

Wildlife Express

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BEEES OF IDAHO

**BROAD-BANDED
LONGHORN**
Svastra petulca

Broad-Banded Longhorn Bee photo
CCBY USGS Bee Inventory

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Native & Non-native
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What is pollination?



idfg.idaho.gov

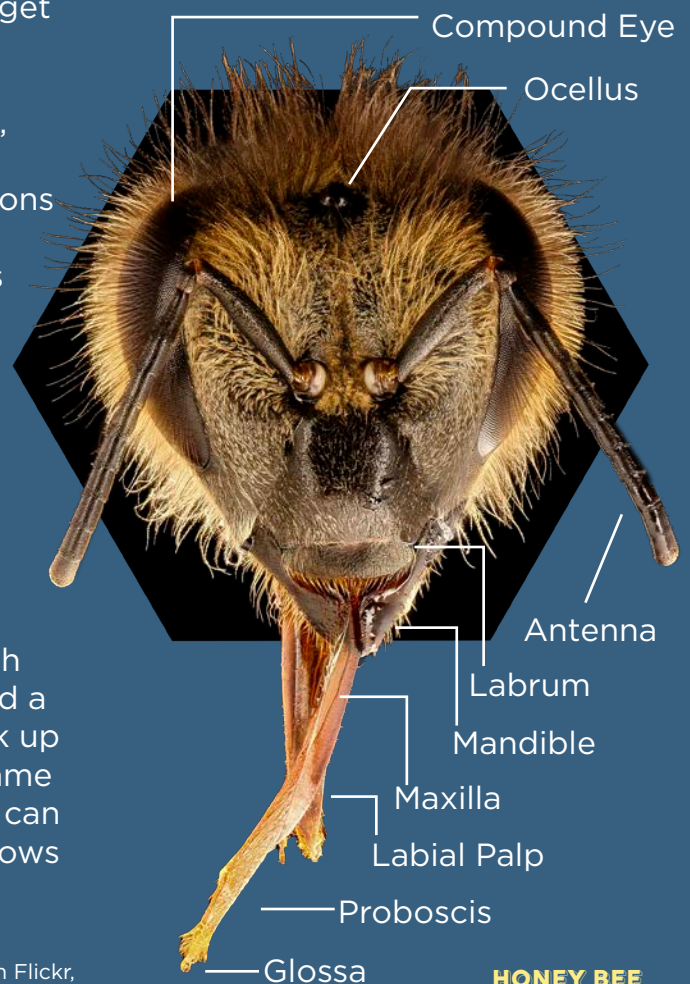
WHAT MAKES A BEE A BEE?



Bees are awesome! One out of three bites of food you eat wouldn't be here without bees. Bees help make fruits and vegetables when they pollinate flowers and don't forget honey!

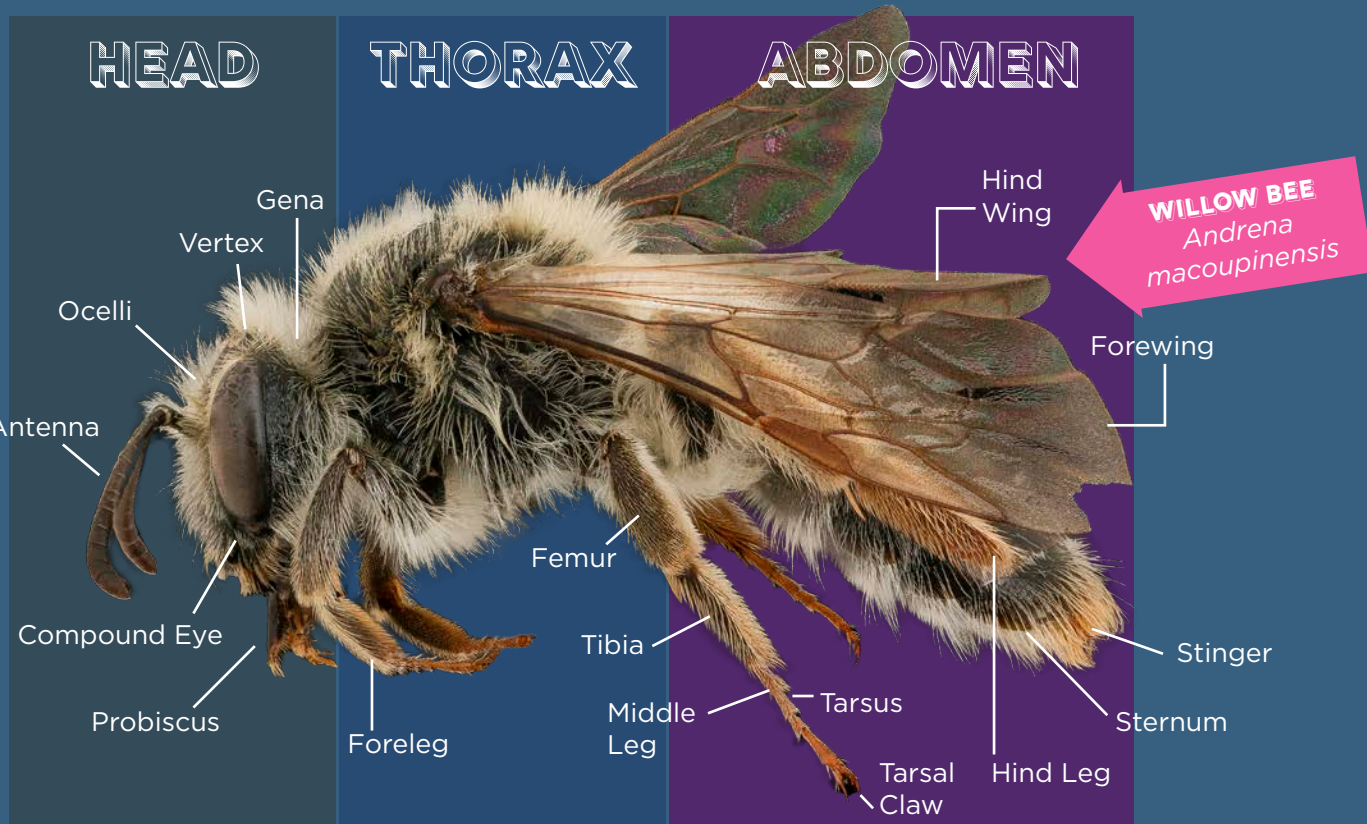
Bees are insects. Instead of a backbone like we have, insects have **exoskeletons** or "outside" skeletons. Exoskeletons are a bit like your fingernails. Exoskeletons are covered with hairs. The hairs help bees collect pollen, feel things, and keep their body temperatures controlled. Bees are cold-blooded. Their body temperatures are the same as their surroundings.

Bees have three parts to their bodies, the head, thorax and abdomen. Compound eyes, antennae, and mouthparts can be found on their heads. The eyes contain multiple lenses and are useful for identifying nectar producing plants. Bees have amazing mouthparts. Most insects have mouths that are made to chew or to suck liquids. Bees have mouth parts that do both! **Mandibles** help them to chew, and a **proboscis** (prow-BAA-skis) acts like a tongue to suck up nectar. A bee's brain is small, about the size of a sesame seed, but amazingly skillful! Some studies show they can remember colors and landmarks. One study even shows they can count!



Photos top to bottom:
Honey and fruit photos stock from Freepik, honey bee CCBY Sandy Sarsfield on Flickr,
Head of Honey Bee CCBY USGS Bee Inventory.

HONEY BEE
Apis mellifera



On the thorax, or middle section, you will find three pairs of jointed legs and two sets of wings. Some bees have a pollen basket near their hind legs which help them carry more pollen. Bees' legs have claws and are sticky. The claws and stickiness help bees grip into things and help with landings. Four wings are used for flying, as you guessed.

The last segment is the abdomen.

It contains the things needed for digestion and reproduction. In females, it also contains a stinger!

There are about 20,000 species of bees around the world. The largest bee in the world is the Wallace's giant bee. It lives in Indonesia. This huge bee has a body that is four centimeters long; its wingspan is six centimeters. That would be like a walnut with wings the size of an adult's thumb flying at you! Thank goodness it is a gentle bee. There is a bit of a battle for the smallest bee. The *Perdita minima* is found in the United States in the Sonoran Desert. It is a little less than two millimeters long. That is about the thickness of a penny! It is hard to even see this bee. The Quasihesma bees in Australia are about the same size.



The next time you see a bee buzzing around, think about all that makes it a bee! Can you see their different body parts?

Photos top to bottom:

Willow Bee CCBY USGS Bee Inventory, Wallace's Giant Bee CCBY Dr. Heinrich Friese 1860, stock images derivative MK Johnson for IDFG, *Perdita ocomaculata* CCBY The Packer Lab on Wikipedia.

Native & Non-native



SPOTTED NOMAD BEE
Nomada maculata

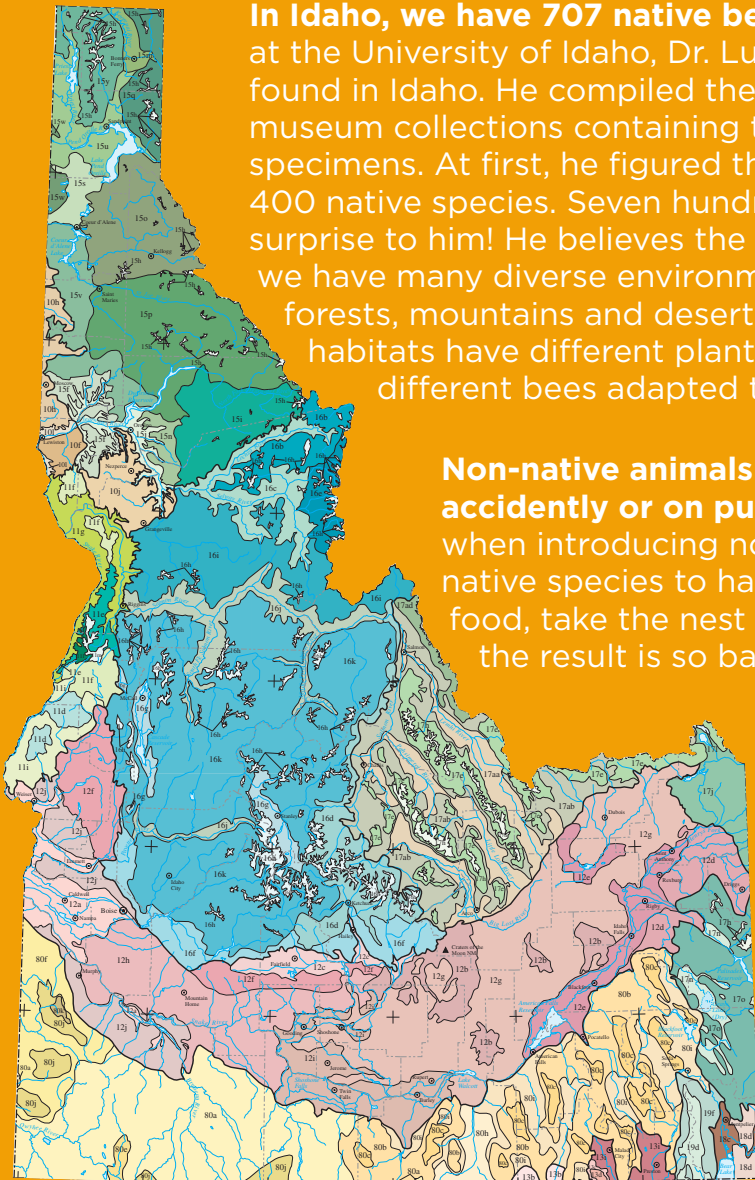
You may have heard the words native and non-native. Perhaps you haven't thought about what they mean, or how these words may impact the environment. When it comes to bees, there's a lot to think about! Native animals are animals that are found naturally in an area. They are adapted to the places they live and have important jobs in their habitats.

In Idaho, we have 707 native bee species! A scientist at the University of Idaho, Dr. Luc LaBlanc, tallied bees found in Idaho. He compiled the number from three museum collections containing thousands of unique specimens. At first, he figured there would be about 400 native species. Seven hundred seven came as a surprise to him! He believes the number is high because we have many diverse environments. We have prairies, forests, mountains and desert habitats! All of these habitats have different plants living in them and different bees adapted to those plants.



MASON BEE
Hoplitis fulgida

Non-native animals can be introduced to an area either accidentally or on purpose. Wildlife managers are very careful when introducing non-native species. They don't want the non-native species to harm the native species. They might eat all the food, take the nest sites, or even bring in a disease. Sometimes the result is so bad that native wildlife can no longer survive.



MINER BEE
Andrena illinoiensis

Honey bees are not native. They were introduced to the United States in the 17th century. Settlers realized raising bees for honey was easier than trying to gather it in the wild.

Problems that affect honey bees can also hurt native bees. People often notice when honey bees are declining in number or being harmed in some way. Honey bees are easier to see in their manmade hives. Native bees are harder to find and most live alone. This makes studying them challenging. A lot of resources have been put toward protecting “bee populations.” Many are declining, and some native bees are in more trouble than non-native bees.

Native bees are often the best pollinators for native plants. Both have adapted to each other. The plant’s flowers are the perfect shape for the bees, and bees have the perfect body designs and techniques for the flowers. To pollinate cherry trees, it takes just ten mason bees to do the work of 60 honey bees. Now there is some native bee power!



Solitary Bees

Solitary bees are lone bees. They do not belong to a colony or hive. Ninety percent of bee species are solitary.

A solitary bee has so much to do! There is no help with the jobs of pollinating and reproducing. A female solitary bee does all of the work by herself. She will have to find a good location to build a nest and lay her eggs. She collects all the food (pollen and nectar) and gathers building materials, such as mud, leaves and debris for a nest. Each egg is laid separately in a "cell" along with a bit of pollen and nectar. When the cell or tube is full, she closes it off and moves on to the next cell. She will eventually lay 20-30 eggs. Once done, the solitary bee does not provide care for the nest. As a matter of fact, shortly after laying the eggs, the female dies.

The eggs hatch into larvae. They stay in the cell and eat the pollen and nectar left by the female. Then they turn into pupae and make a "cocoon" around themselves. They will hibernate for nearly 11 months. The following spring, they hatch as adult bees. Male bees are the first to appear and are ready to mate with the females as they come out of the nest. Males die shortly after mating. For four to six weeks, females do their important jobs of building nests and laying eggs. This allows the cycle to start again.

Solitary bees fly around by themselves and are pretty harmless. Only the female has a stinger, but she doesn't prefer to use it. They will only sting when they feel trapped or threatened.

Some types of solitary bees found in Idaho are mason bees, leafcutter bees, digger bees and cellophane bees. Why do you think they're called cellophane bees? Research it!

Solitary bees are very interesting to watch. You can see them regularly in your garden busying about, pollinating flowers and looking very efficient. Providing nest boxes for solitary bees has become popular for gardeners because they are fun to observe and great to have around the garden.



DIGGER BEE
Habropoda excellens



DIGGER BEE
Habropoda excellens

Photos top to bottom:

Digger Bee CCBY Utah USGS DOI, Solitary bee house CCBY Robert Engelhardt on Wikipedia, Baby bees in cellophane CCBY Rob Cruickshank on Flickr, Digger bee CCBY USGS DOI.

Social Bees

Social bees are bees that live with other bees in a hive. The hive contains the queen bee and worker bees. The hive is similar to a well-run community.

Bumble bees are one of the few native bees that are social. Bumble bee hives are started each spring by a queen bee. The new queen has to start the colony on her own. She locates a nest site and builds a "honey pot." She gets busy collecting pollen and laying eggs in cells. The queen has to care for the young until there are bees old enough to take over the job. She even will sit on her eggs to keep them warm! The duties of collecting pollen and caring for eggs and larvae will be assigned to worker bees when they are old enough. The queen's new job is to only lay eggs. The queen will not live through the winter. Some of her eggs become a new generation of queens. They emerge from the nest in the fall and breed. Then they must find a place to hibernate until the next spring when they will build their own nest.



BUMBLE BEE
Bombus huntii

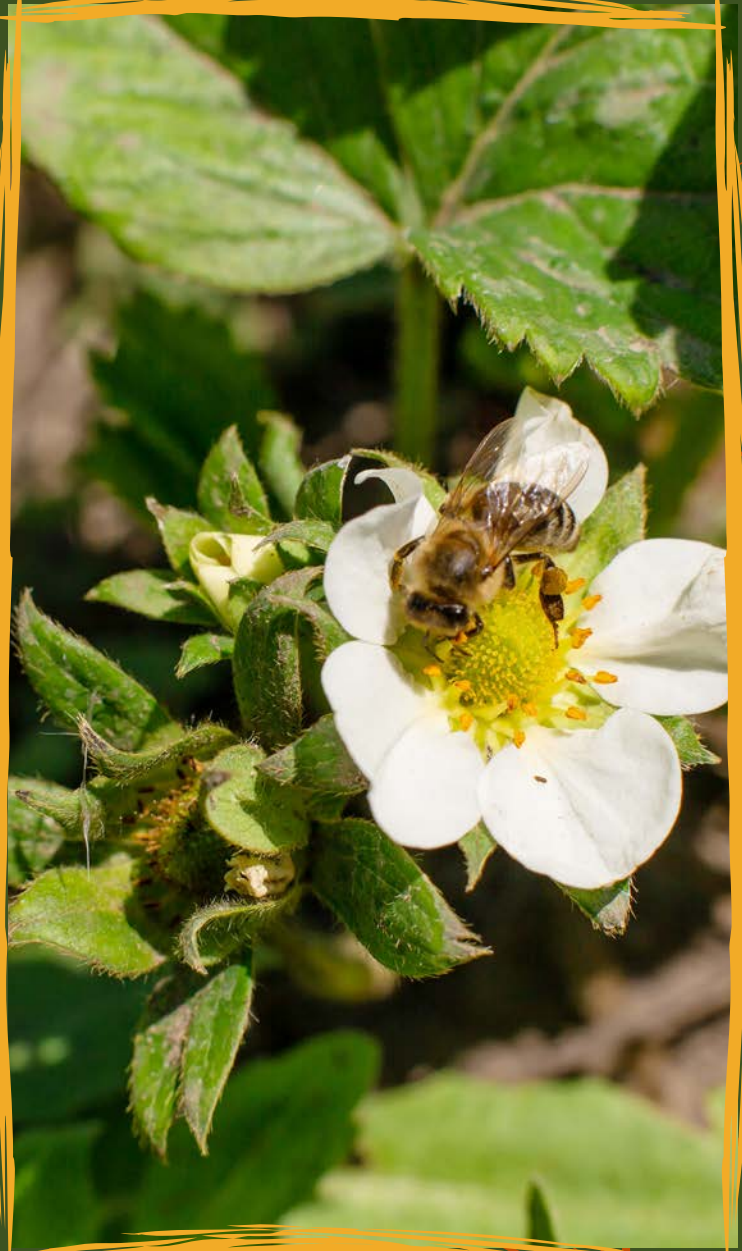


Photos top to bottom:
Bumble bee CCBY USGS
Bee Lab, Bee Life Cycle
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The social structure of the bumble bee hive is simple. A female larva becomes either a worker or a future queen simply by which food it is fed. There seems to be a “magic” ingredient in the bee barf they are fed. If you’re really interested in this, watch this video link. [How does bumblebee barf create a queen? | The Kid Should See This](#) Bumble bees do not have a system to share the location of food and other information with members of the hive. Honey bees have a special “waggle dance” they use to share information. [Click here to see a video available from Smithsonian Magazine online.](#)

Bumble bees can function at cooler temperatures than other bees. They are often the first pollinators to emerge in the spring. Bumble bees have a unique way of pollinating some plants. Tomatoes, peppers, potatoes, strawberries and blueberries are difficult to pollinate because of their unique shape. Thankfully, buzz pollination works for them! Bumble bees grab on to flowers with their mouths and beat their wings rapidly. This creates a vibration. This “buzz pollination” shakes the pollen free, so it can be transferred between the flowers. Look for bumble bee hives in areas where there are a lot of native flowers for the bees to gather pollen and nectar.



Hives are normally underground in mouse tunnels or tree cavities, making them hard to observe.

Photos top to bottom:
Bee on strawberry from Freepik,
Bumblebee Nest CCBY Christa R. on
Flickr.

Citizen Science

Have you ever thought about becoming a scientist? What a great job that would be - researching and solving problems to make the world a better place! Scientists ask questions and discover answers that may save a species from becoming extinct or cure a disease. How do scientists do this? They research and test! This can be a very demanding job. Often it is impossible to do on their own.

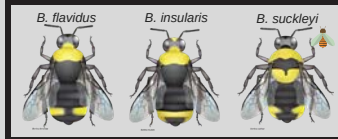
Citizen Science to the rescue! Citizen Science uses everyday people to gather scientific information. Scientists that need help with a project teach interested people how to gather the information they need. Volunteers, called citizen scientists, observe, record and collect data for the project. The information is then given to the scientists to analyze and interpret.

There is a Citizen Science project going on right now called The Pacific Northwest Bumble Bee Atlas Project. This project is designed to help biologists map the bumble bee population in the Northwest. Groups are working together to train people to look for bumble bees! When volunteers find a bumble bee, they take a picture of it. The pictures are uploaded to a website called Bumble Bee Watch.

Why are they doing this? Biologists in the northwest have seen steep declines in many bumble bee species. Biologists need a better understanding of how many bumble bees there are and where they are found. Volunteers help them cover more area during different times. This gives the biologists more information than they could collect on their own. If you know someone who is interested in helping, here is the website. [PNW Bumble Bee Atlas - PNW Bumble Bee Atlas](#). A volunteer has to be 18 years-old or older. If you are under 18, you could partner with an adult. Biologists hope this project will offer a better snapshot of how bee populations are doing and where conservation work might be needed to preserve them.



Cuckoo Bumble bees

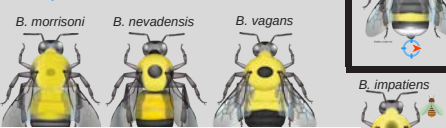
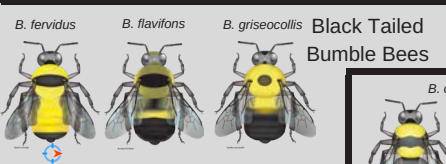
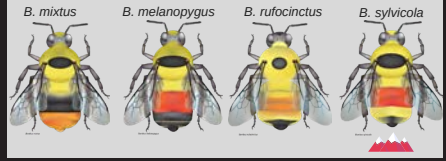
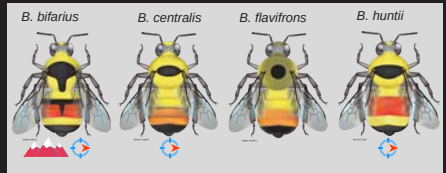


Striped Bumble Bees

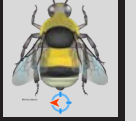
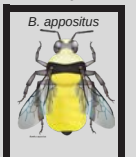


PNW Bumble Bees (*Bombus* spp.) - Females

Red on the Body?



White on the body?



BUMBLE BEE
Bombus huntii





A SWEAT BEE

Agapostemon coloradinus

Importance & Benefits of Bees

Bees have a huge impact on the world and often they are underappreciated. Our lives would be much different if they didn't exist. They are some of the hardest working creatures on the planet and are excellent at what they do!

Bees pollinate nearly one-third of the world's food supply. If it weren't for them, we would not have as many selections of food. Bees pollinate things like tomatoes (think pizza and spaghetti), almonds, peaches, most berries, apples, avocados, broccoli, cauliflower, and so much more! Bees also pollinate alfalfa, which cows eat. We get milk from cows, and we eat beef. As you can see, bees are quite important for our survival. We can't forget either, that bees are responsible for creating the honey we love so much on our toast!

Bees also pollinate flowers that create habitats for us and for wild animals. We enjoy landscapes we create using flowers that bees pollinate. We are fortunate they work for free! Let's give them a hand!

Photos top to bottom:
Colorado Striped Sweat Bee
CCBY USGS Bee Inventory,
Fruit and food photos stock
images from Freepik.

TRANSFORMERS!

bee eggs

pupa

adult

larva

Pupae of drones (honeybee). Here we see drones in various stages of development. On the left, a stretched prepupa (age 11 to 14 days from the egg being laid). At this stage the cell is already capped. After 14 days, the prepupa has shed its skin, and the final form of the bee can be seen. At first, it is all white (second from left). Later it starts to gain color, first with the eye, then the whole pupa. The developing bee remains as a pupa from 15 days after the egg being laid until day 24. In the background is a foundation wall of wax imprinted with cells for the workers.

A bee starts out as an egg, then a worm-like creature and ends up a flying insect that pollinates our food! A bee goes through a complete metamorphosis. There are four stages in their life cycle – egg, larva, pupa and adult. All bees, solitary and social, go through these stages. The difference is that social bees are taken care of by others in the hive. They are tended to during the first three stages of their life. Solitary bees hatch and eat the pollen the female left for them. No other bees are around to care for solitary bees.

After hatching from an egg, the larva does little besides eating and molting. As they grow, they shed their skin. Some larva will grow up to 1500 times their original size before forming a pupa. A pupa spins a cocoon around itself. During this stage, the bee does not feed. Inside the cocoon the adult is taking shape. Once developed, the adult emerges.

In most solitary species, males emerge first and wait for the females to come out. All female solitary bees are fertile and ready to mate upon emerging. In social bees, only the queen is fertile.

WHAT IS POLLINATION?

Pollen, a powdery substance produced by plants, is found on the *anther* or male part of the plant. It has to be transferred to the female part of the plant called the stigma. The transfer has to happen for the plant to mix genes and produce a seed.

It can be difficult to get pollen from the anther to the stigma without help.

Wind, bees, bats and birds can help move pollen.

When bees land on a flower, pollen sticks to hairs on their legs and body. As bees visit different flowers, some pollen drops off and lands on the new flower's stigma. This fertilizes it producing a fruit containing seeds. Bees do not do this intentionally. Honey bees are mostly about gathering nectar, their food source.

Some bees, like the bumble bee, are master pollinators because of their shape, size and the hairs on their bodies. They are able to get far into the plant and can carry a lot of pollen to the next plant or back to their nests. Bumble bee larvae are mainly fed pollen. Bumble bees actively collect pollen, not nectar.

Science has found that bees impact plants in many ways. When pollination is high, fruits look better and taste better. Plants also produce more fruit.

The next time you see a flower, take a look inside. Can you see the flower parts used in pollination?

Photos top to bottom: Edamame Soybean Blossoms CCBY USGS Bee Survey, Cedar bursting with pollen CCBY Andy Heatwole on Flickr, Pollination in action CCBY Ruth Hartnup on Flickr, Rocky Mountain Beeplant CCBY USFWS Mountain Prairie on Flickr, Blazing Star, Idaho Desert Wildflower CCBY Linda Fortuna on Flickr, *Melissodes rivalis* CCBY USGS Bee Survey.

**RIVAL LONG-
HORNED BEE**
Melissodes rivalis



"BEE" OUTSIDE!

WHAT CAN YOU DO TO HELP BEES?

If hearing that bees are declining is sad for you, there are many things you can do. Step up and do your part! Read on for inspiration.

Different organizations offer campaigns for saving bees. Most focus on four similar ideas. The first, which is very important, is to learn about the environment around you. Read, watch, listen and learn all you can about bees. Then go tell people what you know!

The second is to grow pollinator friendly flowers. Research and learn about plants. There are many websites to help you decide what and where to plant. Some bees, like the mason bee, starts to look for food as early as mid-March. Other bees live the active part of their lifecycle later in the fall. So having a collection of flowers that bloom continuously from spring to fall is important.

The third thing you can do is protect and offer bee nesting sites. When planning a garden, know that not every bit of ground needs to be planted. Offer a location of dry, undisturbed soil for bees that nest in the ground. Old hollow stems of plants you've pruned can also offer safe nesting areas. Other nesting sites you can provide are bee houses. Do your research as to what kinds are appropriate. Some are designed just for decoration and do not offer the right sized holes. Also research the best location to set it up.

If you live in an area where others see your garden, be sure to place a sign to let neighbors know that you're providing a safe place for pollinators. Remember, you're sharing the word. They might catch on and plant a garden, too!

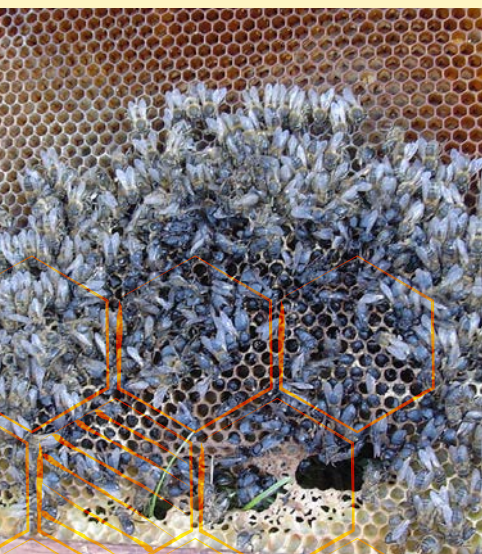
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Nest on Wikimedia Commons.



A fourth, and extremely important thing, is to avoid using dangerous pesticides and insecticides. Know what you're putting on your plants! **Neonicotinoids** (Nee-o-NI-ke-te-noids) are a class of chemicals that are designed to poison the sap and nectar of plants. Pests that feed on the plants are poisoned. Guess what? Helpful bees are also poisoned and killed! Many of us know not to buy pest control products that contain neonicotinoids. People may not know, however, that stores sometimes treat plants with neonicotinoids before selling them. Plants can remain poisonous to bees for months or even years with this pretreatment.

Instead of pesticides:

- Grow from seeds when you can.
- Purchase organic or from a store that is upfront and guarantees that plants are not treated with chemicals that kill bees.
- Instead of chemical pesticides, try natural methods of pest control.
- Bird and ladybug boxes may help with some of the pests.
- Spray aphids with water to get rid of them.



One thing to remember is we never grew food or plants without bees, but we did grow plants without pesticides.

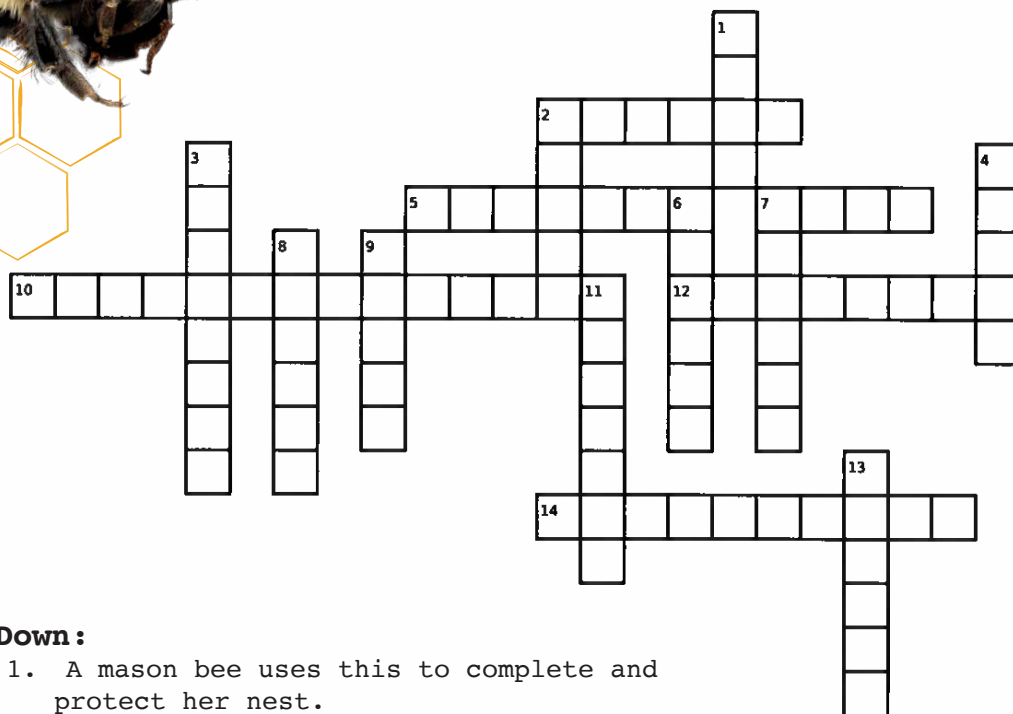
Our positive actions will help to preserve native bees and non-native honey bees. It's important to join in and do what you can to help!



Photos top to bottom:
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Dead bees CCBY Emmanuel Boutet on
Wikipedia, Bee in apple blossom from Freepik.

BEE SMART

Find these words associated with bees.



Word Bank

bumble
clay
cellophane
third
solitary
complete
neonicotinoids
thorax
citizen
native
buzz
stinger
wings
pollen
nectar
honey



Down:

1. A mason bee uses this to complete and protect her nest.
2. One _____ of our food supply is supported through bee pollination.
3. This bee does not belong to a colony or hive.
4. These bees were introduced to our country in the 17th century.
6. This is a sugar-rich liquid produced by plants. Bees drink it.
7. This type of bee is one of the few native social bees found in Idaho.
8. Bees move this from flower to flower. It is also a food source.
9. A bee has two sets of _____.
11. A female bee uses this to protect herself when threatened. Males do not have one.
13. There are 707 _____ species of bees found in Idaho.

Across:

2. The middle part of the bee that contains the wings and legs is called this.
5. _____ science is used to help scientists gather important information.
7. A bumble bee uses this special "vibrating" kind of pollination.
10. These are chemicals used to kill off unwanted pests. Unfortunately it kills bees too.
12. Bees go through four stages of life, or a _____ metamorphosis.
14. This native bee produces a waterproof material to protect her nest. It resembles clear plastic.

Wildlife Express

Honeycomb illustration CCBY Mary K Johnson for IDFG,
Bumble bee CCBY USGS Bee Lab, *Melissodes rivalis* CCBY
USGS Bee Survey.

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WE WOULD LIKE TO HEAR FROM YOU!

If you have a letter, poem or question for Wildlife Express, it may be included in a future issue! Send it to:

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or

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