

# JUST FOR U.S.\*

GRADES 4 - 6

\*UNDERSTANDING SCIENCE

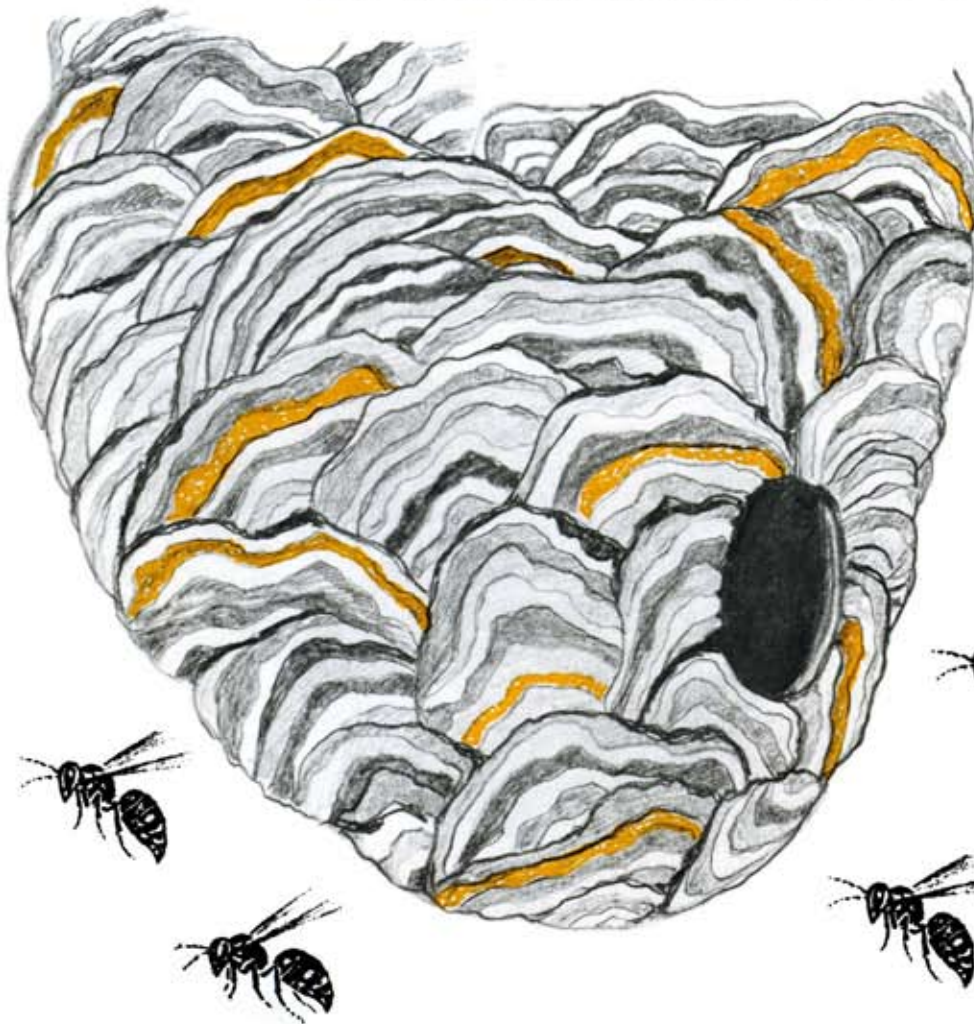
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## BALDFACED HORNETS



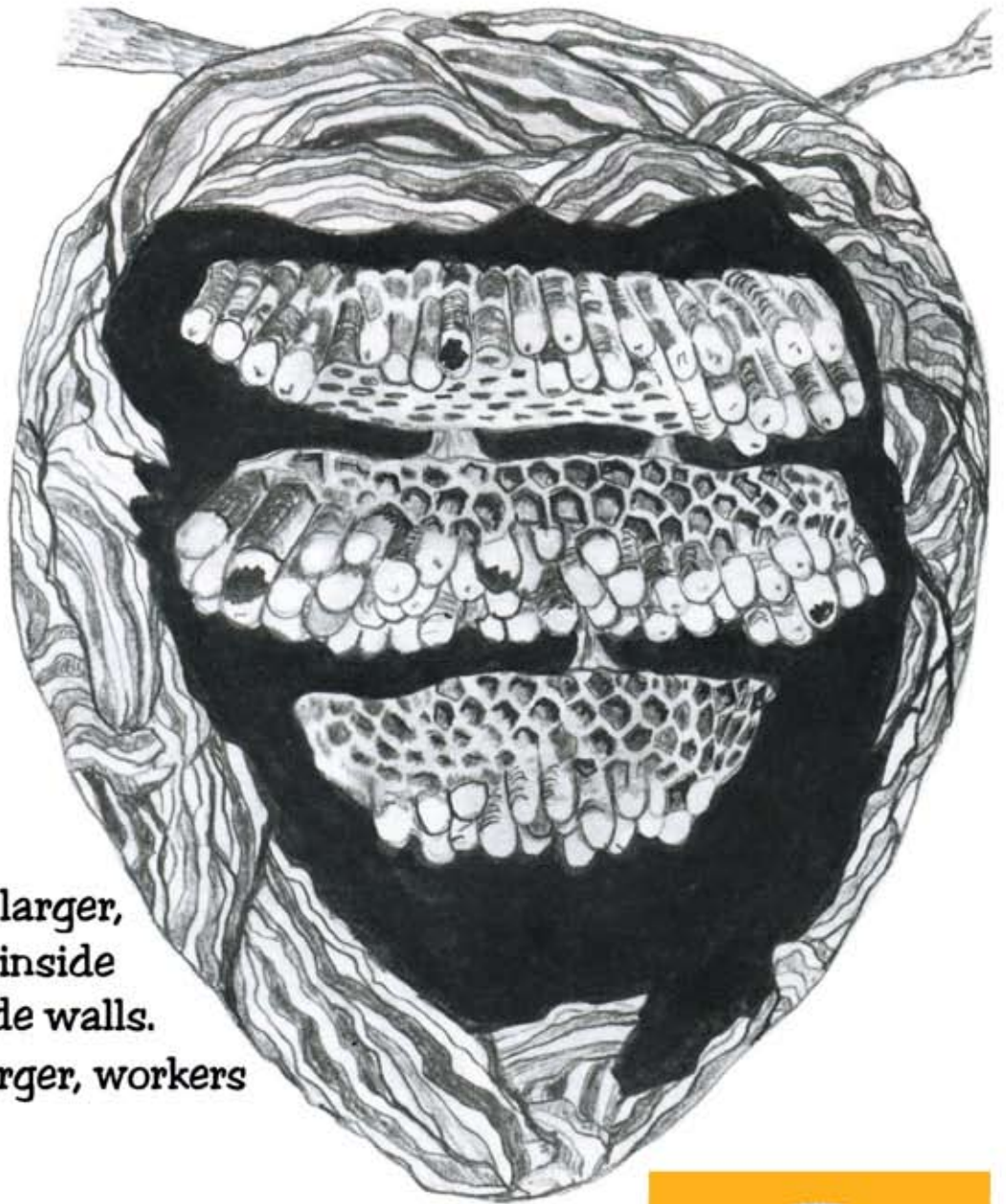
Thousands of workers built this football-sized nest in just one summer.

All the workers are sisters and the queen is their mother.

Some of the workers are guards. Any hornet that tries to enter must have the "smell" of the hive. Strangers, including people, that come too close may be attacked by guards and workers.

## INSIDE THE HIVE

The layers, or combs, inside the hive have six-sided openings called cells. The queen lays one egg in each cell. Sometimes the cells are used more than once.



To make the nest larger, workers take down inside walls and add outside walls. As the inside gets larger, workers build new combs.

The queen started the hive by building a tiny nest in May. She laid a few eggs and raised the first workers. These daughters took over the jobs of the hive. The queen laid eggs all summer. The number of sisters grew larger and larger.



actual size of queen's first nest

## GROWING UP A HORNET

Hornet eggs hatch after 6 or 7 days. The wormlike larvae are fed by the workers. The workers fly out and catch flies and caterpillars. They chew them into a meat paste. When a worker feeds a larva, the larva gives off a drop of clear liquid. This is food for the worker! Workers also feed on nectar and the juice of ripe fruit.

After 10-12 days of eating and growing, each larva spins a silk covering and completes its metamorphosis in another 10-12 days. The new adult chews her way out and goes to work.



life-size worker

## THE BOYS OF THE HIVE



life-size drone

There are no males in a hornet nest all summer. In the fall, the queen lays some eggs that develop into drones, or males. These males will fertilize any new queens raised in the hive. Drones die after they have done their job.

## NEXT YEAR'S QUEENS



life-size queen

In the fall, the queen lays a few eggs that develop into new queens. These young queens leave with the drones and are fertilized by them. Each new queen finds a sheltered place to spend the winter. Next spring, each will start a new hive. Since all the members of a hive die when the weather turns cold, hornets start over every year.

## MAKING PAPER

A hornet's nest is made of tough, waterproof paper. A worker scrapes off pieces of rotting wood or bark with her mouth. The hornet may take tiny bits from trash paper, too.

The worker chews the woody materials. She mixes it with her saliva to make a stringy pulp. The worker adds the wet pulp to the nest and shapes it with her feet. Usually, the new paper dries grayish brown. Bright colors may show up if the hornet used colorful trash paper.



hornet paper--magnification 50X



## IT'S HOT IN HERE

Hornets are summer insects. When the inside of the hive gets hot, a worker brings in a mouthful of water. She spreads the water on the walls or combs. The water evaporates and cools the hive.

## HORNETS ARE HELPFUL, MOSTLY

Hornets are helpful to people because they kill insects that are harmful like flies and caterpillars. Hornets sometimes damage fruit by biting into them for juice.



**OUCH! THAT HURTS!**

Hornets sting to defend their nest or themselves. Every female has a lance-like stinger. She can use it over and over to inject a very painful venom. Hornets are attracted to strong, sweet smells like perfume, shampoo, hairspray, or aftershave. They are also attracted to bright colors and shiny jewelry.



hornet sting magnified 200 times



If a hornet comes near you, remain calm. Raise your hands to protect your face and move slowly away. Do not swat the insect because she is quicker than you are!

If you are stung, mix meat tenderizer with water to form a paste and apply to the site. The paste will break down the venom and decrease the pain.



**DO NOT TAKE DOWN A HORNET NEST.  
GET PROFESSIONAL HELP.**

A thousand workers defending their nest is a dangerous situation.

## SOCIAL INSECTS

Social insects live in colonies and the members depend on each other to survive. Unscramble the name of each social insect.

K O Y T A L S J C L E E W

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make a paper nest like hornets, except  
it is underground.

A E R P P P A S S W

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do not put layers of paper around the  
outside of their combs.

E E E B N H Y S O

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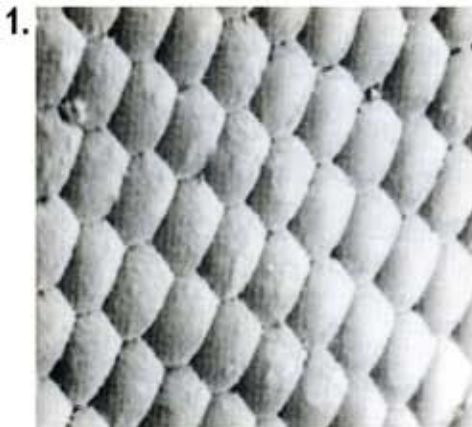
make their combs of wax instead of paper.  
These insects store food in some combs.



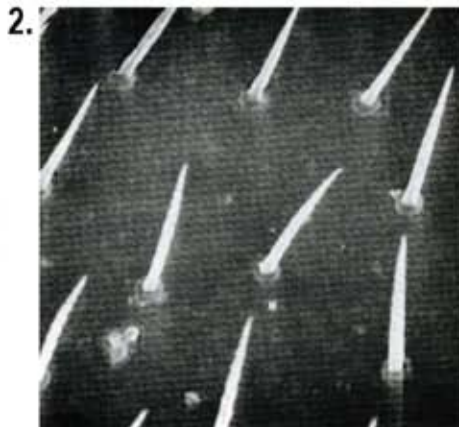
### MYSTERY PHOTOGRAPHS



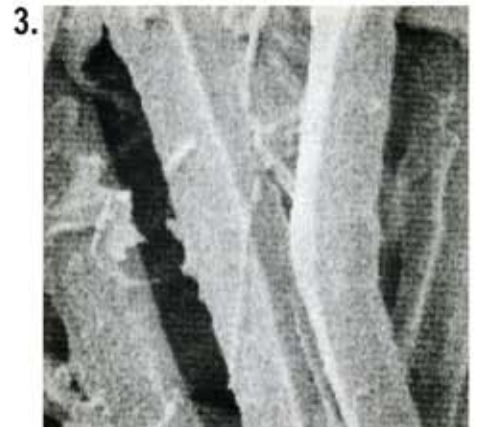
What's in each photograph? Can you find the answers?



magnification 500x



magnification 500x



magnification 1000x

*Just for U. S.* was written by Ginny Johnston with Fred Sherberger as consultant. Illustrations by Judy Cutchins. Electron microscopy photographs by Terri Brown.



RECYCLED PAPER

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