

Thank Goodness for Bees

by Bronwen Wall

Some people say that man's best friend is the dog. Some people say that it's the horse. I say that man's best friend must be the hardworking, humble honey bee.



The honey bee and all other types of bee belong to a large family of insects called Hymenoptera (say hi-men-op-ter-ah). The wasp and the ant also belong to the Hymenoptera family.

Hymenoptera is a Greek word. It means "membrane wings", and that's just what the bee has – two pairs of very thin, see-through wings. Ants don't have wings now, but millions of years ago, the ant was a kind of wasp, and so was the bee.

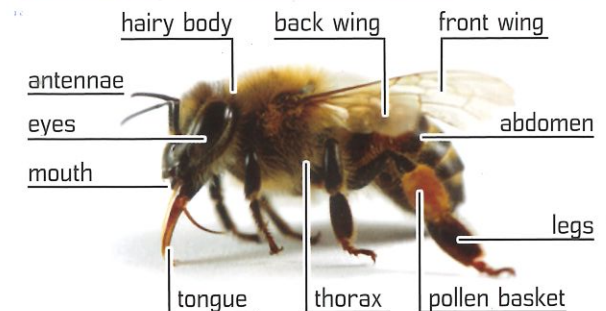
How are bees and wasps different?

Sometimes it's hard to tell a bee from a wasp. Both have a narrow waist. This "wasp waist" helps them to bend and twist. Both have a sting. The big difference between the bee and the wasp is in what they eat. Our friend the bee is a vegetarian.

WASP



BEE BODY PARTS



Most wasps (and ants) eat some animals as food, but the bee hunts only for the nectar and pollen from flowering plants. Some wasps and ants will attack other animals, and they might use their stings to paralyse insects before eating them. However, the bee will only sting to defend itself.

As the bee became a herbivore, or plant-eater, its mouth began to change. Its tongue grew longer to help it dig deep for the nectar hidden in flowers. It also began growing a thick coat of hair to trap pollen. Pollen is useful for fertilising plants. It's also a great source of food for both adult and young bees.



A bee seals a honeycomb with wax

Making honey

The honey bee also has a special honey-making stomach called a crop. This is where the bee stores the nectar that it gathers from flowers. It's the sugar in the nectar that the bee turns into delicious honey.

When the **foraging*** honey bee has collected nectar from a flower and placed it in its crop, a process in the bee's stomach turns the sugar in the nectar into honey. Then the forager bee returns to the hive and transfers the honey to the hive bees.

There, the hive bees remove the water in the nectar. To do this, they spread the nectar across their tongues and poke out their tongues to dry the honey in the warm air. When the honey has dried out enough, the bees pop it into a honeycomb cell.

*foraging honey bee – a female worker bee searching for nectar



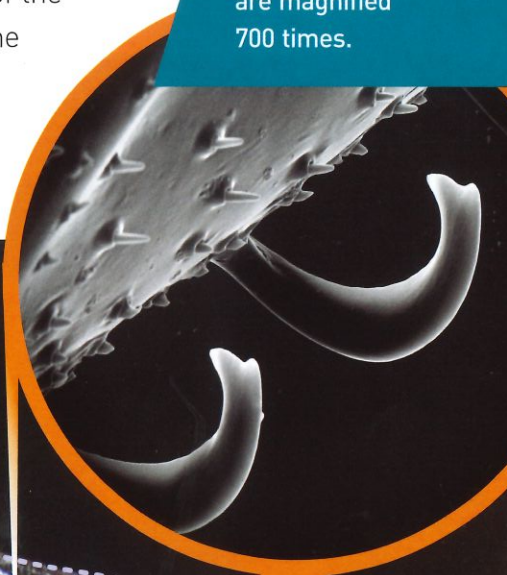
Looking after the hive

But the hive bees don't just spend their days sitting around with their tongues hanging out. They have the important role of looking after the hive and the queen bee. They build the honeycomb and defend the hive. They feed the larvae and the queen. They keep all the cells in the hive tidy, repair any damage, and make sure that the hive is at just the right temperature. They do this by vibrating their muscles to warm it up or by spreading water around and fanning their wings to cool it down. Whew, their days are busy!

Every member of a honey bee colony is so busy and so important to that colony that the bees will change jobs if needed. This is one of the amazing things about the honey bee. If the hive bees have too much nectar to work on, some of the forager bees will come and help them. And if the forager bees aren't able to find enough nectar and pollen, some of the hive bees will stop their work in the hive to head out and search for more. What a team!

Bees have two pairs of membrane wings. When they fly, a row of tiny hooks joins the back wing to the front wing on each side of the body. This gives the bee much more control and helps it fly fast.

These wing hooks are magnified 700 times.



back wing

front wing



Working for the bee team

There are two types of bee: the solitary bee and the social bee, and most of the 20000 different species of bee in the world are solitary bees. Solitary bees live alone. They don't make honey, but they are still important because they help pollinate plants.

Social bees live in groups or colonies. Honey bees and bumble bees are both species of social bee. The honey bee colony is the only one that can survive the winter. The honey bee is also the only bee that makes more honey than it needs and stores it in hives. That's why we are able to eat its honey.

Social bees swarm around their hive.

A solitary bee gathers nectar.



MIND YOUR OWN BEESWAX

Most people know that honey is tasty and good for us, but the wax that the honey bee produces is also important.

Honey bees "sweat" the wax from glands on their stomachs. It falls in tiny, white flakes, which the bees then

make into the honeycomb that they store honey in.

Beeswax is almost indestructible. Pieces of beeswax have been found in tombs that are thousands of years old and in ancient shipwrecks.

Beeswax is a good water repellent. We use it to waterproof all kinds of things, such as boots and bags.



Beeswax makes great candles.



Beeswax is used in ointments, cosmetics, dental floss, and furniture polishes.



Bringing in the bees

In New Zealand, we have 28 types of native bees and 13 species of imported bees. The most important bee import is the honey bee. In 1839, English missionaries brought two basket hives of honey bees across from Australia. They knew how useful the honey bee was in producing honey and wax and in pollinating their crops, and they didn't want to leave such a helpful worker behind.

BUMBLE BEES

In 1885 and 1906, four types of bumble bees were introduced from England. People needed the bumble bee to pollinate the red clover that cattle eat. The honey bee was great for pollinating the small white clover, but its tongue was too short for the larger, red clover. Only the long tongue of the bumble bee could reach far enough. The honey bee's tongue is about 6.5 millimetres long (that's about as long as your little finger nail), while the bumble bee's tongue can be 8–16 millimetres long.

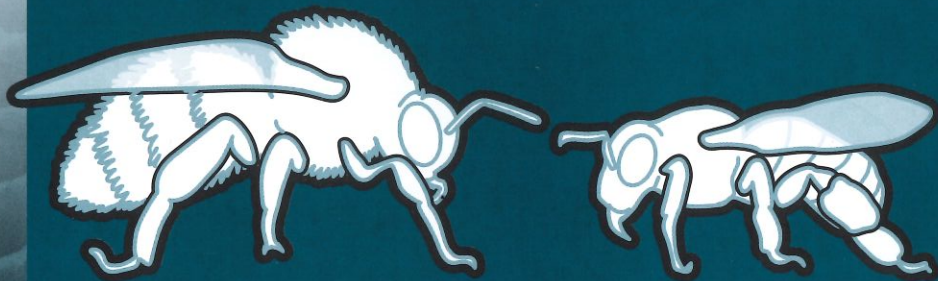
It's easy to spot a bumble bee. It's a big bee (about twice as big as the honey bee), and it's furry and makes a loud buzzing sound as it flies. It's also an impressive worker.



It will start foraging for pollen and nectar much earlier in the day than the honey bee. It needs to. Unlike the honey bee, the bumble bee doesn't let other members of its hive know where it has found food. It doesn't seem to have any kind of language. That's one of the reasons we're not eating bumble bee honey today. The bumble bee only produces enough honey to feed itself, its queen, and its young.

Worker bumble bee

Worker honey bee



Average body size = 19–38 mm	↔	Average body size = 5–15 mm
Smooth back legs	↔	Hairy back legs with pollen baskets
Can give multiple stings	↔	Can only give one sting
Average lifespan = 1 year	↔	Average lifespan = 6 weeks

BUSY BEES!

Each year, New Zealanders eat about 2 kilograms of honey per person. That's one of the highest honey-eating rates in the world. But a lot of bee-work goes into that teaspoon of honey on your toast.

The average lifespan of a worker bee is 6 weeks. The worker bee doesn't sleep during this time. Over the course of her life, she will create about $\frac{1}{12}$ of a teaspoon of honey.

A worker bee makes about 10 trips per day. An average trip is about 2 kilometres. She visits 50–100 flowers on each trip.

- ▶ How many bee-lives does it take to make a teaspoon of honey?
- ▶ How many trips does a worker bee make a week? How many in her lifetime?
- ▶ What distance does she travel over a day? A week? Her life?
- ▶ How many flowers does she visit in a day? A week? Her life?



SUPER CHALLENGE

Meg has a teaspoon of honey in her chocolate drink. About how many flowers were visited to make that teaspoon of honey?

