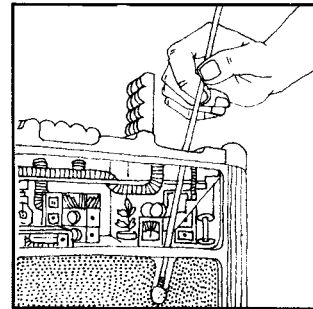
5. Repeat Steps 3 and 4 with more sand until you fill the bottom section completely. It gets a little tricky near the end of the process trying to fill it to the very top.



6. Place the covers back on the bottom of the frame. Make sure they are secure.

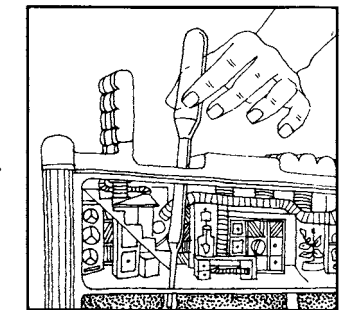


7. Turn the frame right-side-up and insert the two foot pads on the bottom of the frame. These prevent accidental tipover.



8. Lift up the access doors on the top frame and use the tunnel starter to push the cotton plugs into the sand area from above. Push the cotton plugs into the sand layers as far as you can to help the ants start their tunnels.

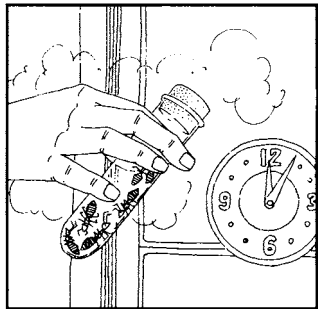
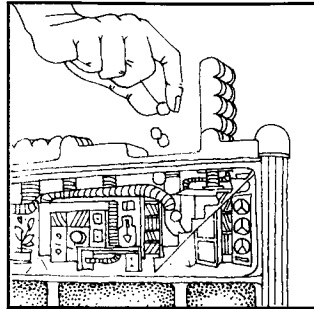
9. Fill the dropper with water and drip the water through the holes and into the sand. Let the water slowly soak through so that all of the sand is moist. The ants can't tunnel in dry sand. However, don't use too much water or you'll drown your ants. It's better to use too little water than too much!





10. Repeat Step 9 for each hole on top. There should be just enough water to completely moisten the sand, but not to make it wet. Remember, it is better to leave the sand too dry than too wet.

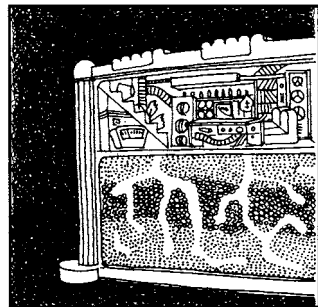
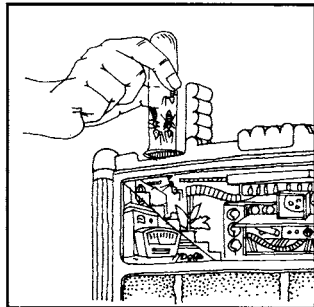
11. Drop a few seeds, small pieces of granola cereal, or a very thin slice of apple through the holes.



12. Place the vial of ants in the refrigerator to cool down—**approximately 5 to 10 minutes and NO MORE.** The temperature change will make them less active.

CAUTION: Don't put ants in the freezer—it will kill them.

13. Remove the ants from the refrigerator and quickly, but gently, shake the ants into the frame through the holes on the top.



14. Place the Ant Factory habitat in a dark place to allow the ants to get used to their new home. Leave them alone for an hour or so.



ANT ANSWERS

1. How do I get my ants?

Send for your supply of ants using the enclosed Ant Certificate. You can also find your own ants.

CAUTION: Don't mix ants of different species or colonies.

2. When will I receive the ants that I order?

Under ordinary conditions, you should receive your ants within two to three weeks from the time you mail your Ant Certificate. We will send your ants by mail upon receipt of your order. If the weather is extremely cold, there may be a one-week delay in order to protect the ants.

3. Do many ants die when they are shipped through the mail?

Some of the ants will die during shipment. However, we consider this when we send the shipment and send many more ants than are needed for your Ant Factory habitat. If you live in a cold area, watch for the mail delivery. You don't want the ants waiting outside in a freezing cold mail box.

4. Will I receive a queen with my ants?

There is a federal regulation controlling the handling of ant queens. All of the ants that we send will be workers. The workers are female ants that cannot reproduce. Even without a queen, these ants are exciting creatures to watch. If you find your own ants, you can look for the queen, eggs, and larvae.

5. Is the Ant Factory habitat escape-proof?

Yes. The Ant Factory habitat was designed to prevent escapes. However, you must handle your Ant Factory habitat carefully. Don't drop it.



6. Is there enough air in the Ant Factory habitat?

Yes. There are small vents built into the Ant Factory frame. They are too small to allow the ants to escape, but provide plenty of air.

7. How long will my ants live?

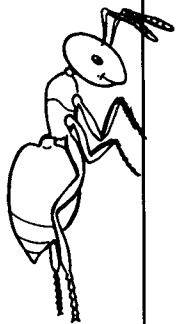
With proper care, they can live as long as six months.



ANT CARE

DO:

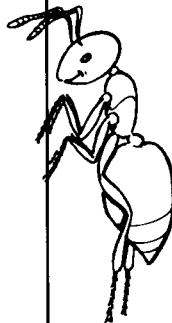
1. Water the sand as follows: Put two drops of water through the holes in the top of the frame every day. If the Ant Factory habitat looks wet on the inside (has beads of water on the plastic), stop adding water for a few days.
2. Feed your ants once a week. Drop the food through the holes on top. Ants will eat many things. Experiment with a few very small pieces of corn flakes or granola, dry dog food, fruit tree leaves, ground beef, or hard-boiled egg whites. You might try a dead insect, a tiny piece of fat, or a thin slice of apple—about as big as the end of your thumbnail.



Ant Food Recipe

- 1 part egg white
- 1 part vegetable oil (corn, cottonseed, or peanut)
- 1 part syrup
- 2 parts water

Mix the ingredients. Put two or three drops in the habitat. Refrigerate the remainder. This food will spoil at room temperature.



3. **Cover the bottom half of the Ant Factory habitat with black paper when you are not watching the ants. This keeps it dark, as it would be underground.** Being in the dark makes it easier for your ants to do their tunnel building.
4. Keep the Ant Factory habitat at room temperature. The temperature should stay between 65°F and 80°F (18°C–27°C). The warmer the temperature, the more active your ants.

DON'T:


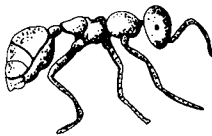




1. **CAUTION: Don't touch the ants. They may bite and sting to protect themselves!**
2. Don't overfeed or over-water your ants. If you overfeed the ants, the food can go bad and this can kill your ants.
3. Don't shake the Ant Factory habitat. It will disturb your ants and might destroy their tunnels. The more careful you are, the easier it will be for your ants to adjust.
4. **Don't put your Ant Factory habitat in direct sunlight.** The ants may get too hot and die. Also, be careful not to let the ants get too cold; don't leave them outside.
5. Don't put any other ants in the Ant Factory habitat. Ants from different colonies will fight. Each colony has a distinctive chemical scent. This is how ants in a colony know whether or not another ant belongs to the colony.

CAUTION: Do not release these ants into your local environment. They could be harmful to some plants. Keep them in the the Ant Factory habitat.



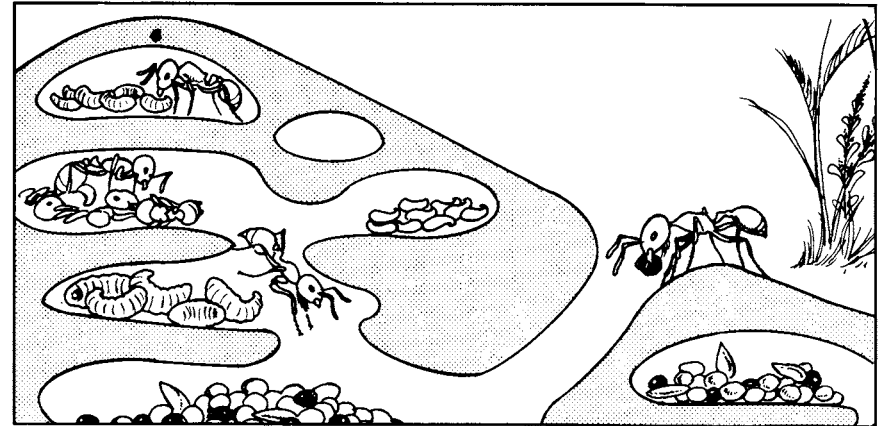
WHY STUDY ANTS?

A scientist who studies ants and other insects is called an entomologist (en-tuh-MAHL-uh-jist). Entomologists are interested in the study of insects for many reasons. By knowing about insects, we can try to control those harmful to humans and use the helpful ones to improve our world. We can even discover more about ourselves by watching and studying insects. Insects are fascinating. Become an amateur entomologist and watch your ants. You will be amazed at what these little engineers can do!

| | | |
|---|--|--|
| BIG-HEADED ANT  | WESTERN HARVESTER ANT  | ALLEGHENY MOUND ANT  |
| SOUTHERN FIRE ANT  | ARGENTINE ANT  | TEXAS LEAF-CUTTING ANT  |

There are 4,000 kinds of ants on Earth. Ants make their homes almost everywhere, from the seashore to the mountains, from rotten logs to your kitchen.

Ants can do amazing things. They can dig great catacombs of tunnels, some as deep as fifteen feet. They can pick up and carry objects that are many times their own weight. Ants can climb trees that are 100 feet (30.5 meters) high. They can move at a speed that compares to a person running 65 miles per hour (104 kph).

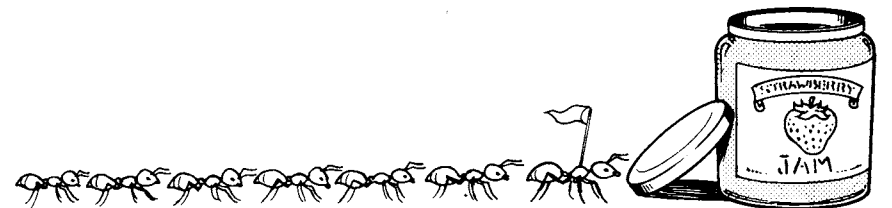


The most interesting thing about ants is that they work together. Ants cannot survive alone. They have communities, just as we do. They work together to build their home, find food, take care of the queen and the young ants, and defend their home. Ants have individual differences. Some ants are hard workers. Others need to be prodded. Ant colonies fight battles with other ant colonies. Their wars, like human wars, result in many dead and wounded.



ANT DISCOVERIES

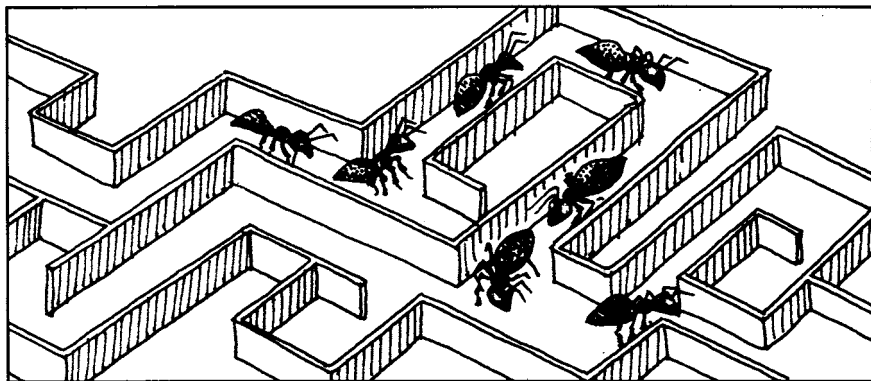
The way ants communicate with each other has puzzled people for many years. Benjamin Franklin experimented with ants to see how they lead each other to food. Since his time, many interesting discoveries have been made. Ants have special glands that make chemicals. These chemicals, called





pheromones (FAIR-uh-moans), can change the way other ants act. Have you ever seen a great number of ants following the same trail? They are probably reacting to pheromones that were put there by an ant from their colony!

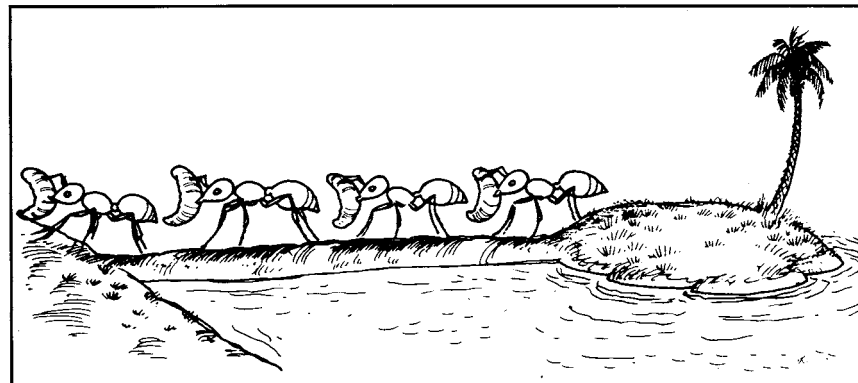
Ants have an amazing ability to find their way home from places that seem far away. Entomologists have found that some ants use the sun to find their way home—even when it is covered with clouds. Entomologists have tried to find out whether or not ants see color. Many say, “No.” However, other entomologists are not sure. One entomologist found that ants can see the differences between certain shapes. As a matter of fact, ants seem to be more attracted to vertical stripes than horizontal ones.



Do ants learn? You may have heard of scientists putting rats in a maze to see if they could learn to find their way through it. But have you ever heard of an ant maze? Well, it’s been tried. Not all kinds of ants can learn a maze, but some ants do very well. Ants that must search out food and find their way back to their ant hill can also find their way through a maze. Do you think that their pheromones helped?

One entomologist tried an interesting experiment to see if ants could solve a problem. He put some ant **pupae** (young ants) on a small island of dirt surrounded by water. The ants threw dirt on the water until they had built a bridge. They rescued the pupae and brought them home. The entomologist then

tried another experiment. He made an island without pupae on it. The ants covered the water with dirt again! The scientist found that ants often cover water with dirt.



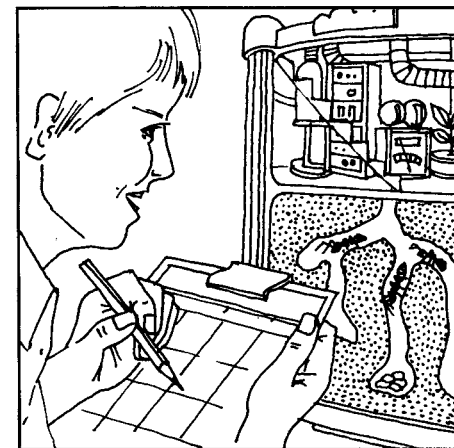
As an amateur entomologist, you can perform experiments with your ants. As a matter of fact, we have included some experiments and data sheets in this guide. Remember that an ant is a remarkable animal. Take good care of your ants!



ANT JOURNAL

Scientists often keep journals in which they record all of their observations, experiments, and discoveries. This way, they always remember what they saw and when they saw it. A journal can be fun!

To make a journal, buy an ordinary notebook or make your own notebook by binding paper in a home-made cover.





To keep your journal, follow these directions:

1. On the cover, write the title of your journal and list the date and time that you put the ants into the Ant Factory habitat.
2. Each time you sit down to watch your ants, record the date and time.
3. List the equipment that you use, such as a magnifying glass, piece of paper, stone, or other items.
4. Make observations about ant activities. Write them in your journal. Try to answer the following questions: Where do the ants sleep? How many are working? What do ants do when they are together in groups? How many die? Do they like one particular layer of colored sand more than another? Take notes or draw pictures. If you do an experiment, write it up in your journal.
5. Use a piece of string to measure the ant tunnels from the outside of your Ant Factory. How many inches or centimeters of tunnels do you think they can dig in one week?

Here is an example of how a page in your journal might look:

| Name _____ | | Starting Date _____ | | |
|------------|----------------------|---------------------|-----------------------------|------------------------|
| Date | Time of Observations | Observations | Length of Tunnel (cm or in) | Number of Ants Working |
| | | | | |
| | | | | |
| | | | | |

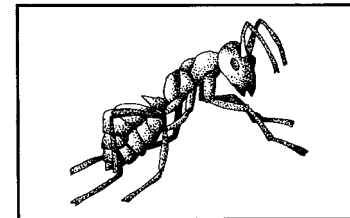


ANT ACTIVITIES

ANT ACTIVITY #1

Studying an Ant's Body

You will learn a great deal about an ant's body by looking very closely at it. On one of the pages of your journal, do the following:

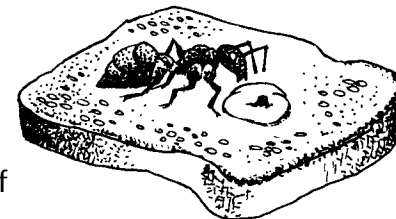


1. Draw a picture showing the parts of an ant's head. It doesn't have to be artistic. See what you can find on its head. Use a magnifying glass if you have one.
2. Draw a picture of its middle part. What is attached to the middle part?
3. Draw a picture showing the back end of the ant's body. Do you see any markings on the back end of the ant?

ANT ACTIVITY #2

What Do Ants Like To Eat?

Do you think that an ant would rather have a piece of bread covered with honey or a piece of dog food?



1. Break off a very small piece of dried dog food (about this big: ○).
2. Break up a piece of bread that is the same size and put a very tiny amount of honey on it.
3. Put the bread and the dog food in the Ant Factory habitat next to each other.

Which one do the ants touch first? Notice the way that the ants use their antennae (feelers) to look for the food. What do you think the antennae do?

Which food was the first to be carried away by the ants?

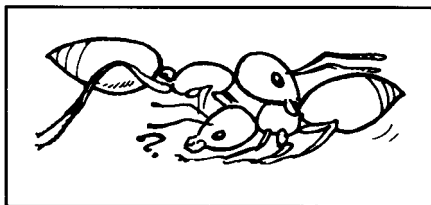


Some people are in the mood for pizza one day and don't want any the next day. Do you think that ants might like dog food one day and honey bread the next? Can you think of a way to find the answer to this question?

ANT ACTIVITY #3

Pheromones

You remember that pheromones are chemicals given off by one ant that make other ants act in a certain way. You may have noticed that your ants move dead ants to a garbage pile away from their tunnels. It is a certain pheromone that makes them aware that the ants are dead. If you put a chemical called oleic acid on a living ant, the other ants will move it to the garbage pile. The poor ant will be carried to the garbage pile over and over again until the smell of the oleic acid wears off.



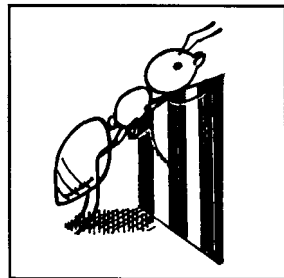
You can observe the action of pheromones by tapping on the habitat window with your fingernail. First, one ant will notice. It will emit an "alarm" pheromone that the other ants notice. Other ants will come running. They will be very excited!

Try tapping lightly on the frame with a small stick. How many ants come running?

ANT ACTIVITY #4

Ant's Vision

Some entomologists have found that ants prefer vertical (up and down) stripes to horizontal (side to side) stripes. To see if you agree with the entomologists, try this experiment:



1. Copy the squares shown below and tape them against the outside of the Ant Factory frame.



2. Watch the ants for five or ten minutes. Fill in the chart below. Put a check in the correct box for each ant that is attracted to the vertical or horizontal lines. Write out your observations in the space to the right. Leave the papers against the Ant Factory habitat for one or two days. Tell what the ants did when they saw the paper.

| | Make a check for each ant. | Observations (What did the ants do?) |
|-------------------------------|----------------------------|--------------------------------------|
| Climbed on vertical stripes | | |
| Climbed on horizontal stripes | | |

Do you think that your results show that your ants liked one kind of line better than the other?

ANT ACTIVITY #5

Ants Never See Red

Did you know that ants can't see the color red? Make a light shield out of red cellophane. Only red light will come through the shield. Since the ants don't see the red line, they will think they are in the dark. You can watch them as they go about their everyday business.

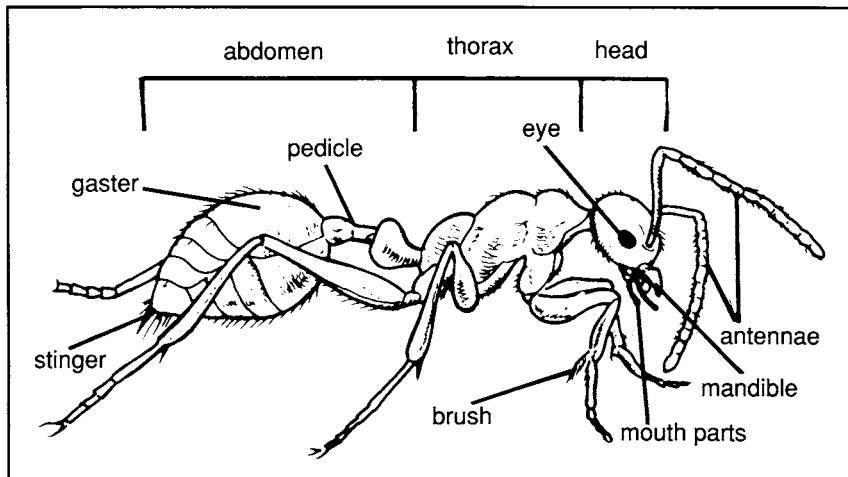
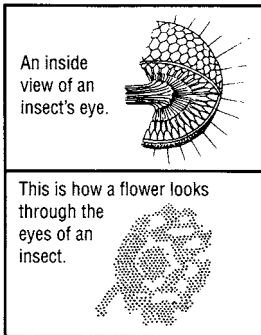


AN ANT FROM THE OUTSIDE IN

Ants have three parts: a head, a thorax, and an abdomen. The list below describes some of the interesting body parts of the ant from head to abdomen.

Some ants have well-developed eyes. Others are blind. Ants' eyes are different from our eyes. They are made of many tiny eyes (called ommatidia).

- An ant's antennae (feelers) are very important. They are used to smell, taste, and touch. How do your ants find the food that you leave for them?
- The ant's strong mandibles are used to move soil, cut up food, fight, bite, carry other ants and move the eggs and larvae. Under the mandibles are the tongue and other mouth parts.
- The legs and wings of the ant are attached to the thorax. (Only the queen and male ants have wings and only during a short time in their lives.)
- On the front two legs of the ant are little brushes. The ant uses these to clean its antennae and its back legs.

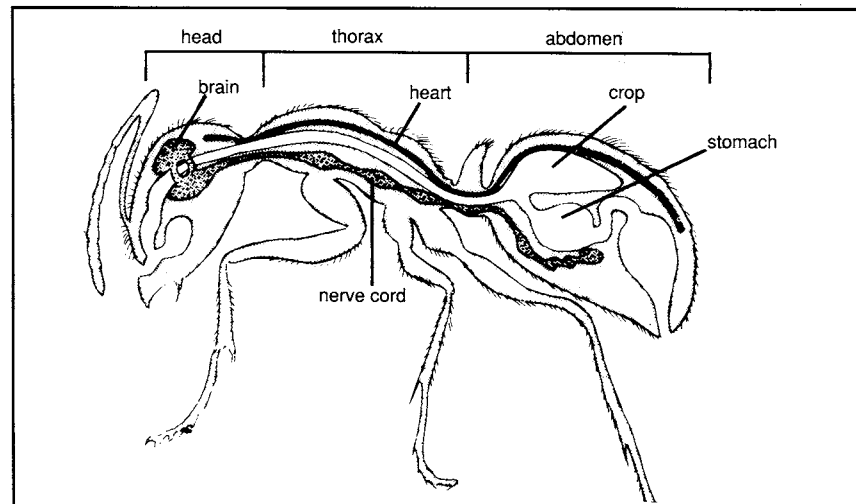


- The **abdomen** of an ant has two different parts. The rear end of the abdomen is called the **gaster**. The ant will often move its gaster forward to help lift a large object.
- Not all ants sting. However, ants that do sting have a **stinger** at the end of their gaster. An ant injects formic acid into its enemy when it stings. This can paralyze or kill other ants.



AN ANT FROM THE INSIDE OUT

An ant has a brain, heart, nerve cord, and stomach, just as we do. However, the ants' organs are very different from ours.



Look at the picture of the ant's heart. Do you think it looks like a human heart? The ant's heart pumps a colorless liquid. There are no veins or arteries to hold this "blood." It just moves through the ant's body freely. The blood carries away the waste products.

- Are you surprised that the ant has two stomachs? The little one is the ant's own stomach and is used to digest food.
- The other stomach is a "public stomach," called the crop.



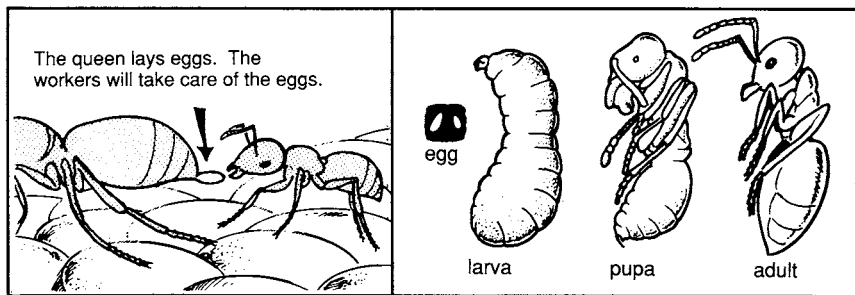
The crop is a large storage tank. It holds food that can be shared by the rest of the ants in the colony. An ant can bring up some of the food stored in its crop and feed it, mouth to mouth, to another ant. (Some entomologists think that chemicals are shared by ants in this way. These chemicals help tell the ants what needs to be done for the community.)



THE LIFE OF AN ANT

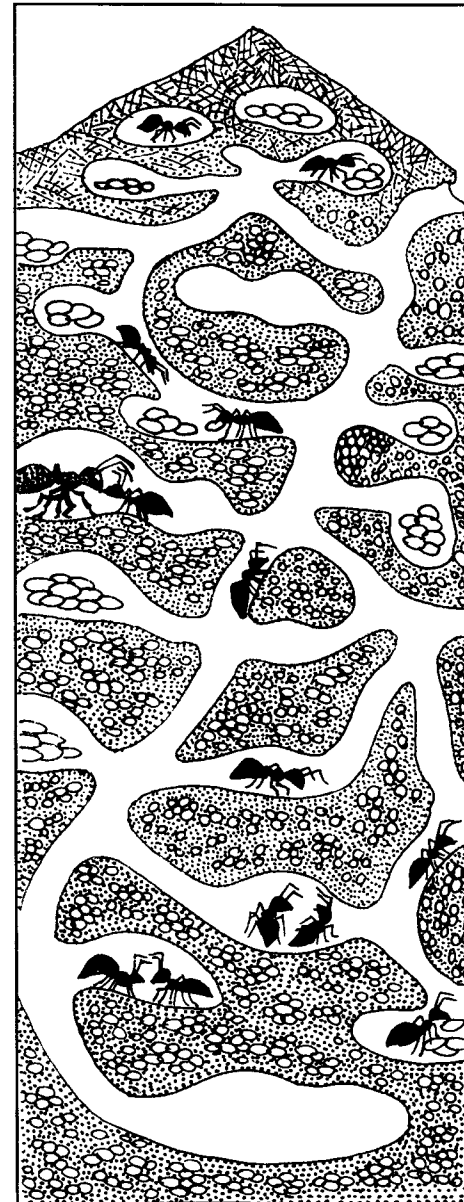
An ant colony is started when young queen and male ants leave the nest in which they were born. They fly high into the sky. After they have mated, the males soon die. The queens shed their wings. The queens of some types of ants tunnel into the ground. All alone, each queen clears a small chamber, closes the tunnel, and begins to lay eggs. The queens do not leave their chambers.

The eggs hatch and become larvae that must be fed by the queen. The larvae are little, legless, worm-like creatures. When the larvae are fully grown, they become "pupae." The pupae of ants are either barrel-shaped or ant-shaped. In time the pupae become adult ants.



The new adult ants emerge from the pupae. They busily go to work preparing the new nest. They also go out and find food. These new worker ants take care of the queen and the new eggs and larvae. The queen will spend the rest of her life laying eggs. Most of the eggs the queen lays will become workers.

Only a few eggs will become either males or queens. The workers are all females, but they cannot lay eggs. They will do many different jobs that are necessary if the ant colony is to survive.



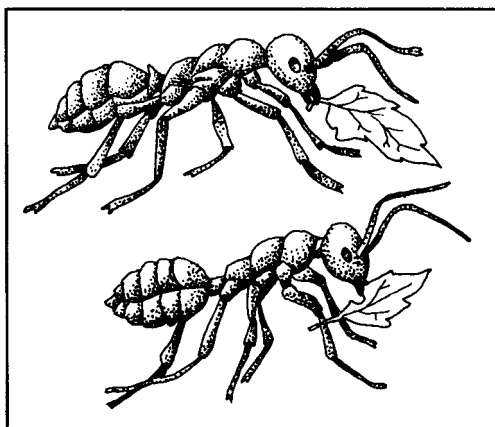
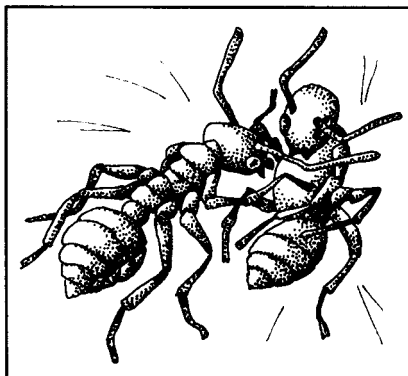
The jobs of the workers depend upon the life style of that particular type of ant. Of all social insects, the ants have the most interesting variations in community life.

The harvester ants dig deep underground "cities" sometimes extending fifteen feet below the surface. The ants gather seeds for future dinners. They store them in underground bins. If a seed sprouts, an ant will grab it and dump it outside many feet from the entrance to the "city." After a rain, the ant hill bustles with ants removing seeds from the nest. The ants lay the seeds on the ground and wait until the seeds have dried. Then they scurry back into the nest with their seeds. The seeds are again neatly piled in their bins. The harvesters



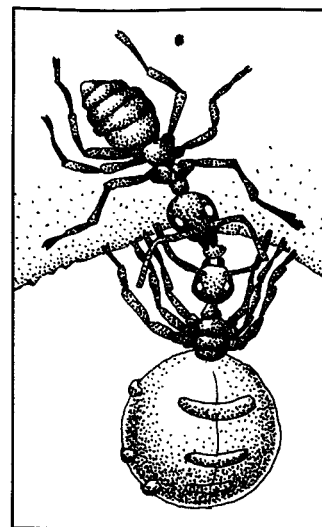
are very tidy and usually as neat above ground as below ground. All of their garbage, including dead ants, is arranged in a pile away from the nest.

The fierce ant "hunters" (called army ants) in Africa travel constantly. They have no home. Army ants eat insects, dead animals, or any living creature that they can catch. They have been known to reduce a tethered horse to a skeleton in a matter of hours. You can imagine how strong their mandibles must be! These ants do most of their hunting when they have larvae to feed. (Their queen lays 25,000 eggs at a time.) When these ants come through villages, the people often leave until the ants have disappeared.



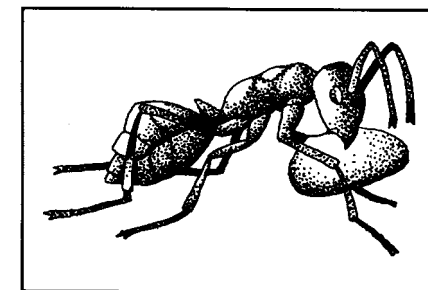
If you ever see rows and rows of ants carrying little leafy "sais," do not be surprised! These ants are "farmers." Called the "leaf cutters" or "fungus growers," they chew up leaves to make a special kind of spongy mulch. They spread this mulch over the floors of large underground chambers. In the mulch they grow

a special kind of fungus. Small bulbs grow on the fungus and are eaten by the ants. These ants must be great farmers to grow enough food for their entire population, which may be several *million* ants.



Some ants "milk" special "cows." These "cows" are insects called aphids. The ants stroke the aphids and the aphids give off little drops of liquid, called honeydew. One group of these "dairymen" ants uses living "storage tanks." Certain members of this group are loaded up with honeydew until they can't even move. They spend their lives hanging from the ceiling of their chamber, feeding hungry ants that pass by and taking all of the extra honeydew from the ants that collect it. It's no wonder they have come to be known as "honey pot ants."

Some ants are slave-making ants. They raid other colonies and steal the pupae. When the pupae become adults, they serve as slaves.



All of these ant communities have something in common. They are made up of female workers that care for the queen and the young ants. They work together to help their colony survive, and survive they do. Ants are among the longest-living insects. It is possible for some ant queens to live fifteen years. Workers may live up to seven years. Ants are a very successful group of animals!

There are many fascinating books about ants. Search online or at your public library and discover more interesting facts about them.