

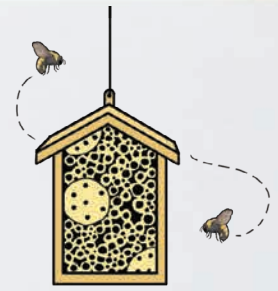


Explore the Bees of Oregon

and how they help make our food



Hello! My name is Josh, and my family has a food truck! Every weekday, 14 we sell great tasting lunches to customers from our truck. My little sister, 27 Jocelyn, and I help our parents. We work in our garden to grow many of 42 the foods we need for ingredients. We also help order the foods we don't 56 grow. Jocelyn and I go to school during the day. We help when there is no 72 school and on the weekends. It's hard work but we all love it. 85



My bee home!

Do you have a favorite meal? Jocelyn and I have different favorites. We couldn't make 100 any of them without local farmers and animals like chickens, cows and pigs. Maybe the 115 most important helpers of all are . . . bees! That's right! Bees pollinate clover for cows to 130 eat—you will learn what the word **pollinate** means later! Then the cows give us milk and 147 meat. Bees also help plants grow fruits like berries, cherries, apples, peaches, pears, plums 161 and watermelons. We use fruit in the smoothies and salsas we make in our food truck. All 178 our lunches include vegetables. We grow many of our own vegetables from seeds. Bees 192 pollinate our vegetable plants. The vegetable we use the most is onions. Guess what? 206 Without bees to pollinate onion flowers, we wouldn't have seeds to grow onions. 219

Do you like math? It's my favorite subject in school, but sometimes I need help. We have a 237 lot of customers, so we make a lot of food! Sometimes we have to double or triple 254 the ingredients in our recipes! My family asks me to figure out the right 268 amounts to practice my math. Sometimes we run out of an ingredient. When 281 that happens, I have to figure out how much of a different ingredient to use. 296 This book has the eight most popular recipes we use for our food truck. 310 I hope you can help me with some math for each recipe! 322

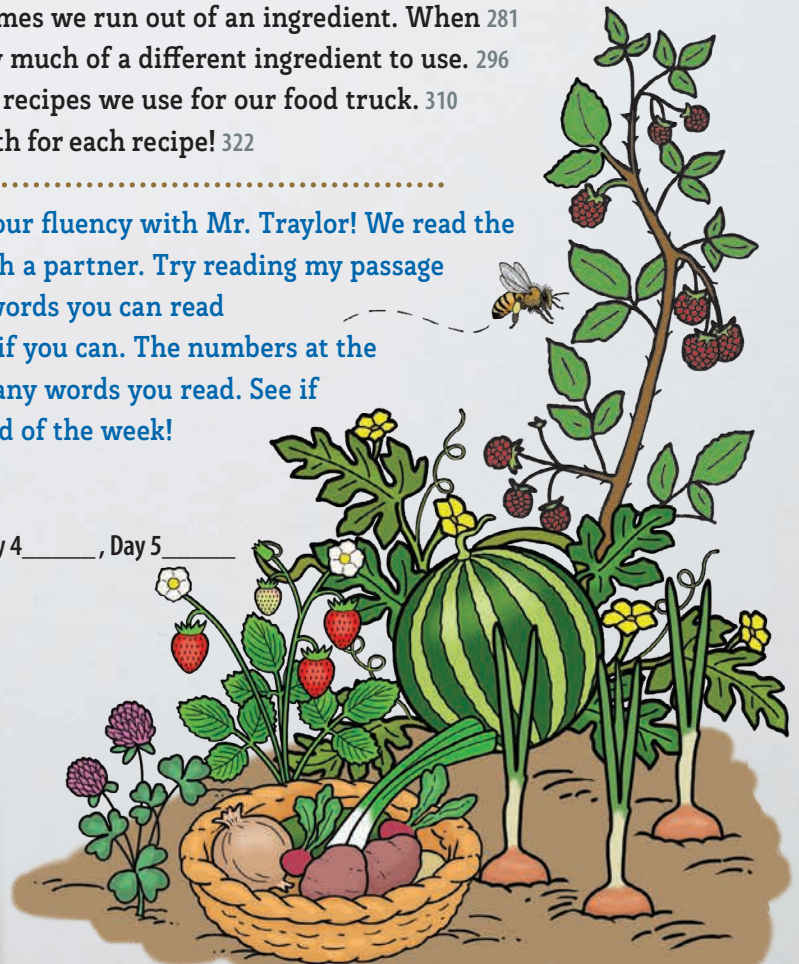
.....
In reading this year, we are building our fluency with Mr. Traylor! We read the same passage each day for a week with a partner. Try reading my passage above out loud and track how many words you can read correctly in a minute. Find a partner if you can. The numbers at the end of the lines are a guide to how many words you read. See if you can improve your score by the end of the week!

Fluency Tracker

Day 1 _____, Day 2 _____, Day 3 _____, Day 4 _____, Day 5 _____

What do you want to know about bees and how they help make our food?

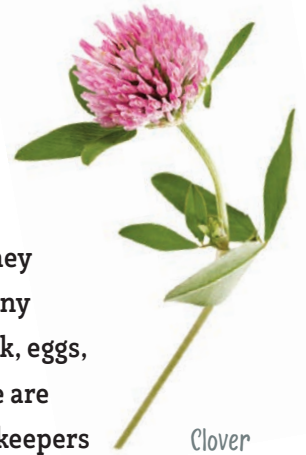
In this book you can learn more! Visit this link: www.foodhero.org/bees for a video that brings the book to life!



What Bees Do for Us



Honey Bee



Clover

Next time you take a bite out of an apple or eat a tasty berry, thank a bee!

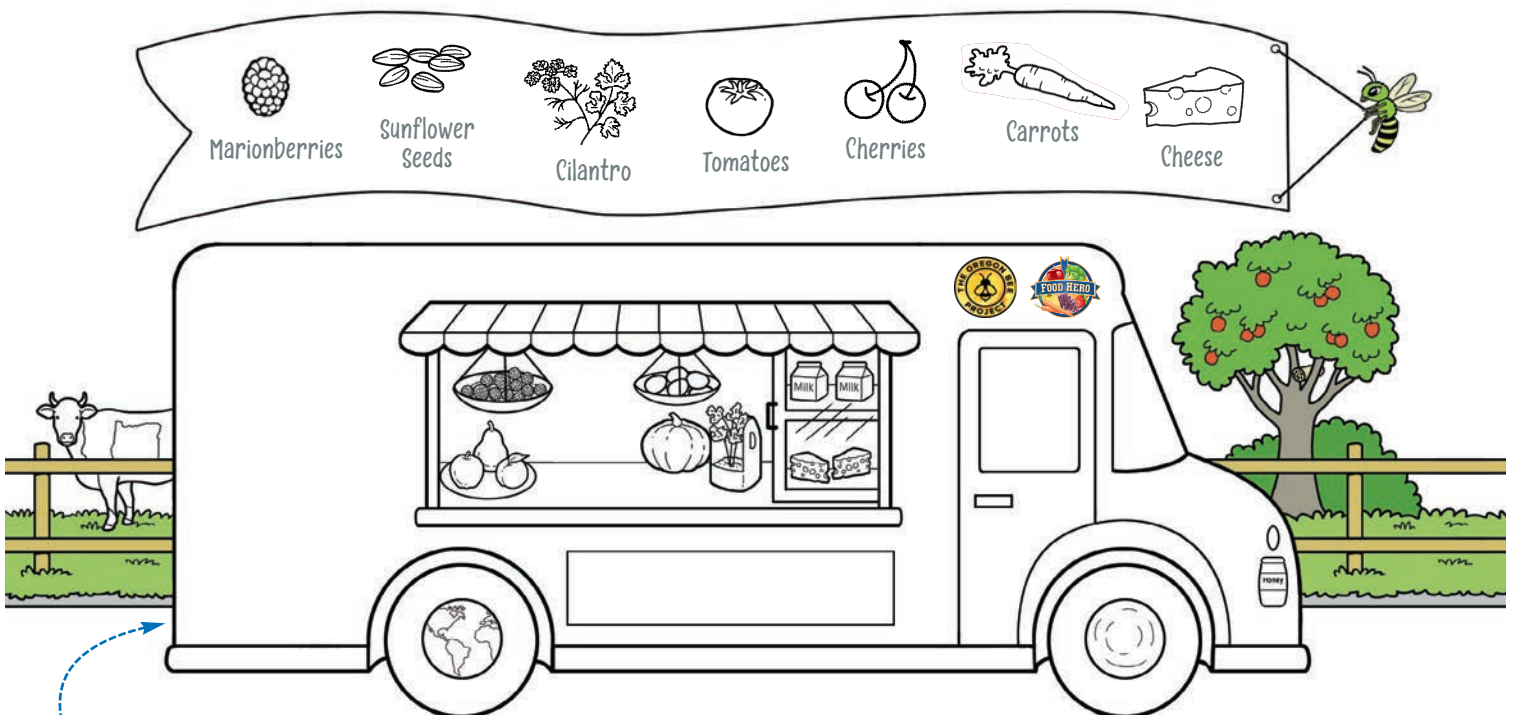
Bees are a very important group of insects that help make some of our favorite foods. How do they do this? By spreading pollen from flower to flower. This is called **pollination**. Bees pollinate many different crops, including types of fruits, vegetables, nuts and seeds. Bees also help produce milk, eggs, cheese and meat—we'll explain how later in this book. Many of the crops Oregon bees pollinate are grown in the state of Oregon, but crops in other states rely on Oregon bees, too! Every year, beekeepers from Oregon bring their bees to other states to help pollinate their crops. For instance, they bring honey-bee hives to California to pollinate the almonds that are grown there.

In Oregon there are over 780 species (types) of bees, 4,000 in the United States and 20,000 in the world! In this book, you will get to know eight of the bee species in Oregon. You'll learn why they are so important to farmers, gardeners and other people across Oregon, the United States and around the world.

Bees help farmers grow 1/3 of the foods we eat! That's like 1 in every 3 bites!

Color in the foods shown below that you like best. Why do you like these foods?

I like these foods because _____



Help Jocelyn and Josh and their family design and name their new food truck!

They want their customers to know that bees help make everything they sell.

Why do bees visit flowers? To collect pollen and nectar to feed themselves and their **offspring** (babies). When bees go in search of pollen and nectar, it is called **foraging**. Most bees collect and spread pollen as they forage. Pollen helps plants make seeds that grow into fruits we like to eat.

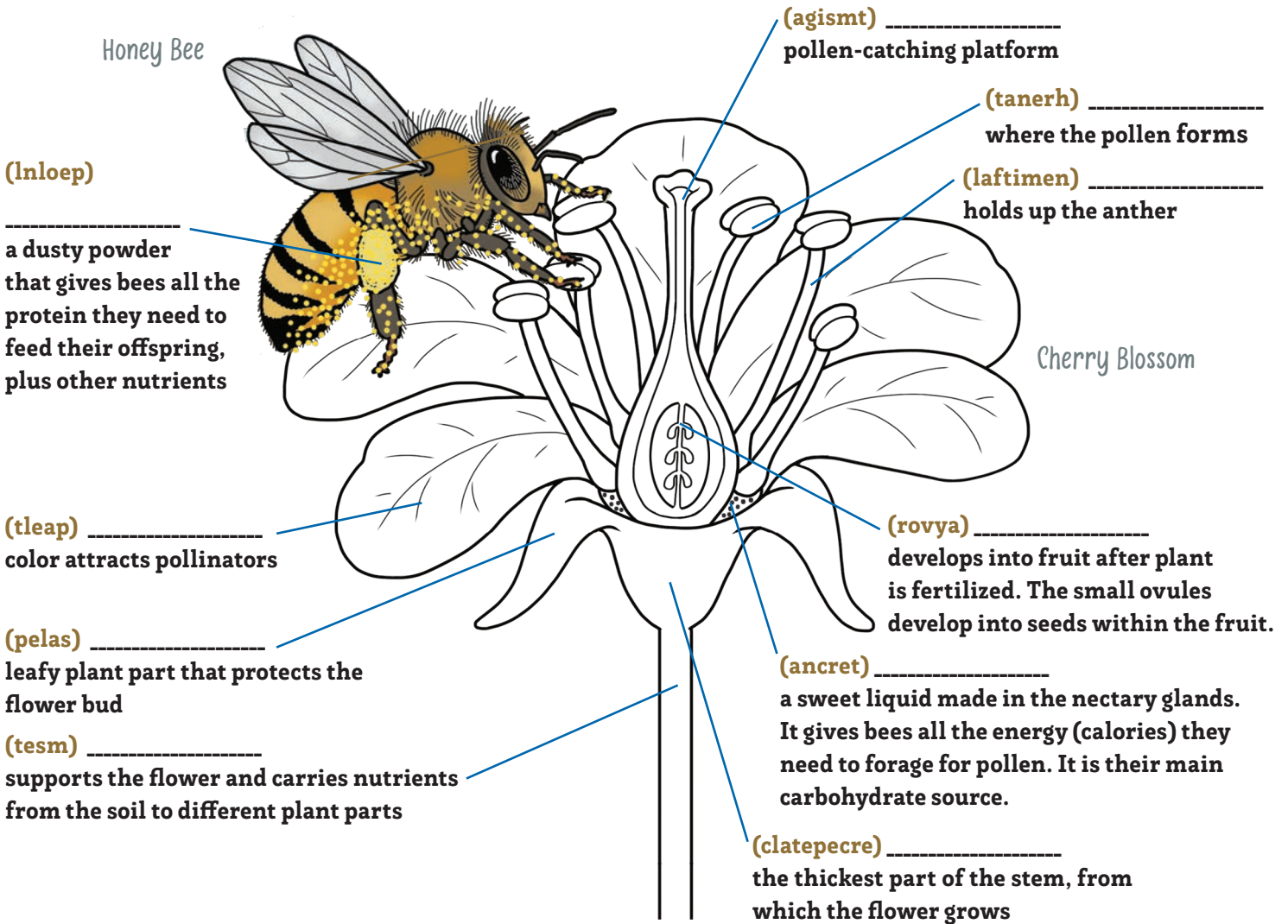
When bees forage, the fuzzy hairs on their bodies pick up and leave behind pollen. Bees often move pollen this way from one flower to another. Sometimes, the pollen from one flower makes it to the stigma of another flower of the same species. When that happens, the flower is **fertilized** and starts making seeds. Seeds are one of the ways plants make more plants (**reproduce**).

Pollination: How Does It Work?



Parts of a Flower

Unscramble the words to match the flower part with the definition. Color in the flower parts.



Word Bank:

- | | | | | |
|--------|------------|-------|--------|--------|
| Ovary | Receptacle | Petal | Stem | Pollen |
| Anther | Filament | Sepal | Stigma | Nectar |

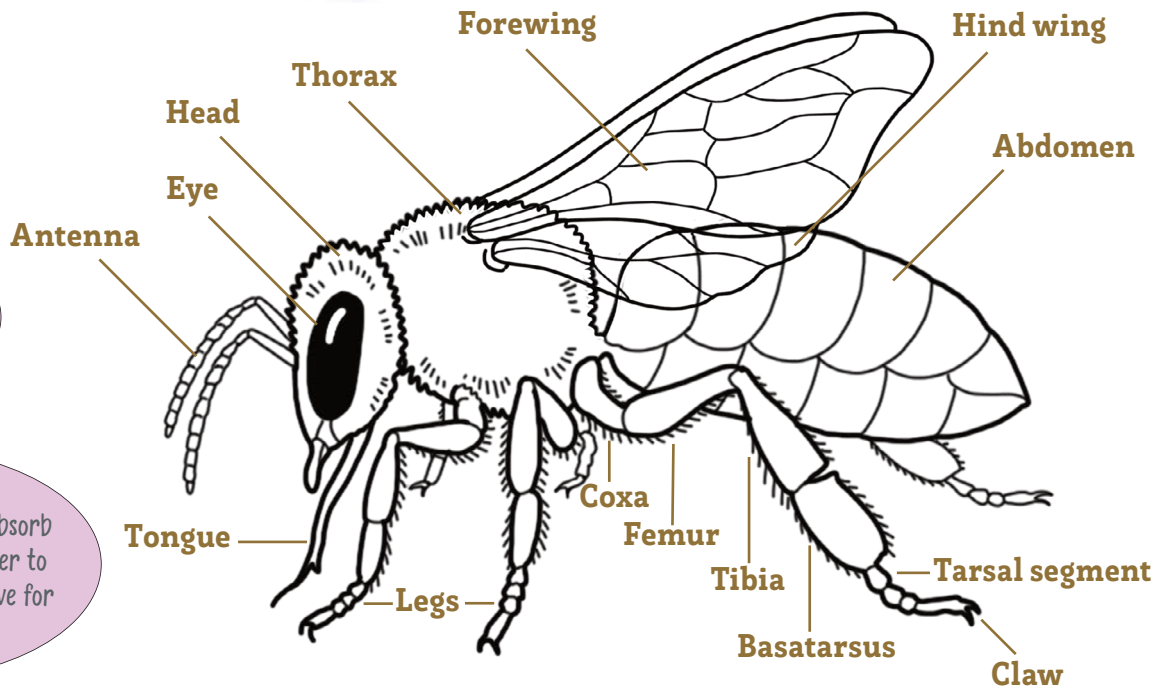
Parts of a Bee

Did you know? A bee is an animal known as an insect. Each type of bee is called a *species*. Scientists who study bees (*mellitologists*) use the parts of a bee to identify them. To help understand how alike or different they are, scientists put similar species together into a group called a *genus*. In this book, you'll learn about a few of the most common *genera* (plural of genus) in Oregon.

Honey Bee

All bees have 3 body segments (head, thorax, abdomen), 6 legs, and 4 wings.

Honey bees have two stomachs; one stomach to absorb and digest food and the other to carry nectar back to the hive for honey making.



Wings - A bee's wings beat so fast they make a buzzing sound! Their wings help them fly up, down, forward, backwards and sideways, and hover. Honey bees' wings beat over 200 times per second.

Legs - Bees use their legs for a lot more than walking. **Just the honey bee:** Their front legs have hairy brushes they use to push pollen toward their back legs and to clean their head and antennae. They use their middle legs to move flower parts and to push pollen on their upper body to their back legs. Then they use their back legs to pack pollen in their pollen baskets (see top of next page). When their baskets are full, they return to the nest. They use their middle legs to pass the pollen from their baskets to another worker in the hive.



Cuckoo Bee

Tongue - A bee's tongue (or *proboscis*) is a thin and hairy tube. It can reach into flowers to suck nectar out like a straw, lick up water and honey, and pass food to other bees. It also helps bees communicate!

Antennae - A bee's two antennae are connected to the brain and swivel in all directions. The tiny hairs on them respond to touch and smell.

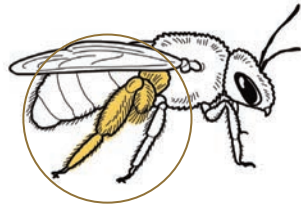
Bees are like super-athletes with body parts adapted to help them find flowers and collect pollen and nectar!

Eyes - Bees have five eyes! Their two big eyes (called *compound eyes*) have thousands of tiny lenses each. These eyes help bees find flowers by sensing differences in light, color and movement. Bees' three small eyes (called *ocelli*) detect brightness and intensity of light, not images, and are arranged in a triangle between the compound eyes.

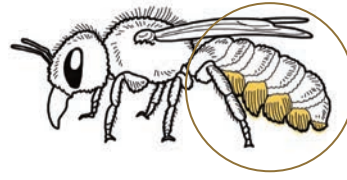
Three Different Types of Pollen-Carrying Structures:



- 1 **Corbicula**
(pollen basket)
Honey bee



- 2 **Scopa** (hairs
on back leg)
Mining bee



- 3 **Scopa** (hairs beneath
the abdomen)
Leafcutter bee



Bumble bee with pollen in a corbicula

Bees Make Healthy Food Acrostic Poem

What is it? An **acrostic** is a poem in which the first letter of each line spells out a word. Often, that word is the title of the poem. Here's an example:

Cherry

- C**ool-weather blossoms
- H**elped to grow by mason bees
- E**at cherries fresh or in fruit salad or parfait!
- R**uby red
- R**ipe in midsummer
- Y**ou can't eat just one!

Your Turn!

Try writing an acrostic poem about your favorite fruit or vegetable that bees help make! First write your title, in large letters, one letter at a time in the blocks on the side of the page. Use as many blocks as you need. Now write something you like about your fruit or vegetable or the bee that helps make it that begins with the letter at the start of each line.



Take a Closer Look: Bee Parts *and* Plant Parts

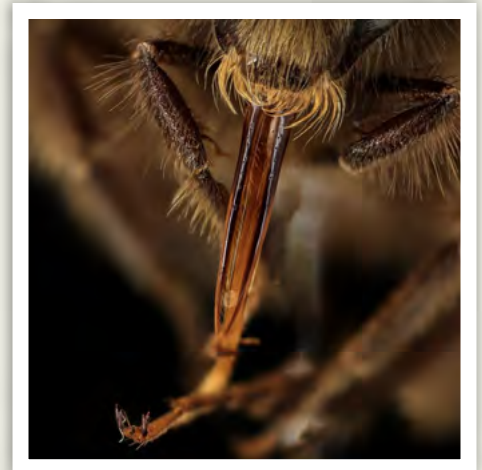
Pretend you are smaller than a bee. What would the world look like to you? **1.** Look at these close-up photos. **2.** Guess what you're looking at. **3.** Write down your guesses on the lines below the photos. **4.** At the bottom of this page, discover what you were looking at!



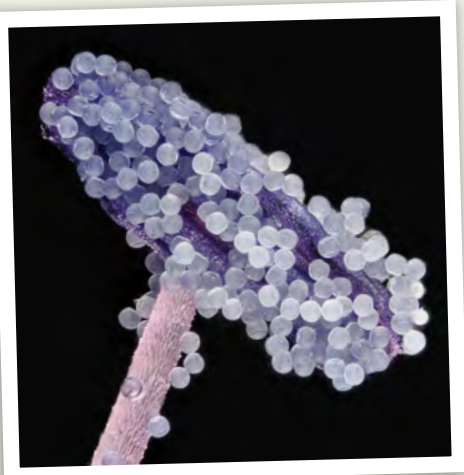
A.



B.



C.



D.



E.



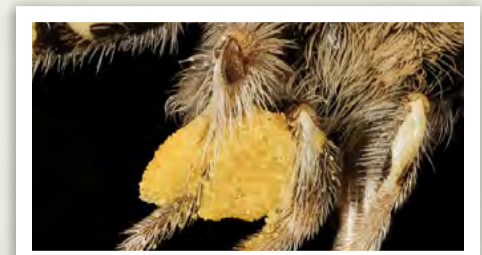
F.



G.



H.



I.

A. Bee antennae where they attach to the bee's head; **B.** Bee's compound eye; **C.** Bee tongue (proboscis); **D.** Pollen grains on an anther with the filament below; **E.** Pollen grains of different plants; **F.** Bee claw; **G.** Bee wing tip; **H.** A flower seen through a bee's eyes (in ultraviolet light); **I.** Loaded pollen basket of a foraging bee.


Images A, B, C, F, G and I courtesy of the United States Geological Service Bee Inventory and Monitoring Lab. Retrieved from <https://www.flickr.com/people/usgsbiml/>. Image H Svea Bruslind, Oregon State University.

Fun Facts About Bees and Bee Word Game


Find a partner. Choose one person to be the “reporter” and one to be the “author.” Without reading the story aloud, the reporter asks the author to think of a word for each prompt under the blank lines below. The reporter writes in the author’s words. Then choose one person to read your very own funny story out loud! Or try and add in the facts for each blank line — you will find the answers throughout the book!

There are so many _____ kinds of bees!  **Squash bees** are _____-sized bees and feed


only on nectar and pollen from _____. The squash bee had never been seen in Oregon until the year

_____.  **Mason bees** pollinate almonds, apples, _____ and more. They use mud and

_____ to build their nests, which is where they get their name. One super _____ bee is the


 **green metallic sweat bee!** These bees pollinate the flowers on many _____ plants and

wildflowers. They also _____ the sweat of mammals. If you have alfalfa or _____ plants you need

pollinated, then  **leafcutter bees** are the bees for you! They _____ out small pieces of leaves and

use them to build their _____.  **Bumble bees** help us by choosing berries, apples, tomatoes

and _____. They are large and _____ bees that are black, yellow, orange or _____.

 **Long-horned bees** are _____ medium-sized bees that are very _____. The males

have long _____. Females have large, brush-like hairs on the back of their legs that they use to carry

_____. They love sun _____. One world-wide pollinator of _____ crops is the

 **honey bee!** That’s because honey bees pollinate _____ different kinds of plants and are _____


to manage. They make _____, which is where they get their _____. Not all bees are hardworking,

upstanding pollinators!  **Cuckoo bees** _____ their pollen from other bees! When they are ready

to reproduce, females wait for females of another species of bee to go search for pollen or _____. While she

is gone, they _____ into the nest and lay their eggs next to the other bee’s _____. When the larvae

_____, they will destroy the other bee’s offspring and eat up all the _____ left by the other bee.

 **Alkali bees** nest in the _____. They are very picky and love salty, moist, _____ soil.

The alkali bees of the Pacific Northwest are the only ground-_____ bees in the _____ managed

by _____.
a group of people

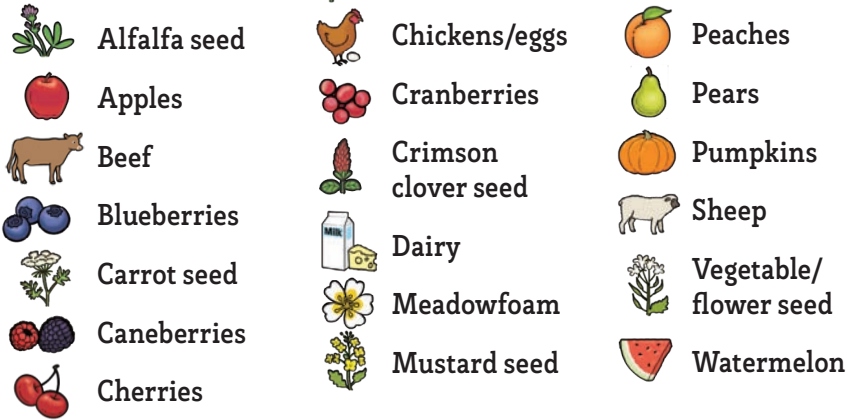
Bees need Bee _____!
plural adjective

What Bees Do for Oregon Crops

Bees pollinate many important crops in Oregon.

This map of Oregon can give you an idea of the types of crops statewide that bees help produce.

Map Legend

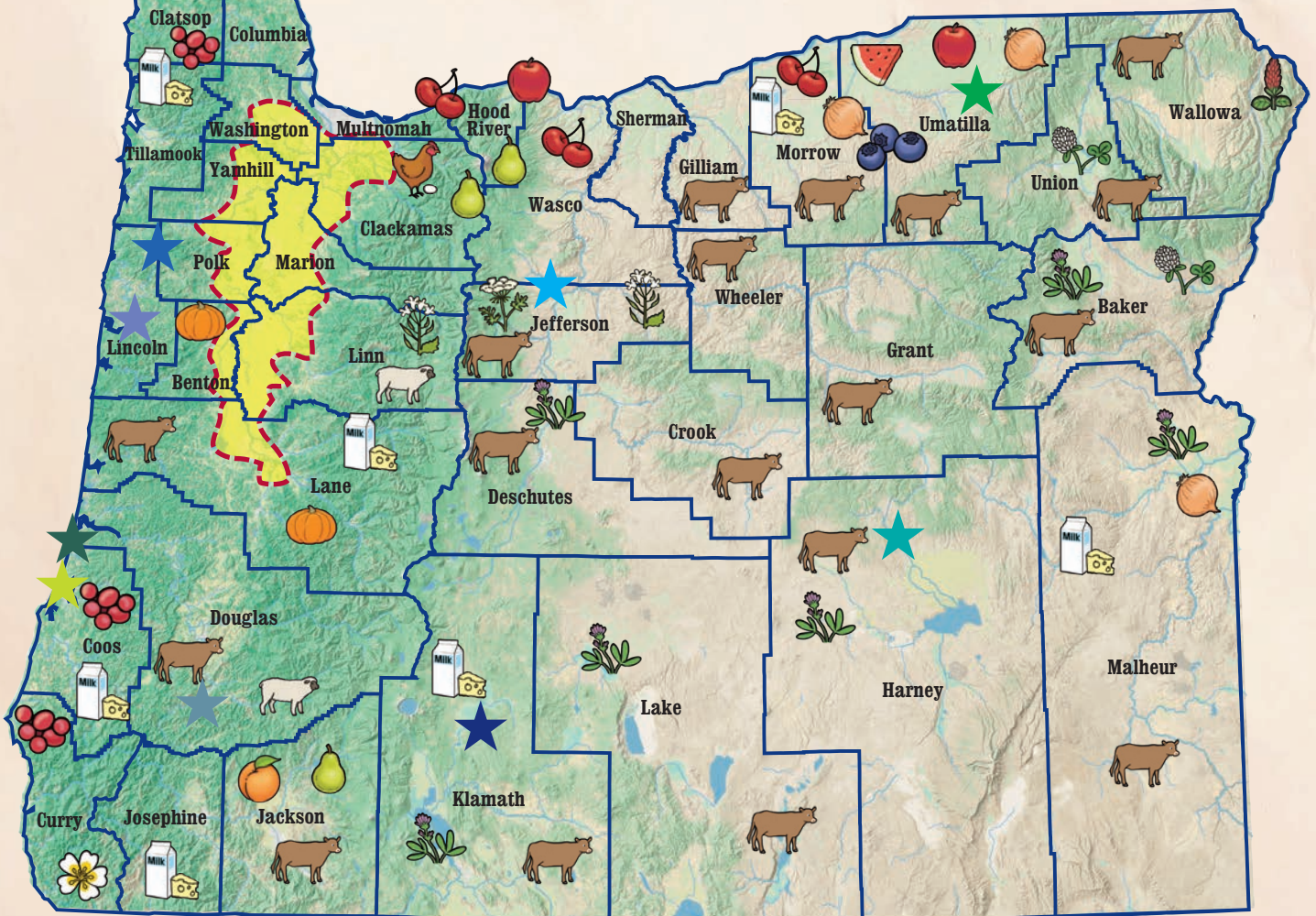


Native/Indigenous People live all over Oregon.

The stars represent the nine federally recognized Tribes in Oregon.

- ★ Burns Paiute Tribe
- ★ Confederated Tribes of Coos, Lower Umpqua and Siuslaw
- ★ Confederated Tribes of Grand Ronde
- ★ Confederated Tribes of Siletz
- ★ Confederated Tribes of Umatilla
- ★ Confederated Tribes of Warm Springs
- ★ Coquille Indian Tribe
- ★ Cow Creek Band of Umpqua Tribe of Indians
- ★ Klamath Tribes

Crops Pollinated by Managed Oregon Bees





Dried Alfalfa

Field Notes:

Bees are champion pollinators. A team of pollinators work with bees in Oregon to make our food. The pollen of rice, oat and corn plants is moved by wind. Insect and animal pollinators include ants, beetles, birds, butterflies, flies, moths and wasps! They may move pollen in different ways, but together they help plants make more plants and help make our food!

Use the map legend to find a favorite Oregon grown food and where bees help pollinate it!



Cobalt Milkweed Beetle

Photo: Oregon Dept. of Agriculture



Male Anna's Hummingbird



White-Lined Sphinx Moth



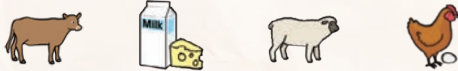
Clouded Sulphur Butterfly



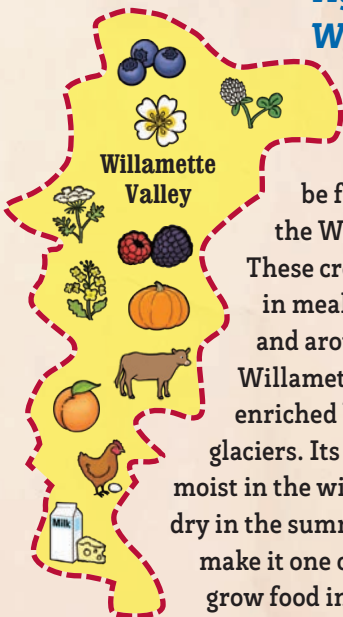
Honey bees on mustard flowers

Why are beef, chicken/eggs, dairy and sheep on the map?

Bees are important pollinators of alfalfa and clover flowers. Farmers grow these plants to feed many different types of animals that give us milk, cheese, meat, eggs and more!



Agriculture in the Willamette Valley



All these crops and more than 150 others can be found throughout the Willamette Valley.

These crops are enjoyed in meals across Oregon and around the world. The Willamette Valley's soil was enriched by volcanoes and glaciers. Its climate is cool and moist in the winter and warm and dry in the summer. These things make it one of the best places to grow food in the world.

Write a Haiku About the Bees of Oregon

A haiku is a poem with three lines. It was invented in Japan. Often, it is about nature. Most haiku have 17 syllables. A syllable is a sound that you say on its own. The word **bee** has only one syllable. The word **springtime** has two. The first and third lines of a haiku each have five syllables, and the middle line has seven syllables: 5 + 7 + 5 = 17.

Here's an example:

Apple Tree

In springtime, it blooms.
Bees and blossoms make apples.
In fall, we make sauce!

Your turn! Try writing a haiku about how food grows. It can describe a farm, a garden, or any fruit or vegetable you like. Try a raspberry bush or a pumpkin patch! First give your poem a title. Then write three things about it, one on each line. Count your syllables!

TITLE: _____

[5 syllables]

[7 syllables]

[5 syllables]



Plant Parts

Fruits and Vegetables

Vegetables are plant parts—roots, leaves, stems and flower buds. For instance, carrots are roots, lettuce is leaves, and celery stalks are stems! Broccoli has stems and flowers that both taste great! Broccoli heads are made of little flowers that have yet to open (see picture).

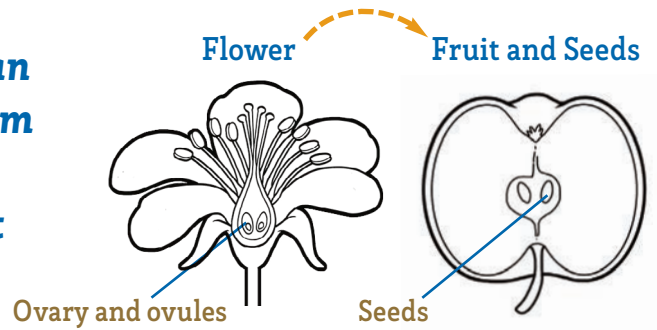
Fruits are made from plant parts, too. For some plants, after their flowers are pollinated, in time, a fruit is formed. For instance, this happens with apples, cherries and squash. In nature, fruit helps plants spread their seeds for miles: animals come to the plant to eat the tasty fruit and then spread its seeds in their poop.

In cooking and nutrition, some fruits are called vegetables. That's true for tomatoes, green beans, peppers and squash. This is because their taste and the nutrients they provide are more like vegetables than fruits. For example, green beans—also called string beans—are green, fleshy pods that grow around the seeds of a bean plant. People think of them as a vegetable, but plant experts think of them as a fruit.



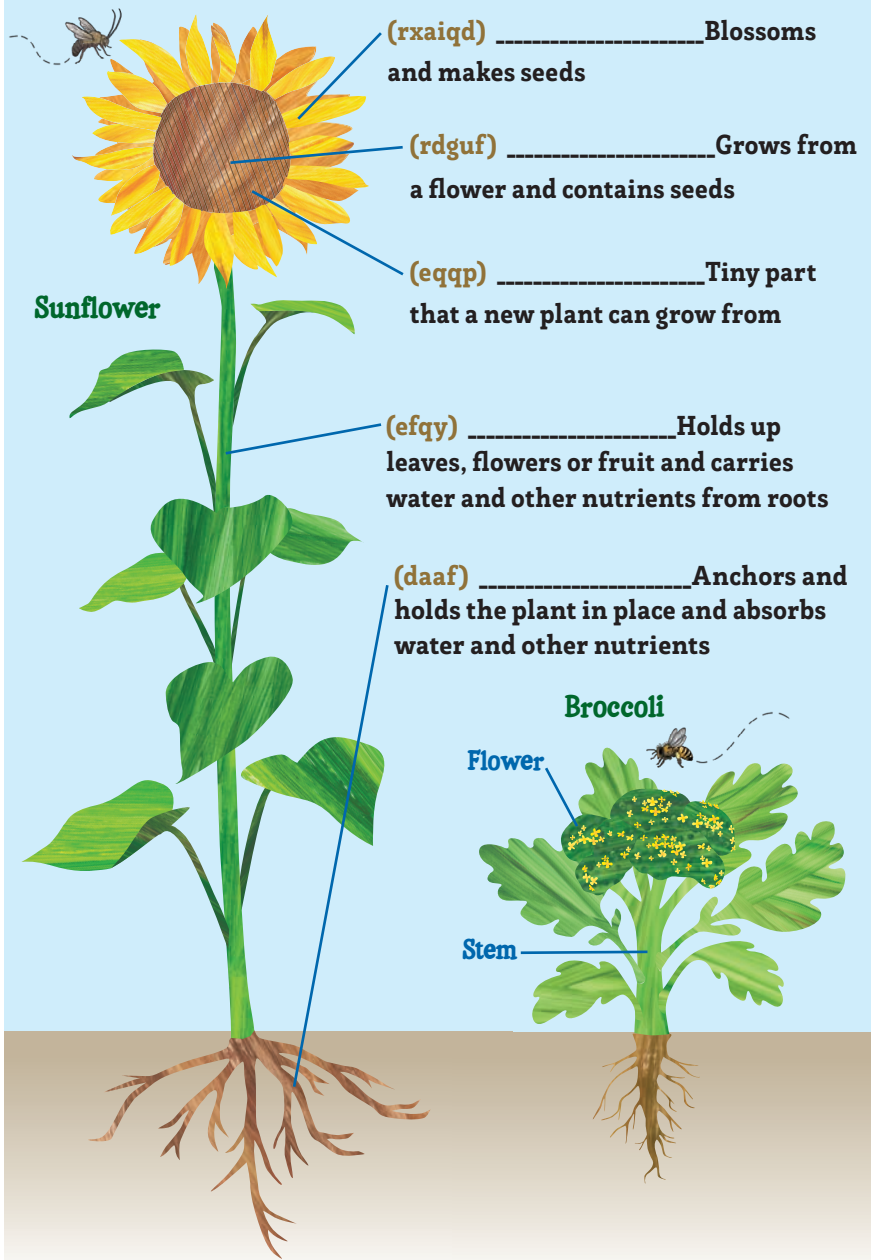
Many plants and bees need each other to survive; they are interdependent.

The Part of an Apple Blossom that Turns into a Fruit and Seeds



An ovary turns into a fruit; ovules turn into a fruit's seeds.

Decode the letters below to reveal the plant part.



Decoder:

m = a	u = i	a = o	f = t
p = d	x = l	d = r	g = u
q = e	y = m	e = s	i = w
r = f			

Plant Parts

More About Seeds and Plant Part Salad

A seed contains everything that is needed for a plant to grow except water, healthy soil, air and sunshine. Bees help make seeds. In return, seeds can grow into plants that make pollen to feed bees. Seeds are high in protein. Pumpkin seeds and sunflower seeds make a healthy snack.

Fun Seed Facts!

- ☛ You can carve a pumpkin and roast and eat its seeds, or dry the seeds out and save them to plant.
- ☛ Sunflowers are also a plant with seeds we can eat or dry out and plant.
- ☛ Did you know that strawberries have their seeds on the outside? A strawberry flower is made of many tiny flowers fused into one big flower. The little dots on the surface of a strawberry are the seeds of each flower.
- ☛ How big are seeds? Seeds come in all shapes and sizes. Avocados have one large seed.



Plant Part Salad Recipe

Toss all of these ingredients in a bowl and lightly add your favorite salad dressing!

- 6 cups **leaves**, such as lettuce, spinach, chard
- 1 cup **roots**, such as beets, carrots, radishes
- 2 cups **flowers**, such as broccoli, cauliflower
- 1 cup **stems**, such as celery, broccoli stems, chard stems
- 2 cups **fruit**, such as apple, tomato, cucumber
- 1/4 cup **seeds**, such as sunflower seeds, peas, beans

For the full recipe, go to www.foodhero.org/recipes/plant-part-salad

Recipe Planning - Read the recipe above for *Plant Part Salad*. Below, write down the ingredient/s you would choose for each plant part if you made the recipe at home. Then name your salad!

- ☘ Leaf _____
- ☘ Root _____
- ☘ Flower _____
- ☘ Stem _____
- ☘ Fruit _____
- ☘ Seed _____
- ☘ Dressing _____

Make it your own!
Name your salad recipe:

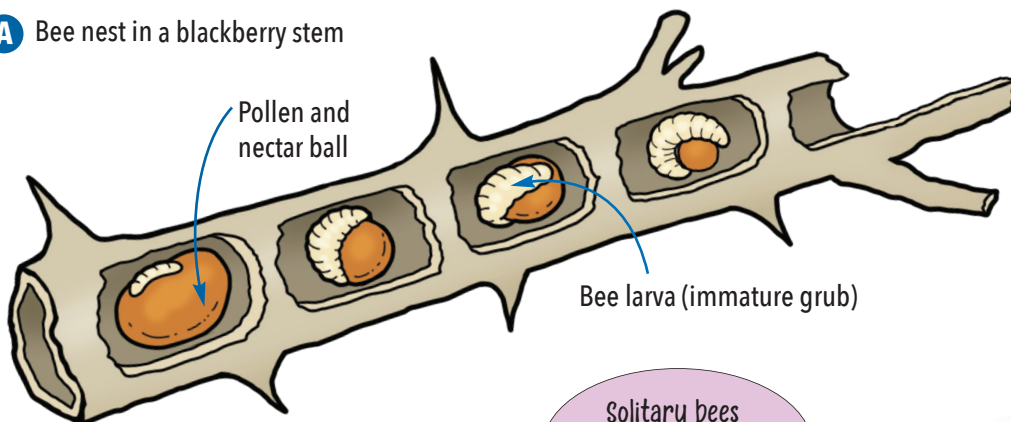


Solitary Bees

Solitary bees are bees that live alone—not in a hive or with other bees. Most bees found in Oregon are solitary bees.

Mason, leafcutter, long-horned and alkali bees are some examples of solitary bees. After mating, a solitary female bee, all on her own, will build her nest, forage for pollen and nectar, and lay her eggs. The solitary female bees below are making their nests in three different places: (A) a plant stem, (B) a tunnel in the ground, (C) an old tree stump.

A Bee nest in a blackberry stem



Mason bee emerging from a cocoon

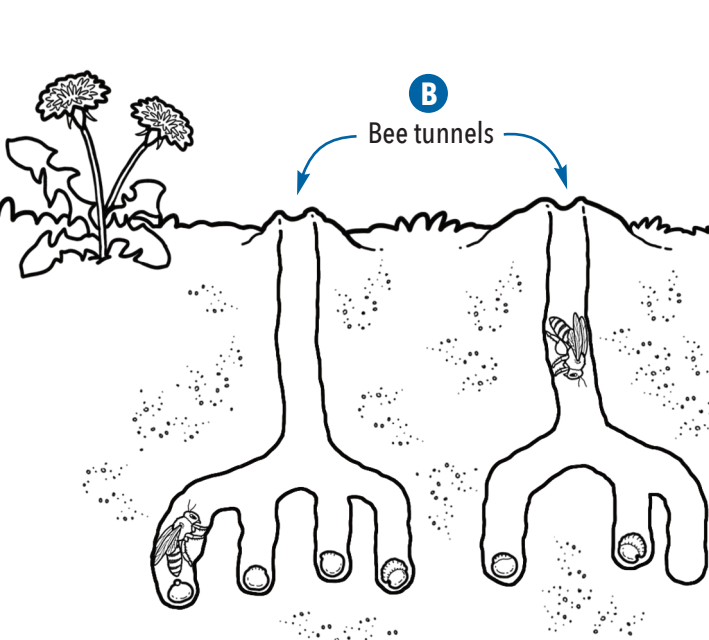
Solitary bees don't make honey or wax.



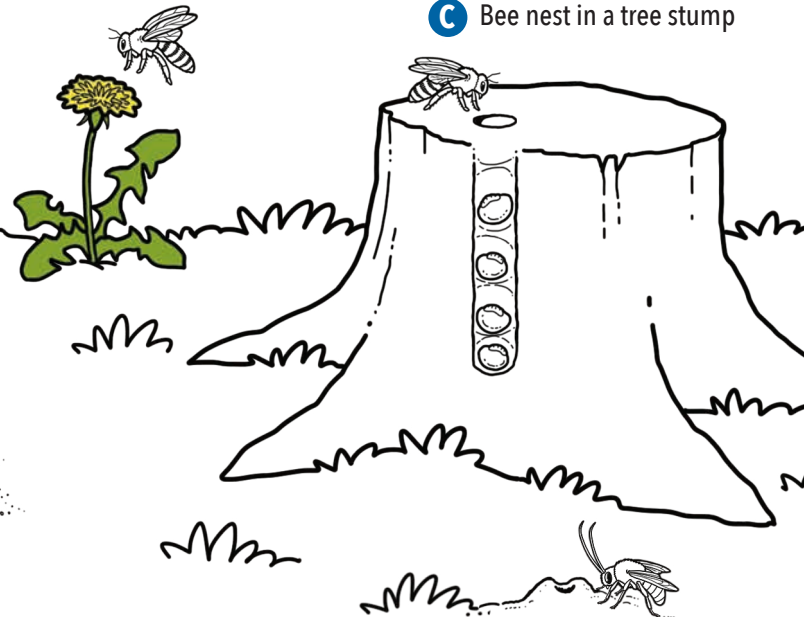
Common dandelions (*Taraxacum officinale*) Unlike the horned dandelion, the common dandelion is not **indigenous** to North America. In the 1600s, colonists brought common dandelion seeds with them from Europe, as they believed the plant could cure many illnesses. In time, some people came to view the common dandelion as a weed that crowds out native plant species. Other people, including Indigenous Peoples, saw it as a great source of food and medicine. Did you know that you can eat dandelions from flower to root? They are an excellent source of vitamins A and C. One cup of dandelion greens contains almost twice as much iron as spinach! You can buy dandelion greens and teas at local grocery stores. In the kitchen, you can use the greens in salads, soups, bread, pesto, smoothies and desserts. Dandelions can also be used to make oils, teas, jellies, salves and traditional medicines. And of course, bumble bees and honey bees that pollinate dandelions make honey!

B

Bee tunnels



C Bee nest in a tree stump



Solitary Bee Life Cycle

No matter where a solitary female bee nests, these steps happen:

1. The female bee creates a chamber or cell where she can safely lay an egg.
2. In any chamber she creates, she mixes a ball of pollen and nectar to feed her offspring.
3. She lays an egg on each ball, seals up the nest, and then leaves.
4. When an egg hatches, out comes a tiny larva (the first growth stage of a bee). The larvae all feed on their pollen balls and grow bigger.
5. When the larvae have grown big enough, they undergo **metamorphosis**, (a change in shape). The bee larvae slowly change from immature grubs to adult bees. Just like caterpillars, some bee larvae spin silk cocoons before they go through this process.
6. When the adult bees come out of their cells, males and females will mate with bees from other nests. Mated females start new nests of their own.



Camas (*Camassia quamash*) Camas, a type of native lily flower, have been an important part of ecosystems for thousands of years. Camas have been an important traditional food for many Tribal people. Camas usually grow on prairies. Mason bees, bumble bees, hoverflies and European honey bees all pollinate camas flowers. Indigenous Peoples have long used traditional practices to protect Camas prairies. These include removing invasive plant species, turning the soil to allow air in, and traditional burning methods to promote new plant growth. These practices work: camas fields were once so abundant they were described from a distance as "seas of blue." Colonization removed Indigenous Peoples from their homelands and people began developing the prairies for agricultural use. Now less than 1% of native prairies in Oregon remain. Today, Indigenous Peoples and others are working to restore camas' habitats for future generations of people and bees. You can help them! Camas can easily be grown in your yard or a community or school garden. You can find seeds or bulbs at many garden stores and native plant nurseries.



A habitat is a home to living things that provides the shelter, water and foods they need. Draw more native camas flowers in the habitat above. The flowers will provide more pollen and nectar for the bee species that pollinate camas!





Solitary Bees

Squash Bees

Genus: Peponapis

(pronounced pep-on-A-pis)



Squash Bee
11 to 14 mm in length



Female squash bees collect pollen on thick brushy **scopa** (hair) on their back legs.

Although other bees can pollinate squash plants, squash bees are some of the only bees that can fully digest squash pollen.

Color in the hidden pictures!



Zucchini



Gourd



Pumpkin



Field Notes:

Squash bees found in Oregon are medium-sized, fuzzy bees that feed only on the pollen of plants in the squash family (squashes, pumpkins and gourds). They spend their whole lives around the plants they pollinate. They nest in the ground beneath squash plants and even sleep inside squash blossoms. In fact, the best way to find squash bees is by looking inside squash blossoms in the cool of the morning when the bees are still asleep. Squash bees are new to Oregon and are still making their way around. Can you find squash bees in your community?

Color this page online and more at: FoodHero.org/bees



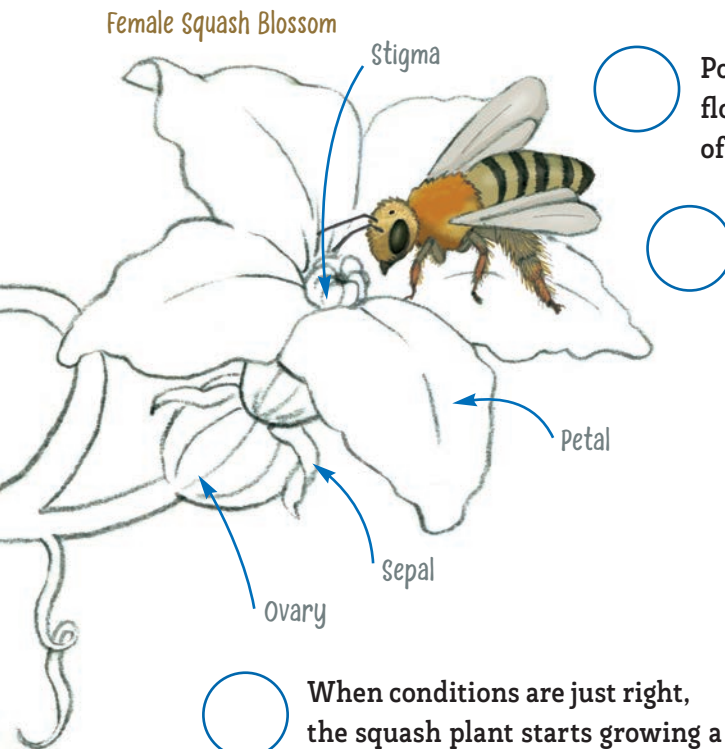
A trait of this bee is that it is fuzzy.

Name a synonym for fuzzy:

Pollination in Action

The Pollination of a Squash Plant

Follow this species of squash bee, *Peponapis pruinosa*, as it pollinates a squash flower. In the circles below, enter the numbers 1 through 6 to put the steps of pollination in order. Step 1 has been filled in for you. When you've finished, color in the flower!



Pollen collected from the first flower falls on the stigma of the second flower.

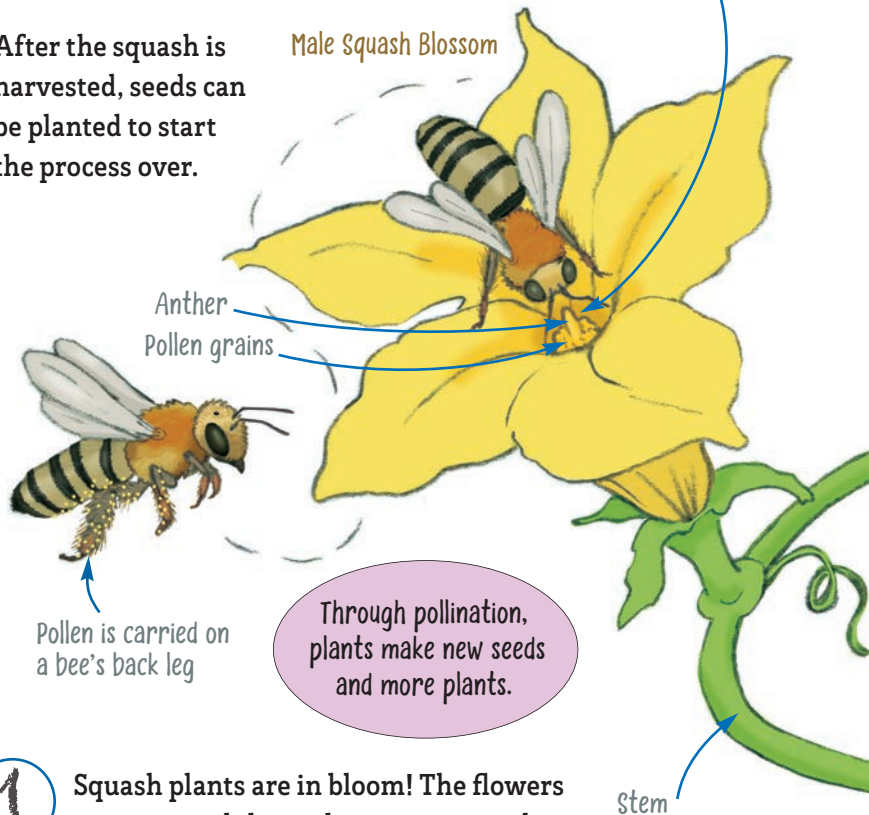
After the squash is harvested, seeds can be planted to start the process over.

When conditions are just right, the squash plant starts growing a squash with seeds inside.

A female squash bee travels to a squash plant to collect pollen from an exposed anther of a squash flower.

The bee travels to another squash plant nearby.

Male Squash Blossom



Pollen is produced on anthers and nectar is made at the base of the flower on floral nectaries.

Pollen is carried on a bee's back leg

Through pollination, plants make new seeds and more plants.

1 Squash plants are in bloom! The flowers are open and the anthers are exposed.

The Story of Squash and Squash Bees in Oregon

We would not have squash bees if not for squash plants and the Indigenous Peoples who formed a **reciprocal** relationship (taking care of each other) with the plants. This reciprocal relationship began over 10,000 years ago in Central America. As the people slowly **cultivated** the land to grow squash for food and for trade, they created a **migration** of squash to the north and the bees followed!

Squash was not originally part of the traditional diet of Indigenous Peoples of the Pacific Northwest. Only in recent years has enough squash been grown in the region to attract squash bees. In 2017, squash bees were first spotted in Oregon by kids in a garden in Ashland!



Draw a star on the map where you live!



Three Sisters Soup



Squash Bee and Squash Flower

The Three Sisters—squash, corn and beans—thrive when planted together. Many traditional foods of Native Indigenous Peoples, past and present, need wild bees, like the squash bee, to grow and reproduce. These foods include the Three Sisters, blueberries, chokecherries, cranberries, dandelions, huckleberries, peppers, pumpkins, sunflowers, sweet potatoes, tomatoes and many more.

Ingredients

- 1 ½ Tablespoons **vegetable oil**
- ¾ cup diced **carrot** (1 medium carrot)
- 1 cup chopped **onion** (1 medium onion)
- 1 teaspoon **garlic powder** or 4 cloves **garlic**, minced
- 2 cups diced **summer** or **winter squash** (fresh or frozen)
- 1 ½ cups **corn** (fresh or frozen) or a 15-ounce can (drained and rinsed)
- 1 ½ cups **cooked beans** (any type) or a 15-ounce can (drained and rinsed)
- 1 can (15 ounces) diced **tomatoes** or 2 cups diced fresh
- 3 ½ cups low-sodium **broth** (any type)
- ¼ teaspoon **pepper**



Indigenous Peoples continue to contribute vast amounts of knowledge and stewardship to our understanding of the plant world.

Directions

1. Wash hands with soap and water.
2. Heat oil in a large pan on medium heat. Add carrot and onion and sauté until onions have begun to turn slightly brown, about 8 to 10 minutes.
3. Add garlic, squash and corn. Stir for another 3 to 4 minutes.
4. Add beans, tomatoes, broth and pepper. Allow soup to come to a boil.
5. Turn heat down to a simmer until all vegetables are tender (15 to 30 minutes, depending on the vegetables used).
6. Refrigerate leftovers within 2 hours.

Makes 8 cups

Prep time: 15 minutes

Cook time: 30 minutes

Nutrition Facts	
8 servings per container	
Serving size	1 cup (297g)
Amount per Serving	
Calories	170
% Daily Value*	
Total Fat 4g	5%
Saturated Fat 0.5g	3%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 130mg	6%
Total Carbohydrate 28g	10%
Dietary Fiber 3g	11%
Total Sugars 7g	
Includes 0g Added Sugars	0%
Protein 8g	
Vitamin D 0mcg	0%
Calcium 50mg	4%
Iron 1mg	6%
Potassium 494mg	10%
Vitamin A 294mcg	33%
Vitamin C 16mg	18%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.



Recipe Math Challenge

Today two friends come to eat lunch at the food truck. Each friend orders a 2-cup bowl of Three Sisters Soup. How many milligrams (mg) altogether will the friends consume of:

✿ Potassium _____

✿ Vitamin C _____

.....Three Sisters.....

Bees play a vital role in the existence
and balance of all life on earth.

-Erin Angus



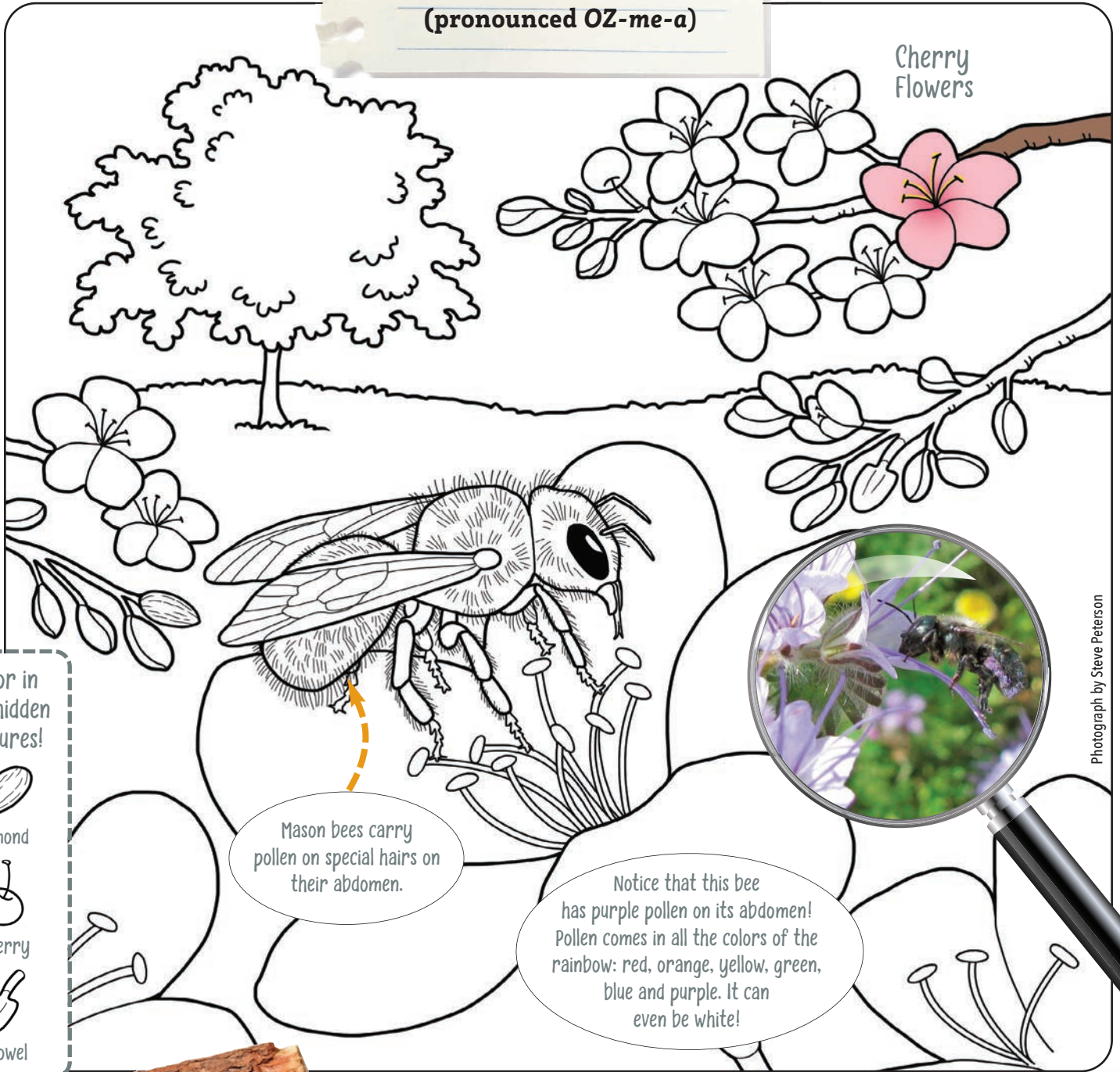
Three Sisters is a companion planting method—these plants grow better when planted together. The corn stalk creates a trellis for the beans vine. Meanwhile, the beans bring in nitrogen (a key nutrient for plant growth) from the air. At the same time, the wide squash leaves keep the soil cool, moist and free of weeds. The Three Sisters way of planting, as well as the traditional Three Sisters Soup recipe, originated from Indigenous farmers. These included farmers from the **Haudenosaunee Nation** (pronounced hoe-dee-no-SHOW-nee), also known as the **Iroquois Confederacy**.



Solitary Bees
Mason Bees
 Genus: *Osmia*
 (pronounced OZ-me-a)



Mason Bee
 6 to 12 mm in length



Cherry
 Flowers

Color in
 the hidden
 pictures!



Almond



Cherry



Trowel

Mason bees carry
 pollen on special hairs on
 their abdomens.

Notice that this bee
 has purple pollen on its abdomen!
 Pollen comes in all the colors of the
 rainbow: red, orange, yellow, green,
 blue and purple. It can
 even be white!

Photograph by Steve Peterson

Field Notes:

Some **mason bees** are pollinators of almonds, apples, blueberries, raspberries and cherries, as well as many wild plants. They are called mason bees because they use mud or clay to build their nests, just like a mason. A mason is someone who uses bricks and mortar to build homes and other buildings. They are small to medium-sized bees that are colored in bright metallic blues and greens and sometimes black. In Oregon, they are most often used to pollinate cherries. They work quickly: under some conditions one female mason bee can pollinate three times as many flowers as a single honey bee in the same amount of time.

Color this page online and more at: [FoodHero.org/bees](https://www.foodhero.org/bees)



A trait of this bee is that it
 is a fast pollinator.
 Name a synonym
 for fast:



Mason Bee and
Cherry Flowers

Super Sundae



Cherries bloom in early spring when the weather can still be cold and frosty. Mason bees do some of their best work pollinating cherry trees while most other bees are still sleeping in their warm nests.



Ingredients

- 1 cup low-fat plain or vanilla yogurt
- $\frac{2}{3}$ cup chopped peaches (fresh, frozen, or canned and drained)
- $\frac{2}{3}$ cup cherries (fresh or frozen)
- 2 Tablespoons granola

Instructions

1. Wash hands with soap and water.
2. Divide yogurt between 2 clear glasses or dishes.
3. Spoon half of the peaches and cherries on top of the yogurt.
4. Sprinkle each sundae with granola.
5. Refrigerate leftovers within 2 hours.



Makes 2 cups
Prep time: 10 minutes

Visit FoodHero.org for a tasty Skillet Granola recipe!

Nutrition Facts	
2 servings per container	
Serving size	1 cup (231g)
Amount per Serving	
Calories	150
% Daily Value*	
Total Fat 3g	4%
Saturated Fat 1.5g	8%
Trans Fat 0g	
Cholesterol 5mg	2%
Sodium 90mg	4%
Total Carbohydrate 24g	9%
Dietary Fiber 2g	7%
Total Sugars 18g	
Includes 1g Added Sugars	2%
Protein 8g	
Vitamin D 0mcg	0%
Calcium 231mg	20%
Iron 0mg	0%
Potassium 430mg	10%
Vitamin A 27mcg	3%
Vitamin C 6mg	6%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.



Recipe Math Challenge



It's Saturday, and the food truck is at the farmers' market. We did the math and found out we need 16 cups of fruit to make this recipe for our customers! We have 8 cups of cherries from our tree, but we have only $1\frac{1}{3}$ cups of fresh chopped peaches! We decide to substitute frozen peaches for the fresh peaches.

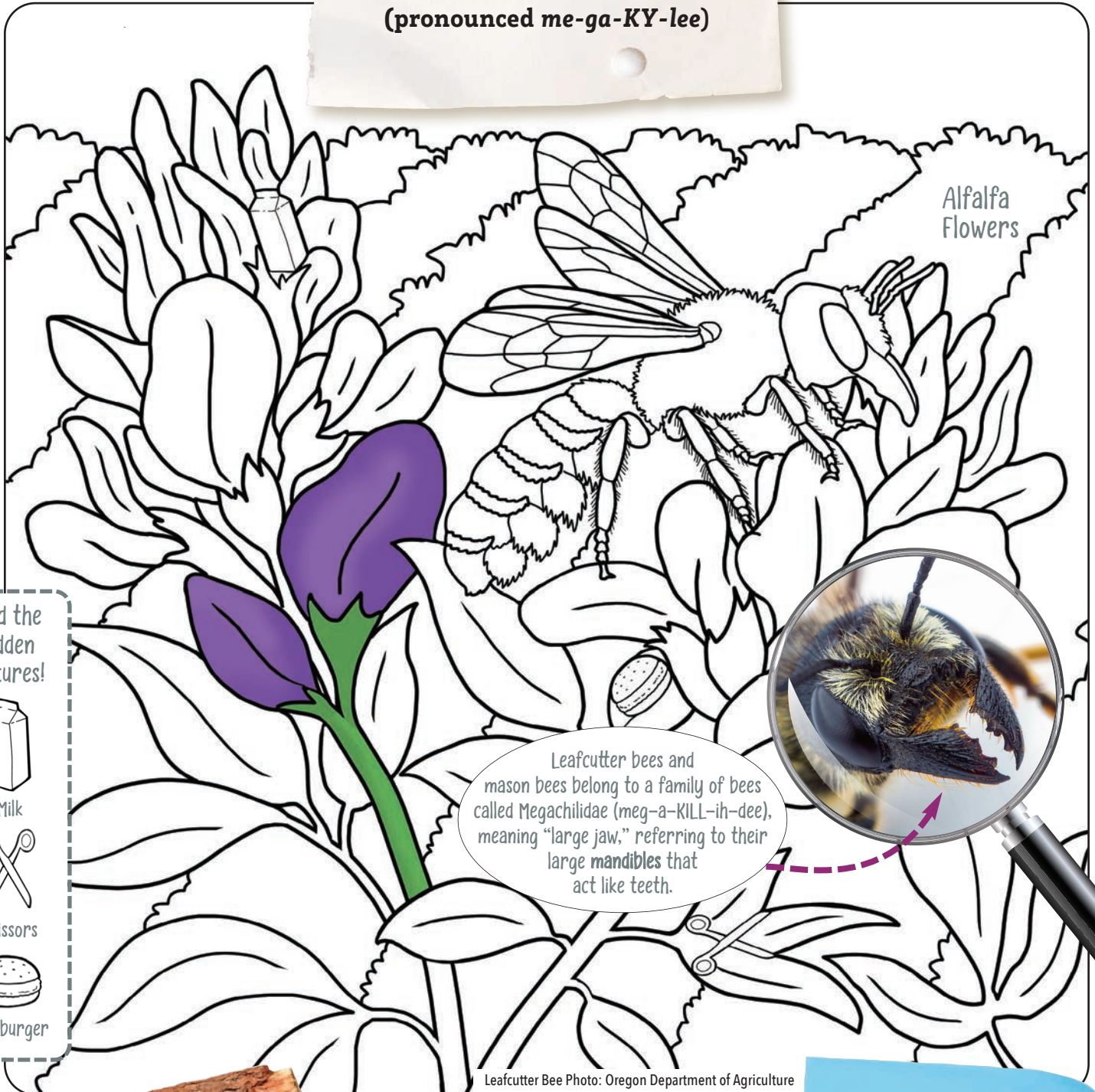
❁ How many more cups of peaches will we need to make this recipe?



Solitary Bees
Leafcutter Bees
 Genus: *Megachile*
 (pronounced me-ga-KY-lee)



Leafcutter Bee
 6 to 22 mm in length



Find the hidden pictures!



Milk



Scissors



Hamburger

Leafcutter bees and mason bees belong to a family of bees called Megachilidae (meg-a-KILL-ih-dee), meaning "large jaw," referring to their large mandibles that act like teeth.

Leafcutter Bee Photo: Oregon Department of Agriculture

Field Notes:

Leafcutter bees are pollinators of alfalfa and many wild plants. They are called leafcutter bees because they cut out small pieces of leaves to use to build their nests. Leafcutter bees are darkly colored, small to medium-sized bees. In Oregon, they are important pollinators of alfalfa grown for seed. Farmers buy the seed to grow alfalfa plants, which are fed to cows and other **livestock** (animals raised on a farm) that give us milk, cheese, yogurt, eggs, meat and more.

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A trait of this bee is that it can cut leaves for its nest.
 A synonym for cut is:



Leafcutter Bee and Alfalfa Flowers

Stuffed Potatoes



Many farmers and ranchers feed their livestock alfalfa hay. It's loaded with nutrients like protein, vitamins and minerals that help the animals produce high-quality meat and dairy products. Oregon leafcutter bees help produce the alfalfa seed that these farms rely on. Think about all the hard work of leafcutter bees when you enjoy this Food Hero recipe.

Ingredients

- 2 medium **potatoes** or sweet potatoes
- 1 cup **cooked beef** or black beans (cooked or canned, drained and rinsed), or a mixture
- $\frac{3}{4}$ cup **salsa** (try Food Hero's Salsa Roja or Salsa Verde)
- 1 cup **broccoli** (frozen or fresh)
- $\frac{1}{2}$ cup shredded **cheese** (try cheddar, feta, pepper jack or Mexican blend)

Directions

1. Wash hands with soap and water.
2. Scrub potatoes well. Poke each potato with a fork 2 or 3 times. Microwave on HIGH for 5 minutes, turn potatoes over, and microwave another 3 to 5 minutes, or until easily pierced with a fork. Set aside.
3. In a microwave safe bowl, combine beef and/or beans, salsa and broccoli. Microwave for 2 to 3 minutes, stirring occasionally, until heated through.
4. Cut potatoes in half length-wise and flatten with a fork. Divide beef and/or bean mixture between the four halves. Sprinkle with cheese and serve warm.*
5. Refrigerate leftovers within 2 hours.

***Topping ideas:** chopped cilantro, hot sauce, avocado, black olives, green onion, plain low-fat yogurt or sour cream.



Makes 4 potato halves
 Prep time: 5 minutes
 Cook time: 10 minutes



Nutrition Facts	
4 servings per container	
Serving size	1 potato half (226g)
Amount per Serving	
Calories	250
% Daily Value*	
Total Fat 10g	13%
Saturated Fat 5g	25%
Trans Fat 0g	
Cholesterol 45mg	15%
Sodium 480mg	21%
Total Carbohydrate 24g	9%
Dietary Fiber 4g	14%
Total Sugars 3g	
Includes 0g Added Sugars	0%
Protein 16g	
Vitamin D 0mcg	0%
Calcium 131mg	10%
Iron 2mg	10%
Potassium 667mg	15%
Vitamin A 67mcg	7%
Vitamin C 41mg	45%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.



Recipe Math Challenge

Your food truck is open every day of the week and sells stuffed potatoes daily. One portion is two halves of a potato.

🌻 If you sell an average of 56 stuffed potato plates every day, how many will you sell in the month of July? Hint: There are 31 days in July.

Leafcutter Bee Photo: New Zealand Arthropod Collection



Solitary Bees

Long-Horned Bees

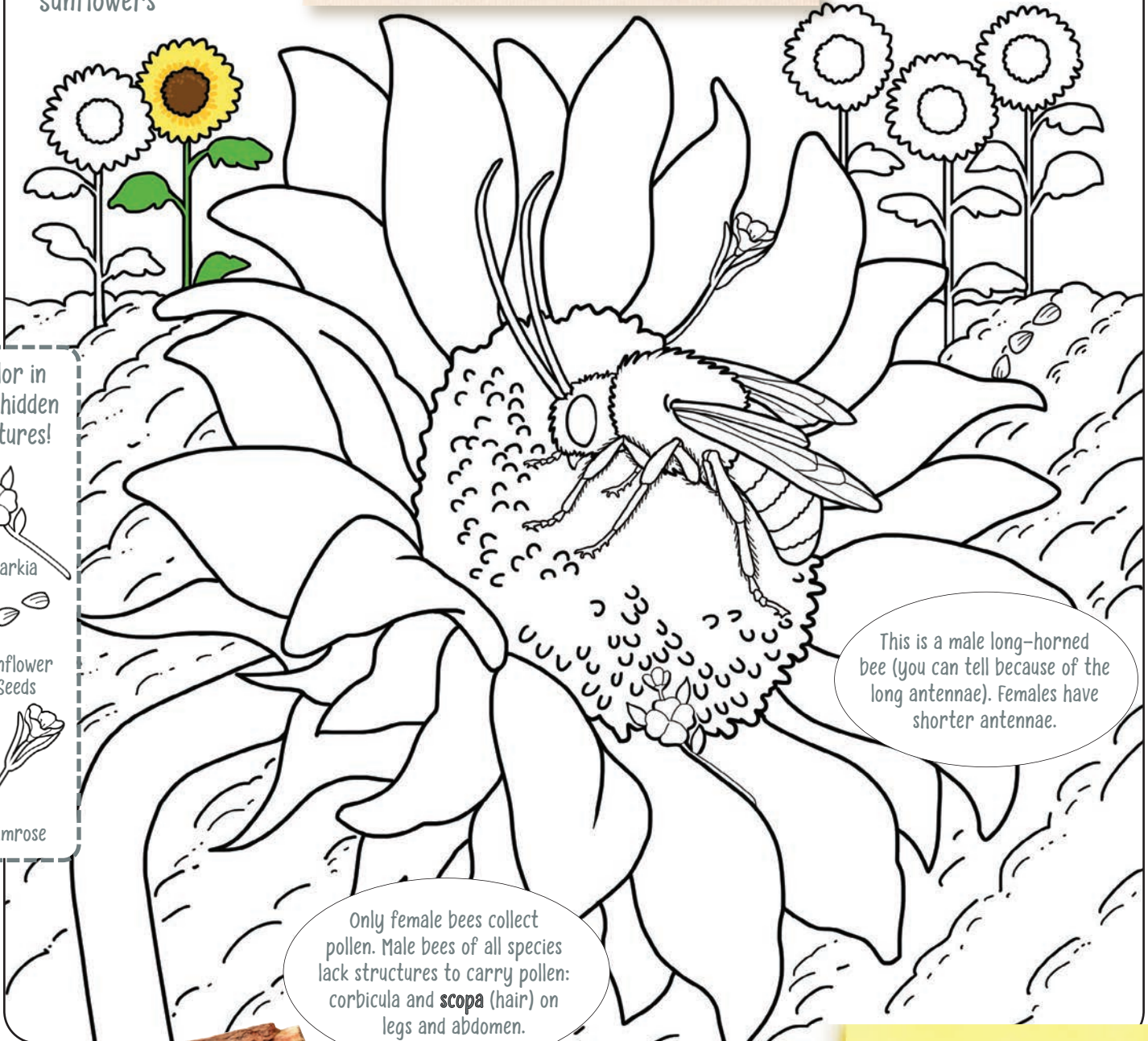


Long-Horned Bee
9 to 15 mm in length



Genus: *Melissodes*
(pronounced mel-eh-SOH-dees)

Sunflowers



Color in the hidden pictures!



Clarkia



Sunflower Seeds



Primrose

This is a male long-horned bee (you can tell because of the long antennae). Females have shorter antennae.

Only female bees collect pollen. Male bees of all species lack structures to carry pollen: corbicula and **scopa** (hair) on legs and abdomen.

Field Notes:

Long-horned bees are beautiful medium-sized bees that are very fuzzy. They are dark with yellow, black or white hairs. Males have long **antennae** (horns) like the bee shown. Females have large, brush-like hairs on their back legs that they use to carry pollen. Bees in the genus *Melissodes* like to visit plants in the sunflower family the most. They also visit a number of native plants. Planting sunflowers in your community, and watching the blooms, is the best way to find these bees in Oregon.

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A trait of this bee is that they are beautiful.

Name a synonym for beautiful:

Cranberry Oatmeal Balls



Long-Horned Bee and a Sunflower

Enjoy this no-bake treat, and think about the hard work of the long-horned bees of Oregon!

Ingredients

- 1 cup **oats** (quick-cooking or old fashioned rolled)
- 1/3 cup **sunflower seeds**
- 1/3 cup **peanut butter** or sunflower seed butter
- 3 Tablespoons **honey***
- 1/3 cup dried **cranberries**

Instructions

1. Wash hands with soap and water.
2. In a medium bowl, combine all ingredients until well mixed.
3. Form about 2 Tablespoons of mixture into a ball and place on a baking sheet. Repeat with remaining mixture to make 16 balls.
4. Refrigerate for 30 minutes and until ready to eat.

*Honey is not recommended for children under 1 year old.

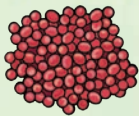


Makes 16 balls
Prep time: 15 minutes
Chill time: 30 minutes

Nutrition Facts

8 servings per container	
Serving size	2 balls (43g)
Amount per Serving	
Calories	180
% Daily Value*	
Total Fat 7g	9%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 65mg	3%
Total Carbohydrate 24g	9%
Dietary Fiber 3g	11%
Total Sugars 12g	
Includes 6g Added Sugars	12%
Protein 6g	
Vitamin D 0mcg	0%
Calcium 23mg	2%
Iron 1mg	6%
Potassium 84mg	2%
Vitamin A 0mcg	0%
Vitamin C 0mg	0%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.



Recipe Math Challenge

If the recipe were to be doubled, how much of each ingredient would you need?

- ☀ Oats _____
- ☀ Sunflower seeds _____
- ☀ Peanut butter _____
- ☀ Honey _____
- ☀ Cranberries _____



Cuckoo Bees

Genus: *Nomada*

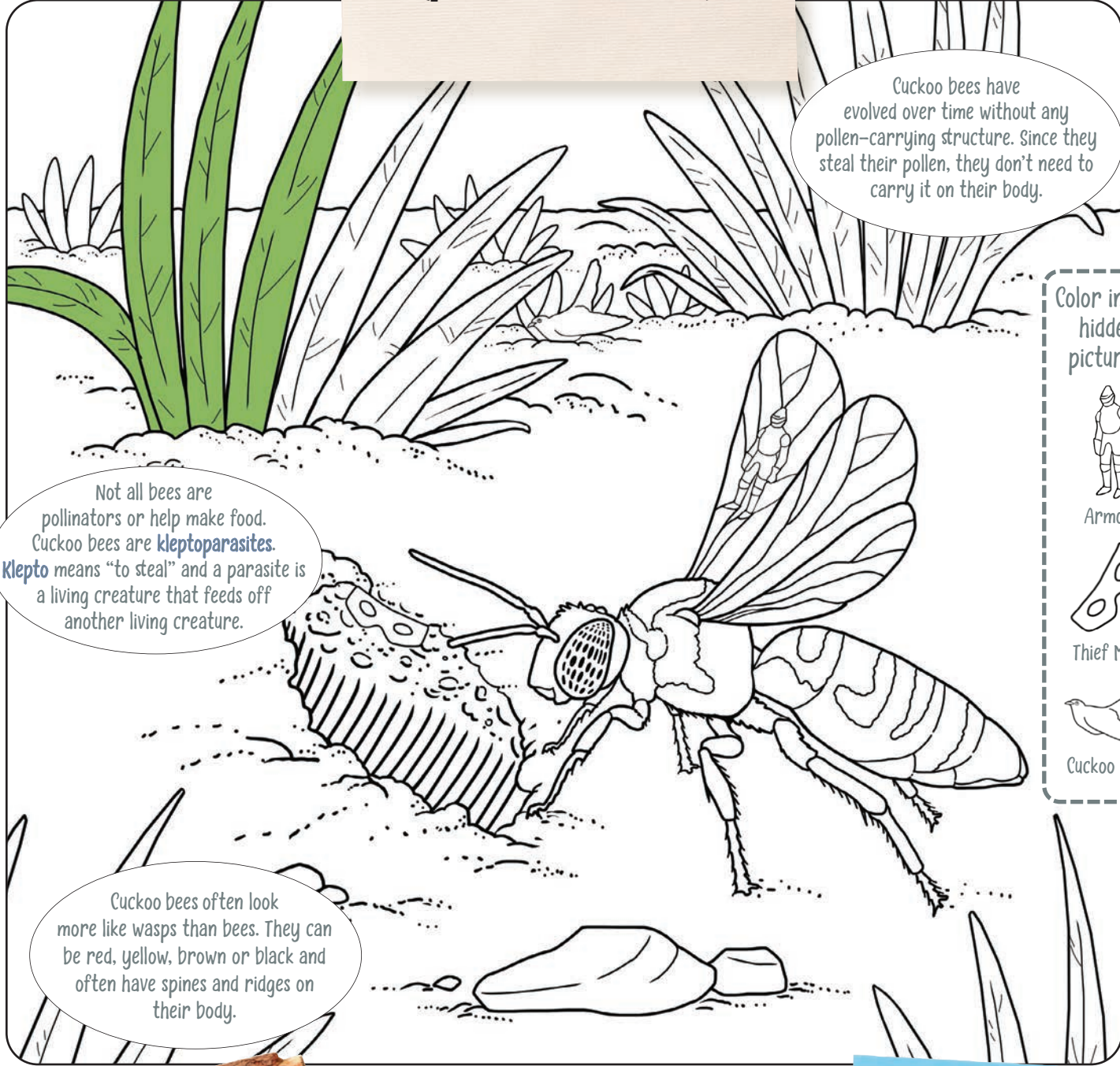
(pronounced no-MA-da)



Cuckoo Bee
8 to 10 mm in length



Cuckoo bees have evolved over time without any pollen-carrying structure. Since they steal their pollen, they don't need to carry it on their body.



Not all bees are pollinators or help make food. Cuckoo bees are **kleptoparasites**. **Klepto** means "to steal" and a parasite is a living creature that feeds off another living creature.

Cuckoo bees often look more like wasps than bees. They can be red, yellow, brown or black and often have spines and ridges on their body.


Color in the hidden pictures!

-  Armor
-  Thief Mask
-  Cuckoo Bird

Field Notes:

Cuckoo bees don't forage for pollen. They have found a way to steal it. When a *Nomada* female **reproduces** (has babies), she looks for a nest that is being built by a female bee closely related to her. Once she finds a nest, she waits for the female bee who made it to go forage. Then she sneaks inside and quickly lays her own eggs, right next to some of the other bee's eggs. Each of her eggs will hatch into a larva (the early stage of a bee that looks like a caterpillar), destroy the offspring of the other female and eat pollen left by the female who made the nest. Cuckoo bees got their name from cuckoo birds, which lay their eggs in other birds' nests.

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A trait of these bees is that they are **sneaky**.

Name a synonym for **sneaky**:



Solitary Bees

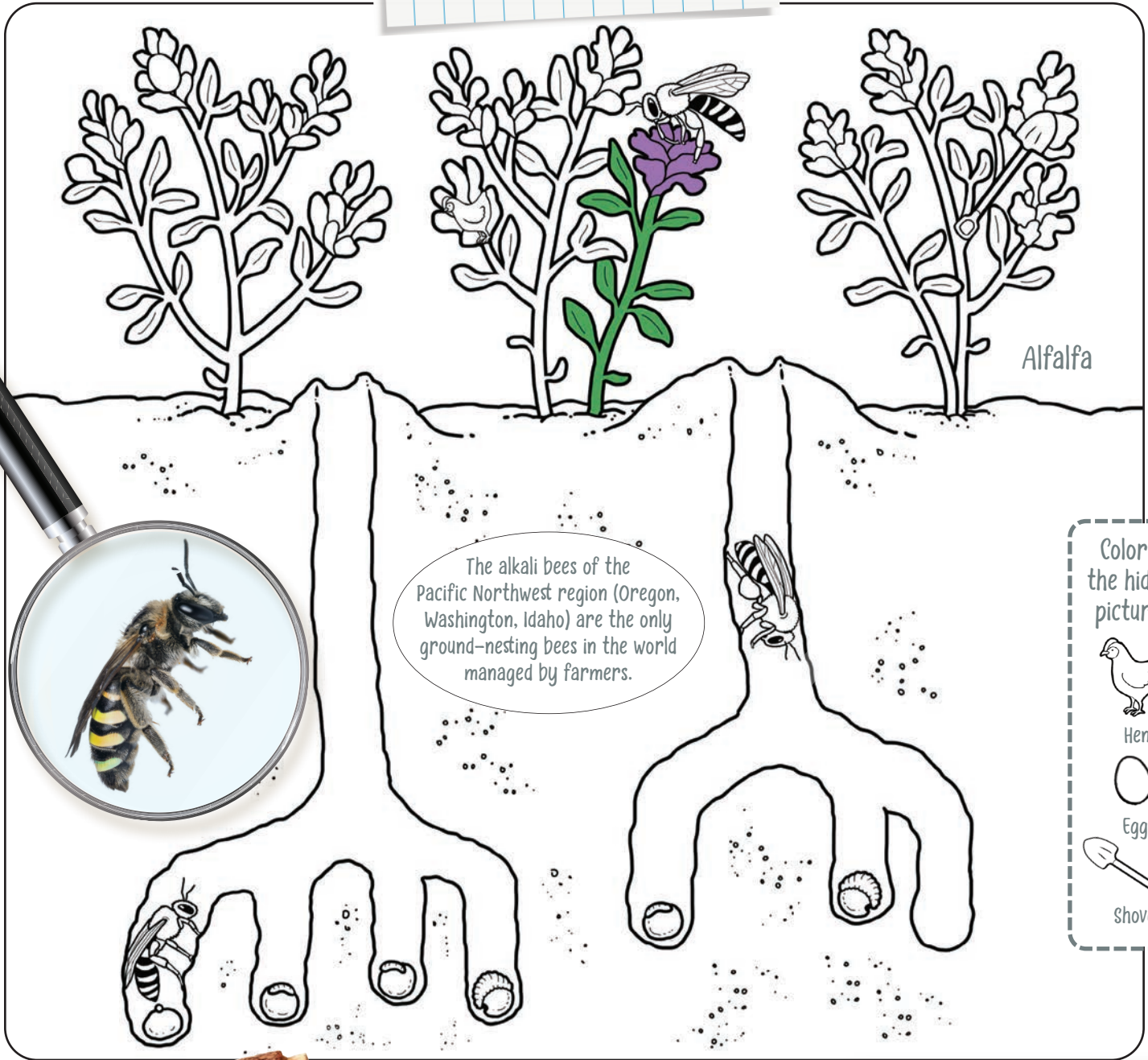
Alkali Bees

Genus: *Nomia*

(pronounced NO-mi-a)



Alkali Bee
12 to 13 mm in length



The alkali bees of the Pacific Northwest region (Oregon, Washington, Idaho) are the only ground-nesting bees in the world managed by farmers.

Color in the hidden pictures!



Hen



Egg



Shovel

Alkali Bee Photo: Oregon Department of Agriculture

Field Notes:

Alkali bees, like leafcutter bees, pollinate alfalfa flowers to make alfalfa seed. From the seed, farmers grow hay to feed many different types of animals. Even chickens like alfalfa hay! Alkali bees nest in the ground and are very picky; in the wild they love salty, moist and crumbly soil. Some farmers have figured out how to create these same conditions in the soil on their farms. At these sites, thousands of females build nests side-by-side, packing their nests with alfalfa pollen. After the females lay an egg, the hungry alkali bee larvae consume the pollen and complete their development underground.

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A trait of this bee is that it makes its nest in the ground. A synonym for ground is:



Solitary and Social Bees Green Metallic Sweat Bees



Green Metallic
Sweat Bee
7 to 12 mm in length



Genus: Agapostemon
(pronounced a-ga-POSS-ta-mon)



Purple
Aster Flowers

Metallic sweat bees
carry pollen on
their hind back legs.

Growing flowers in your
community helps the bees
that make your food.

Find the
hidden
pictures!

Dandelion

Salt shaker

Cilantro

Field Notes:

Green metallic sweat bees pollinate the flowers of many cultivated plants (plants grown on purpose) as well as many wildflowers. Sweat bees have been given this name because they lick the sweat of mammals as a way to add salt to their diet. They are medium-sized and have a bright metallic green color. These bees love open and flat-shaped flowers such as daisies, dandelions, wild roses and blackberry and apple blossoms. They love purple asters, a plant grown by many Oregon nurseries (places where plants are grown on purpose).

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A trait of this bee is that it
is bright in color.
Name a synonym for bright:

Quick Tomato Salsa



Green Metallic Sweat Bee and Cilantro

The flowers of many common herbs, such as cilantro, rosemary, thyme, basil and mint, provide great food for bees like the sweat bee. They also help make our food taste better! A great way to enjoy fresh herbs is by making salsa.

Ingredients

- 1 can (15 ounces) **diced tomatoes**
- 1/4 cup **onion**, chopped (a 1/4 medium onion or 2 green onions, including green tops)
- 1 clove **garlic**, chopped or 1/4 teaspoon garlic powder
- Juice of 1 **lime**
- 1 can (4 ounces) diced **green chiles**
- 1/4 cup fresh **cilantro leaves**, loosely packed

Directions

1. Wash hands with soap and water.
 2. Combine ingredients, except cilantro, in a blender. Blend to the thickness you like.*
 3. Finely chop cilantro and stir into other ingredients.
 4. Refrigerate leftovers within 2 hours.
- *No blender? Make a chunky salsa by cutting all ingredients to desired size before mixing.

Visit FoodHero.org for more tasty salsa recipes and a baked tortilla chips recipe.



Makes 2 cups
Prep time: 5 minutes



Nutrition Facts	
16 servings per container	
Serving size	2 Tablespoons (39g)
Amount per Serving	
Calories	10
% Daily Value*	
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 70mg	3%
Total Carbohydrate 2g	1%
Dietary Fiber 1g	4%
Total Sugars 1g	
Includes 0g Added Sugars	0%
Protein 0g	
Vitamin D 0mcg	0%
Calcium 0mg	0%
Iron 0mg	0%
Potassium 59mg	2%
Vitamin A 1mcg	0%
Vitamin C 2mg	2%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.



Recipe Math Challenge



On Friday the food truck will make lunch for a garden party of 40 people! For writing our grocery list, let's plan to serve each person 1 cup of salsa. About how much of each of these ingredients do we need to buy?

- Cans of tomatoes _____
- Whole onions _____
- Whole limes _____
- Cans of diced green chilies _____

Social Bees

Social bees are bees that live together as a family.

They share the work of building a nest, foraging for food and caring for young. Honey bees and bumble bees are examples of social bees.

Honey bees live in hives.

Honey bees live together in a hive. A hive is an above-ground structure where a group of bees **nest** (live) together. A hive can be made by people, or it can be made by bees in the wild. Inside the hive, honey bees use wax to make honeycomb. It has cells honey bees use to raise their young and store honey and pollen. Each cell is a hexagon (6 sided).

What do superheroes have in common? They all have superpowers! 10

Can you guess what honey bees' superpower is? They make and store honey! 23

In fact, they are some of the only bees that can! Honey making is 37

an amazing process. First, older worker bees collect nectar 46

from flowers. They swallow the nectar and fly back to the 57

hive. There, they spit it out and pass it off to another, 69

younger worker bee. The younger bee takes the 77

nectar and swallows it herself. This process is called 86

trophallaxis (tro-ful-AK-sis). The younger bee travels to an open section of honey comb 99

and spits the nectar out into an open honeycomb! Ewwwww! How can something so 113

gross taste so good? Well, the bees' spit has special chemicals called **enzymes**. As the 128

nectar sits in the honeycombs, the enzymes make its sugars easier to **digest** (break 142

down when they are eaten). 147

Younger worker bees take turns fanning the nectar with their wings. This causes water 161

in the nectar to **evaporate** (dry up and change to gas). The nectar becomes sweeter and 177

stickier. After a few days, it turns into honey. Unlike nectar, which can easily **spoil** (go 193

bad), honey can stay good to eat for a long time if it doesn't get wet. 209

Next, the worker bees cover the honey in the honeycombs with wax. Do they do this 225

to keep it warm? No! The wax keeps water out of the honey. That's important because 241

the honey is the bees' food. All winter, when there are no flowers blooming and it is too 259

cold to go outside, they will eat it for energy. Storing honey allows bees to stay active 276

year round! Have you ever seen honey bees flying on a warm day in December? They 292

aren't out to play! They are probably pollinating an early crop like almonds. 305

Honey bees don't wear masks or fight crime. But now you know why they're superheroes! 318

Fluency Tracker

Day 1 _____, Day 2 _____, Day 3 _____, Day 4 _____, Day 5 _____



Honey bees making honey and more!

1 During the spring and summer, older worker bees leave the hive to search for flowers within five miles of the hive.



2 These worker bees collect nectar from up to 100 flowers per flight! By visiting these flowers they also pollinate them. Many of these pollinated flowers become the food we eat!



3 They swallow nectar and store it in their honey stomach. Once full of nectar and pollen, they fly back to the hive.



4 They pass the nectar from their stomach to a younger worker bee who swallows it into their stomach. The younger worker bee takes it and spits it into an open honeycomb cell.



5 Younger worker bees fan the nectar, so water evaporates. The nectar gets thicker and begins turning to honey.



6 They cap the honey with wax to keep it from spoiling so that they can eat it throughout the winter.



7 Honey can be harvested for people to eat. Beekeepers leave some honey in the hive for the bees, too!

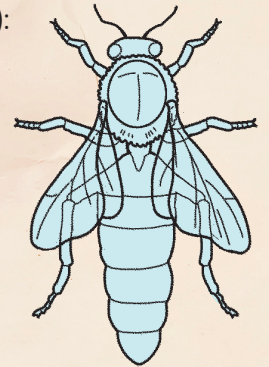


Who is in the hive?

These three types of bees play different roles in the hive. Honey bees living in a hive have a caste system made up of a queen bee, drones and worker bees. Each relies on the others to keep the hive healthy.

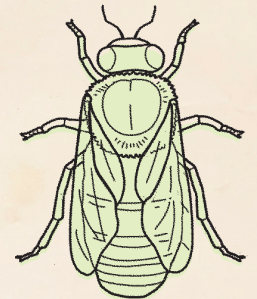
Queen bee (about 1 inch long):

The queen is the mother of all the bees in the hive. Her job is to lay eggs to make more bees. Most queen bees leave the hive only once in their life, when it's time to mate.



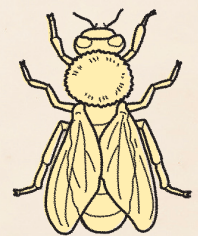
Drones (about 3/4 inch long):

Male honey bees are called drones. They are produced in the summer and their job is to mate with queens from other hives. They do not have a stinger, don't work or gather food and are fed by worker bees.



Worker bees (about 1/2 inch long):

Worker bees are all female and have different jobs depending on their age. When they are young, they start off cleaning the hive and then caring for and feeding young larvae. In their last stage of life, they become foragers, bringing in nectar and pollen to feed the bees in the hive. They use a figure-eight dance called a *waggle dance* to communicate. It tells other bees the direction and distance away from the hive to a flower patch.



1 inch = 25.4 millimeters



Aster

Fun Fact! The color, flavor, texture and smell of honey changes depending on which flowers the nectar comes from. To make a pound of honey, about 2.6 million flowers must be visited!

Visit FoodHero.org for great tasting recipes with honey in them!

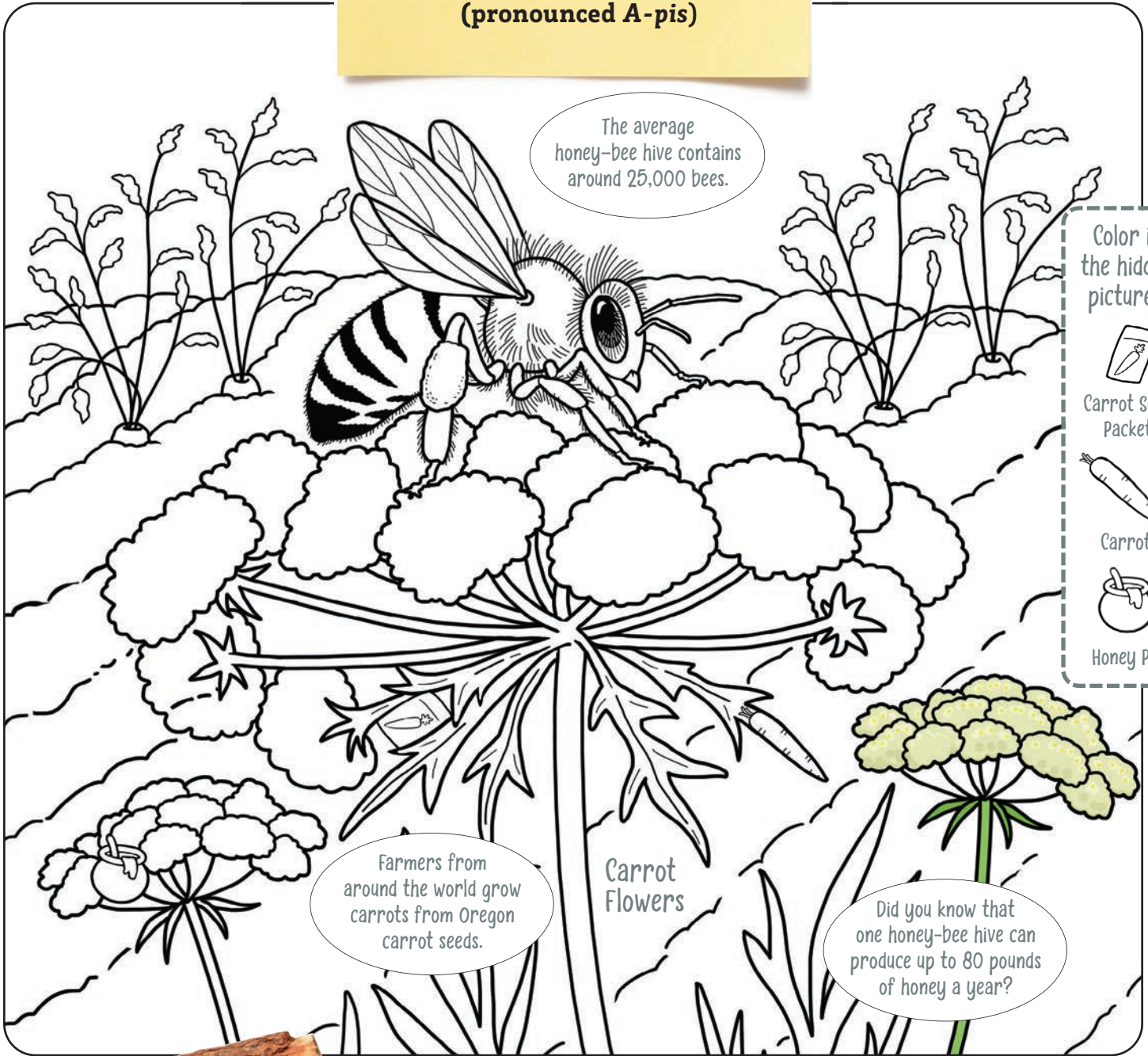






Social Bees
Honey Bees
 Genus: *Apis*
 (pronounced A-pis)



Honey Bee
 12 to 15 mm in length



The average honey-bee hive contains around 25,000 bees.

- Color in the hidden pictures!
-  Carrot Seed Packet
 -  Carrot
 -  Honey Pot

Farmers from around the world grow carrots from Oregon carrot seeds.

Carrot Flowers

Did you know that one honey-bee hive can produce up to 80 pounds of honey a year?

Field Notes:

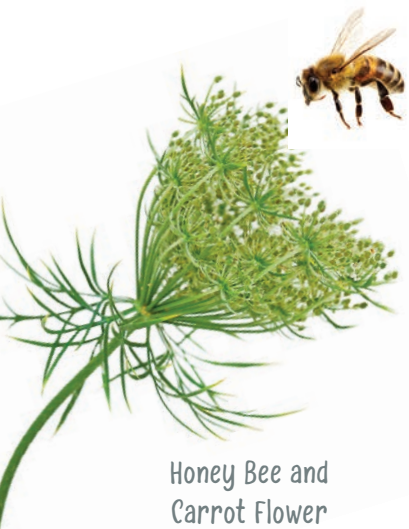
Honey bees are pollinators of agricultural crops worldwide. That's because they pollinate many different types of plants (some other bee species are very picky eaters), and they are easy to manage. For hundreds of years, beekeepers have known how to raise them in portable nests that they can move from field to field. Honey bees make tasty honey, too, which is how they got their name. They are medium-sized bees that range in color from black to pale yellow. Colonizing Europeans brought honey bees to North America starting in the 1620s. In Oregon, they are one of the only pollinators of carrots, which Oregon farmers mainly grow not for the vegetable, but for the seeds produced by carrot flowers.

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A trait of these bees is that they are easy to manage.

Name a synonym for manage:



Honey Bee and Carrot Flower

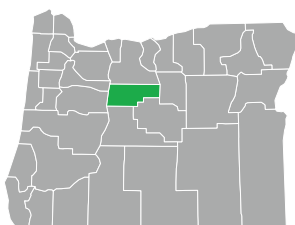
Carrot Peach Smoothie



Much of the carrot seed used to grow carrots across the United States comes from Jefferson County, Oregon. Enjoy this tasty smoothie recipe thinking about the honey bees of Oregon!

Ingredients

- 1 can (15 ounces) **peaches**, undrained*
- 1 cup **carrots** (frozen, cooked from fresh, or canned and drained)
- 1 medium **banana**, peeled (fresh or frozen)



Directions

1. Wash hands with soap and water.
2. Combine all ingredients in a blender or food processor, including juice from the canned peaches.
3. Blend until smooth and serve right away.
4. Refrigerate or freeze leftovers within 2 hours.

*Want to use fresh or frozen peaches instead? Use 1½ cups fresh or frozen peach slices and ½ to ¾ cup water or 100% fruit juice.

Visit FoodHero.org for more great-tasting smoothie recipes!



Makes 3 cups
Prep time: 5 minutes

Watch Oregon farmers harvest carrots:



Nutrition Facts

3 servings per container	
Serving size	1 cup (208g)
Amount per Serving	
Calories	130
<small>% Daily Value*</small>	
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 50mg	2%
Total Carbohydrate 31g	11%
Dietary Fiber 3g	11%
Total Sugars 25g	
Includes 0g Added Sugars	0%
Protein 2g	
Vitamin D 0mcg	0%
Calcium 17mg	2%
Iron 0mg	0%
Potassium 301mg	6%
Vitamin A 324mcg	36%
Vitamin C 6mg	6%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Recipe Math Challenge

The food truck is making summer lunches for 75 children. A smoothie will be served with each lunch. The recipe serves 3 children, so we will need to increase it! About how much of each of these ingredients do we need to buy to serve all the children tomorrow?

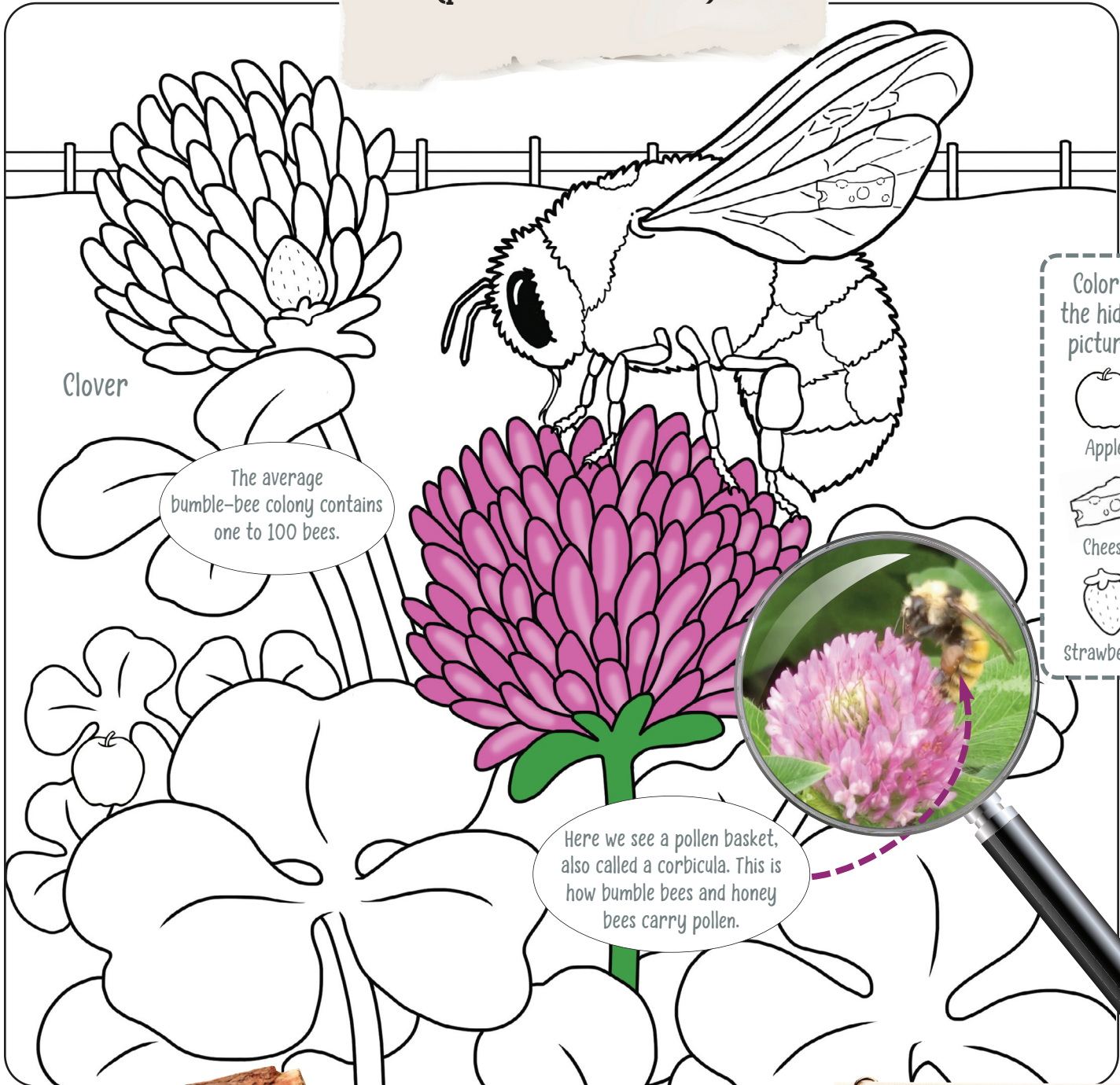
- 🌻 Cans of peaches _____
- 🌻 Cups of frozen carrots _____
- 🌻 Whole bananas _____



Social Bees
Bumble Bees
 Genus: *Bombus*
 (pronounced BOM-bus)



Bumble Bee
 11 to 23 mm in length



Clover

The average bumble-bee colony contains one to 100 bees.

Here we see a pollen basket, also called a corbicula. This is how bumble bees and honey bees carry pollen.

Color in the hidden pictures!



Apple



Cheese



Strawberry

Field Notes:

Bumble bees are important pollinators of many wild and **agricultural** plants (plants grown by farmers). Some of the crops they pollinate include cranberries and other berries, apples, tomatoes, peppers and squash. They are large and fuzzy bees, and their bodies are most often colored with a mixture of black, yellow, orange, brown or white hairs. In Oregon they are important pollinators of red clover. Oregon is one of the largest growers of clover seed in the world. Farmers buy the seed to grow clover plants, which are fed to cows and other livestock that give us milk, cheese, yogurt, eggs, meat and more.

Color this page online and more at: [FoodHero.org/bees](https://www.foodhero.org/bees)



A trait of this bee is that it is large. A synonym for large is:



Bumble Bee and Clover

Bell Pepper Nachos



Bumble bees not only help produce cheese, but also pollinate many crops grown in greenhouses, such as tomatoes and peppers. Enjoy bumble bees' hard work with this Food Hero recipe.

Ingredients

- 4 bell peppers
- 1 cup **salsa** (try Food Hero's Quick Tomato Salsa)
- 2 teaspoons **seasoning** (try one or a mixture- chili powder, garlic powder, ground cumin, pepper)
- 2 cups cooked **beans** or meat (chopped or shredded), or try a combination
- 3/4 cup shredded **cheese**

Directions

1. Wash hands with soap and water.
 2. Preheat oven to 350 degrees F.
 3. Wash bell peppers, remove seeds and cut into bite-sized pieces. Arrange pieces close together in a single layer on a large foil-lined baking sheet.
 4. In a medium bowl, combine salsa, seasonings, beans and/or meat. Spoon the mixture evenly over pepper pieces. Top with cheese.
 5. Bake for 15 minutes, or until peppers are heated through and cheese is melted. Serve warm.*
 6. Refrigerate leftovers within 2 hours.
- *Try some toppings for more flavor, like chopped green onions, cilantro or black olives.



Makes 8 cups
Prep time: 5 minutes
Cook time: 15 minutes



Nutrition Facts	
8 servings per container	
Serving size	1 cup (136g)
Amount per Serving	
Calories	100
% Daily Value*	
Total Fat 3.5g	4%
Saturated Fat 1.5g	8%
Trans Fat 0g	
Cholesterol 20mg	7%
Sodium 340mg	15%
Total Carbohydrate 9g	3%
Dietary Fiber 3g	11%
Total Sugars 3g	
Includes 0g Added Sugars	0%
Protein 9g	
Vitamin D 0mcg	0%
Calcium 72mg	6%
Iron 1mg	6%
Potassium 211mg	4%
Vitamin A 46mcg	5%
Vitamin C 48mg	53%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.



Recipe Math Challenge



The food truck is planning to sell 3,000 nacho plates next month. Each plate is a 1 cup portion.

🌸 How many bell peppers will you need? *Hint: each serving is half a pepper. Pay attention to how many cups a recipe makes. _____

What do bees use to make their nests?

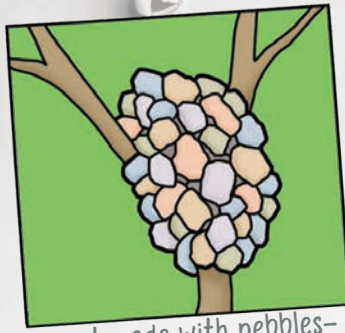
You might be familiar with bees' nests made from wax. But did you know that, depending on the species, bees use all kinds of different materials for nest building? They might use twigs, leaves, flower petals, mud, stones, plant resin or even snail shells! We must protect wild bees' nests so that bees can **thrive** (live healthy lives) and pollinate our food.



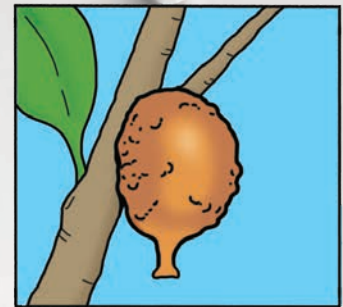
Wild Bees' Nests



A nest made in a shell-
mason bee



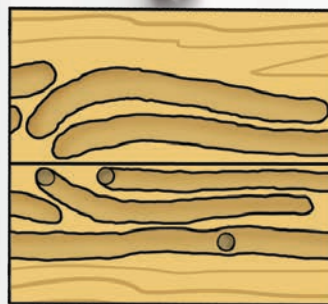
A nest made with pebbles-
pebble bees



A nest made of resin-
resin bees



A nest made from leaves-
leafcutter bees



Nests made in wood-
carpenter bees



Nests made in the soil-
mining bees

Draw a wild bee's nest.

Think about what type of bee made the nest. What materials did your bee use to make the nest? Why did your bee choose these materials?

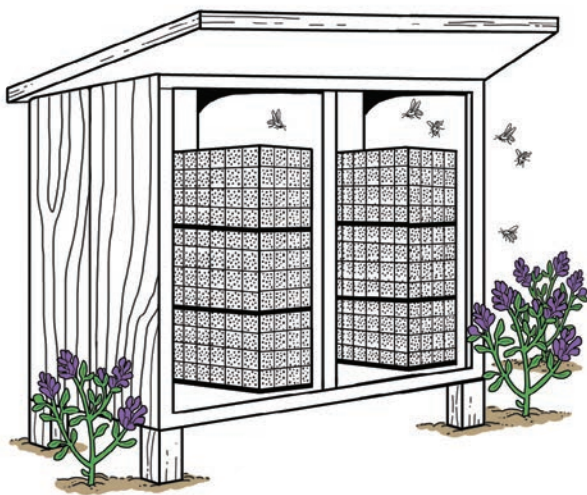
Managed Bees of Oregon

and Where They Live (nest)

For over 9,000 years, humans have been seeking out wild bee nests. From these nests they gather things like wax and honey. The bees in the nests also help them pollinate their crops. Over time, people also figured out how to raise some wild bee species using structures they built themselves. These bees are called **managed bees**. In Oregon we have four types of managed bees: **honey bees**, **leafcutter bees**, **mason bees** and **alkali bees**. Honey bees are raised to make honey and wax and to pollinate crops. Oregon's other managed bees are raised only for pollination. Below are three types of structures used to manage bees:

1 Tubes or blocks

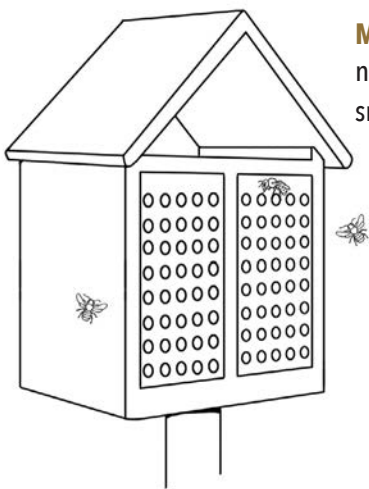
Managed **leafcutter bees** and **mason bees** nest in small tubes or in blocks with many holes in them. Hundreds of blocks or tubes are often stored next to each other in a bee shelter that protects the nests from rain and wind.



A leafcutter-bee shelter in an alfalfa field.

Managed bees do not fly far from their nest. Farmers place these nests next to the flowers being pollinated.

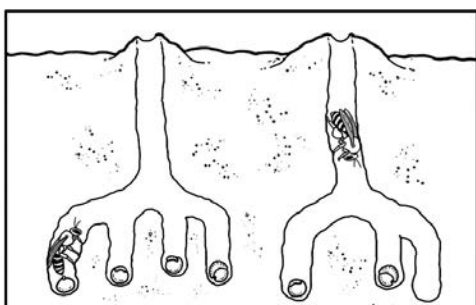
Mason bees nesting in small tubes.



Participants in the Oregon Master Beekeeper Program's Spanish-language track holding a frame from a top bar hive.

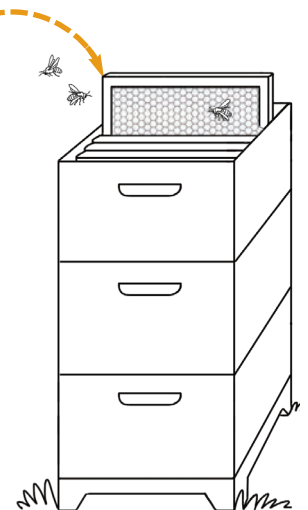
2 Hives

Honey bees are kept in boxes called hives and are the most common managed bee worldwide.



3 Underground nests

Alkali bees are raised in underground nests.



In the Field with Bees

and How to Safely Watch Them

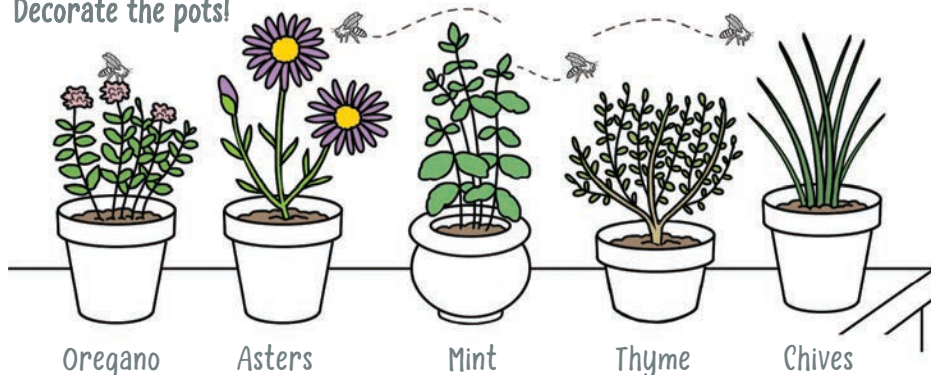
You can learn a lot about bees by watching them!

A great way to start is to find a patch of blooming flowers. Then, take a few minutes to watch the flowers to see if any bees appear. If they do, observe what they are doing and:

Follow these tips to keep you and the bees safe!

- ✓ Move slowly and watch what's going on around you so you avoid crushing or stepping on the bees.
- ✓ Do not pick bees up! If one lands on you, wait for it to leave on its own or gently brush it away.
- ✓ Do not run away from bees or swat them.
- ✓ Stay at least 10 feet away from bees if you see them coming in and out of a hole in the ground, a hole in a tree or a hole in a building.

Decorate the pots!



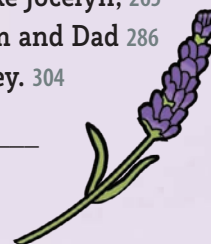
Hi! Welcome back! Thanks for helping with our math last week. The food truck is closed today, but I'd like to share a story about Jocelyn and bees!

Yesterday we went to the farmers' market. So many bees were flying around! Jocelyn got super scared when some of them swarmed around her. She started trying to swat them and shouted, "I don't like bees!" My friend Eli and I told her not to do that. We told her that bees usually don't sting unless they think they're in danger. She didn't believe us. A few minutes later, we saw her teacher, Mrs. Moran, buying flowers. Mrs. Moran backed us up. "Jocelyn," she said, "because of bees we have beautiful flowers to enjoy, and all kinds of tasty fruits to eat, like peaches and berries. Bees also give us honey. I use honey in my cooking." She even told Jocelyn that without bees, we wouldn't have pumpkins. Last school year, everybody in Jocelyn's class got a pumpkin. They pulled the seeds out, counted them, and then roasted them to eat. Plus, I read to Jocelyn some pages in my favorite bee book about being scared of bees. They said what to do so you won't get stung!

Jocelyn REALLY likes peaches and berries and honey and pumpkins! So now she has become a big fan of bees. In fact, now she loves bees so much, she's been coloring in pictures of them from my favorite bee book, and looking for them all over. You can color the pictures in your book, too, and just like Jocelyn, you can see how many different kinds of bees you can find. Now Jocelyn is trying to get Mom and Dad to start our own beehive so the bees can pollinate our garden and she can harvest their honey.

Fluency Tracker

Day 1 _____, Day 2 _____, Day 3 _____, Day 4 _____, Day 5 _____



Bee Word Game

Find a partner. Choose one person to be the “reporter” and one to be the “author.” Without reading the story aloud, the reporter asks the author to think of a word for each prompt under the blank lines below. The reporter writes in the author’s words. Then choose one person to read your very own funny story out loud!

When I go _____ bees, I _____
(verb) (verb)
for plants with lots of blooms or _____. If the
(noun)
weather is _____ and there are bees around, I
(adjective)
move _____ to avoid _____
(adverb) (verb ending in -ing)
them. I make sure to be _____ so I don’t injure or
(adjective)
disrupt them. I know to stay at least _____ feet
(number)
away from them, especially if they are _____
(verb ending in -ing)
into or out of a _____ in the ground, a
(noun)
_____ in a tree or a _____ in
(same noun) (same noun)
a building.



Leafcutter Bee



We need bees!

Fun Facts About Bees



Watching bees is a great way to learn about the amazing things they do, like how they help make healthy food!

True or False - Fun Bee Facts

1. Only female bees can sting.

True! The body part bees sting with (the stinger) is the same body part bees use to lay their eggs. Since only females lay eggs, only females can sting.

2. Bees can only sting one time.

True and False! This is true only for honey bees. All other bees can sting more than once. When a honey bee stings you, its stinger, along with a special venom sack, rips off the bee and sticks into you. This kills the bee.

3. Some people are allergic to bee stings.

True! Bee stings hurt for a few minutes, but most people are not harmed by them. Some people are allergic to bee stings and need to be extra careful when they are around bees.

4. Bees like to sting people.

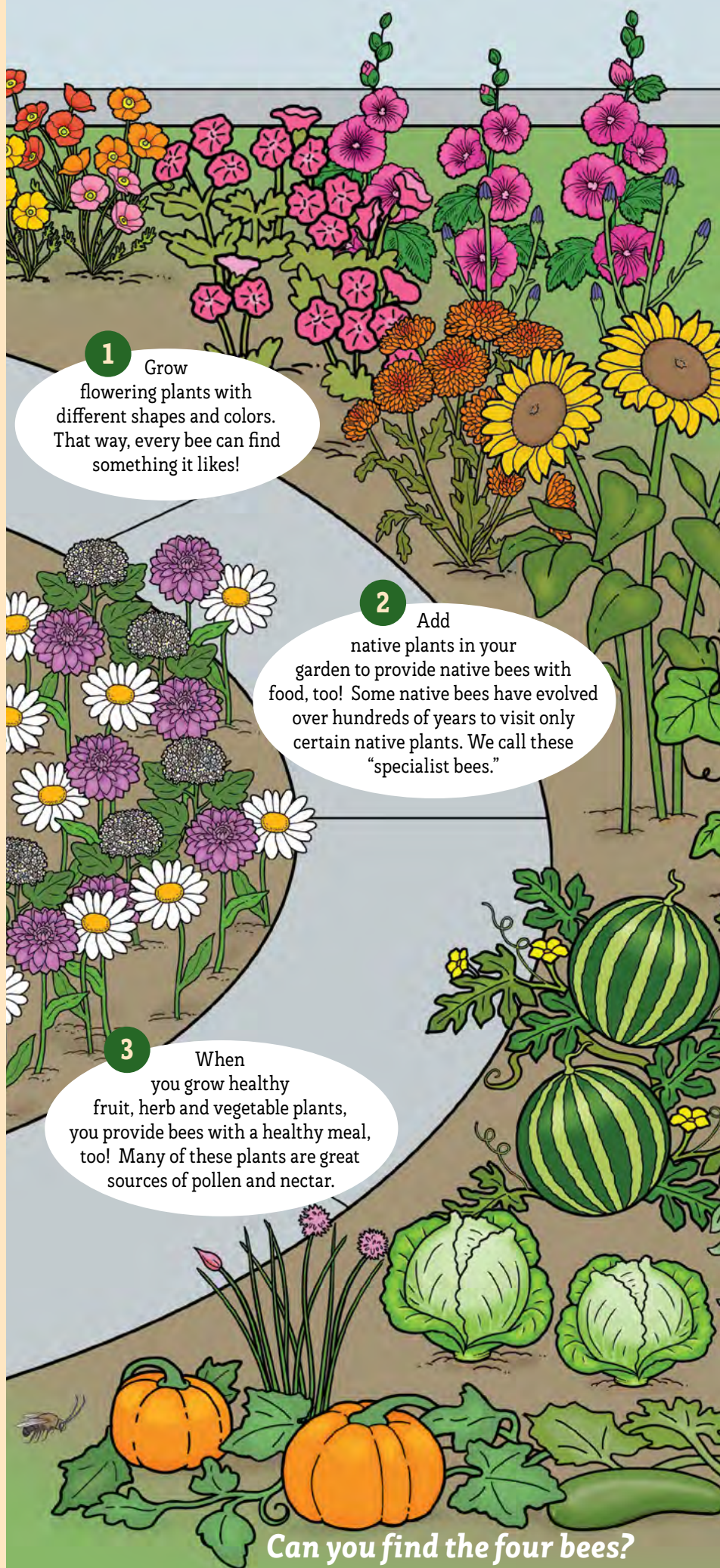
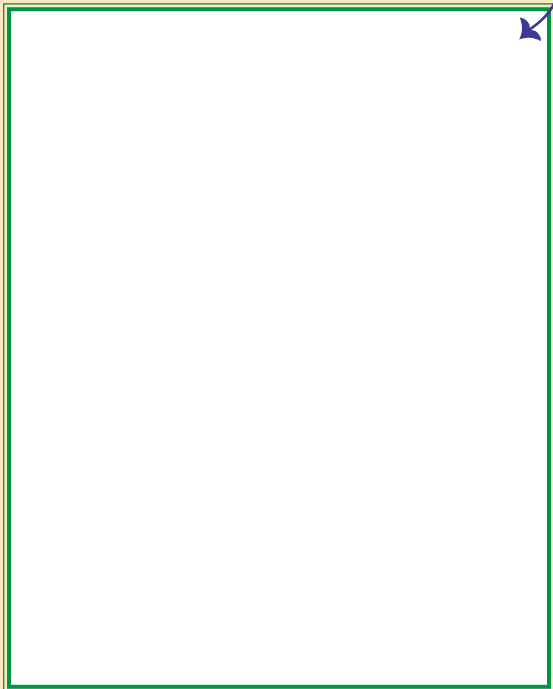
False! Bees would rather not sting you! Bees sting to protect themselves from creatures that want to eat them. Most humans do not threaten bees, so bees rarely sting them. When stings do happen, it’s often because someone accidentally swats or steps on a bee, or is standing too close to a nest. Most of the time, though, it is safe to observe bees around you.

What You Can Do for Bees

A school garden tour of ideas!

Some bees are active in the spring, some are active in the summer and some are active from early spring through fall. By making sure there is always something in bloom, you can help provide food for them all! This is extra important early in the spring and late in the fall when fewer plants are in bloom.

Add a garden sign or mural below!

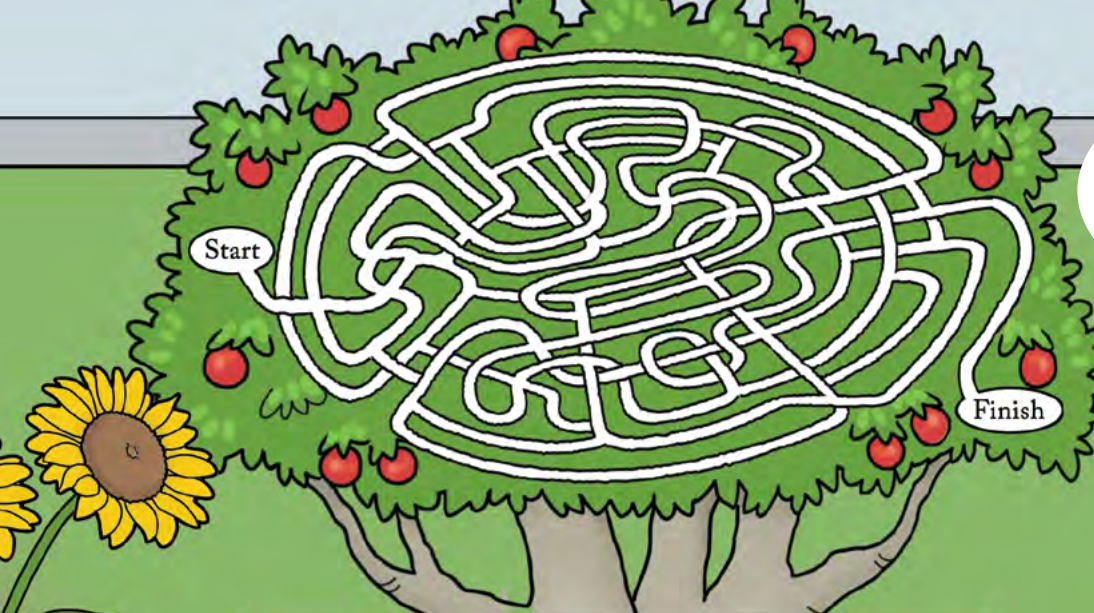


1 Grow flowering plants with different shapes and colors. That way, every bee can find something it likes!

2 Add native plants in your garden to provide native bees with food, too! Some native bees have evolved over hundreds of years to visit only certain native plants. We call these "specialist bees."

3 When you grow healthy fruit, herb and vegetable plants, you provide bees with a healthy meal, too! Many of these plants are great sources of pollen and nectar.

Can you find the four bees?



7

Try leaving parts of your garden wild. A tidy garden looks nice, but wild areas provide bees with important habitat. Bees use supplies like loose twigs, sticks, old leaves and logs to build their nests and stay safe in winter.



6

Add bee-friendly plants to your school or home yard, like a blueberry bush, strawberries or an apple tree.

8

Be a Bee Hero!

Share what you've learned about bees with your family, friends and neighbors.

Write down how you plan to help bees!



4

Did you know bees get thirsty, too? On warm days, place a shallow dish of water near flowering plants. Make sure to add a landing pad above the water; rocks or marbles work great. Then have fun watching bees drink in their bee bath!



5

Don't have a lot of space or time to tend plants? Provide bees with a great snack. Adopt a small flowering container plant.



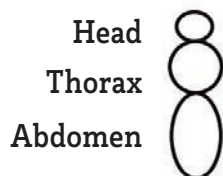
Draw your favorite bee of Oregon. Draw a flower from a plant that makes food and that your bee loves to visit. Add a nest if you want!



*Write about: How is this bee different from other bees? Why does your bee love this flower?
How does your bee help the flower make food?*

Bee Body-Part Checklist

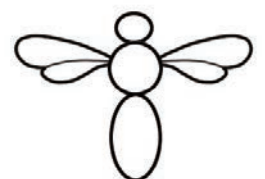
3 body segments



3 sets of legs



2 sets of wings



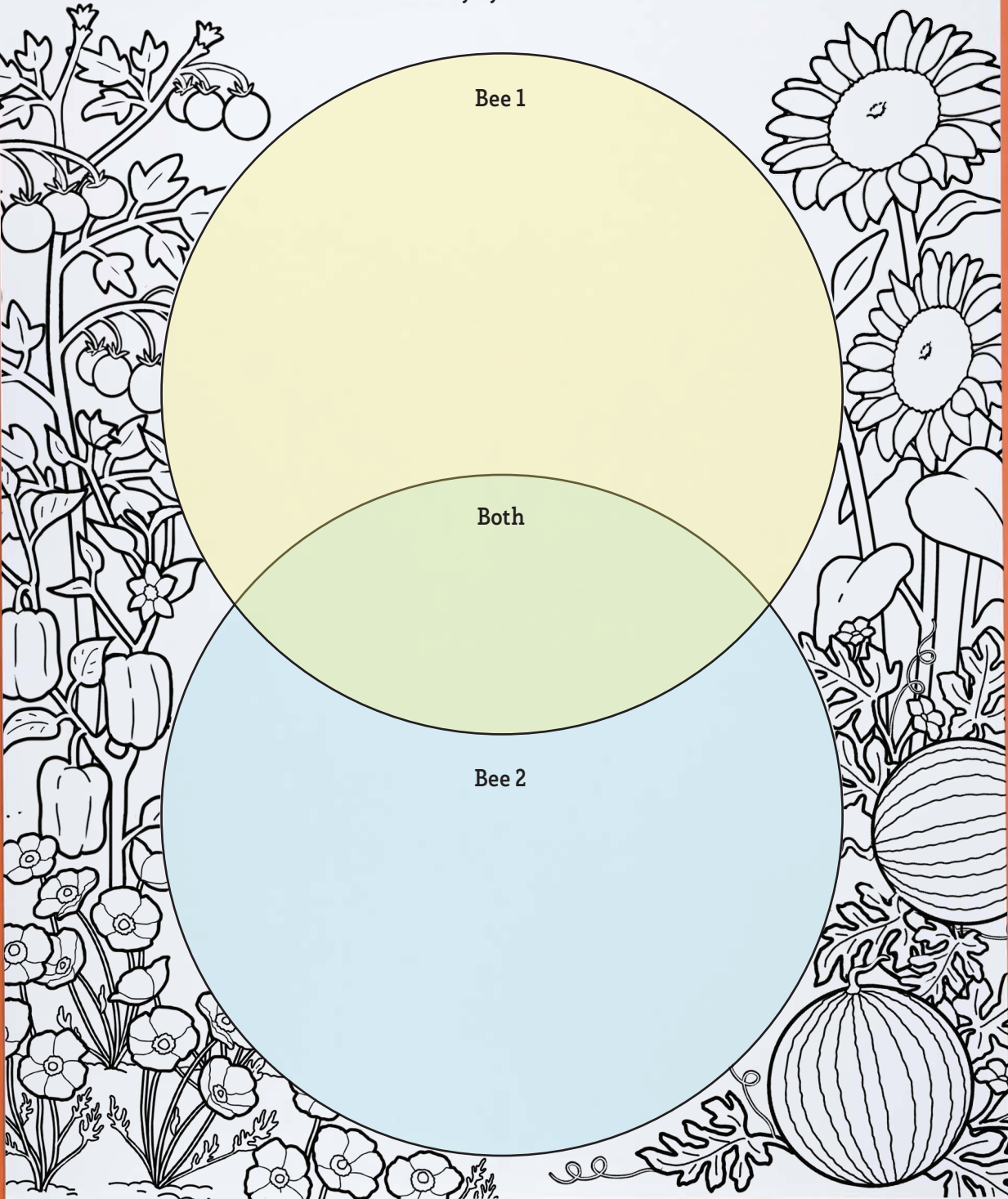


Compare Bees



Just like bee scientists (**mellitologists**), let's compare bees! Write down two bees to compare.

List or draw two or more ways your bees are alike and different.



Bee Word Search

Use the word bank to find the hidden names of Oregon bees.
Words can be horizontal, vertical, or diagonal.

O L M A G S O B A U N C R T M N
 A O I U N W L O T E R S A F I E
 C N H O N E Y B E E O N H O N C
 R G A G L A A Y A D L A F C A F
 I H L A O T E L Q M E R L L X R
 S O G I A B M A S O N B E E H O
 W R A I O E P A C E H K E V S N
 I N D H A E I U E L R B L E A H
 A E H S A F H B R A H C I R I A
 Q D A A U X E A R S A U A M P L
 A B C N A L C O A X L C E Y L K
 M E K U B W A U R R S K A R U A
 E E Q M A C Q L E T I O A Y K L
 N S U L C S U H H R L O V S S I
 P B C A R W O T A W R B F G T B
 B E S R C X A N T E J E Y E A E
 J T W L E A F C U T T E R B E E

Bees make healthy food!



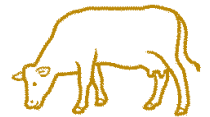
Bumble Bee



Honey Bee



Mason Bee



Leafcutter Bee



Green Metallic Sweet Bee



Long-Horned Bee



Squash Bee

Word Bank:

- | | |
|----------------|-----------------|
| Bumble Bee | Long-Horned Bee |
| Honey Bee | Cuckoo Bee |
| Mason Bee | Alkali Bee |
| Leafcutter Bee | Squash Bee |
| Sweat Bee | |



Talk with your family and friends about how bees make healthy food!

Find recipes by ingredient at www.FoodHero.org



Did you find the hidden images on all of the bee pages?





What I learned about bees

and how they help make healthy food



Notes:



Cherry Blossoms

Glossary



abdomen The segment of an insect's body behind its head and thorax (the middle body part where legs and wings attach).

adjective A word that describes a noun, such as its color, age or texture.

agricultural Referring to the science or practice of farming, including growing crops or raising animals for food, eggs or milk.

antennae A pair of long, thin sensory appendages (external body parts) on the heads of insects; used to smell, hear and feel.

confederacy A group or groups of people joined in or forming an alliance (relationship); a union.

cultivate To prepare and use land for farming or gardening; for example, to plant seeds or till the soil.

evaporate To convert into vapor (gas); to vaporize.

fertilize To introduce male reproductive material to an egg in a female animal or plant.

forage To search widely for food or provisions (supplies); to scavenge.

fuzzy Having a frizzy or fluffy texture or appearance (look); downy.

genus (The plural is *genera*.) A category or grouping that ranks above a species and below a family.

indigenous Referring to the people, plants or other organisms living on a land from the earliest times; native.

ingredient A component, part or element of something.

interdependent Referring to two or more organisms that are dependent on each other.

klepto Referring to an animal or insect that compulsively (can't stop themselves) steals.

livestock Insects and animals cultivated, grown or raised for commercial (to make money) purposes; farm animals.

mandible In an animal's mouth, a jawbone; in an insect's mouth, either half of the organ that crushes.

metamorphosis The transformation (change) of one form of organism into another, such as a larva into an adult.

migration The movement of a group of animals from one area to another; relocation.

nest A structure or place made to lay eggs or for protection; a roost; to build or occupy a nest.

noun A word that is used to name a person, place or thing.

nursery A place where plants are grown for transplanting (moving plants from one place to another), for use as stock and for sale.

offspring The immediate or first descendant of a person or organism; child.

pollinate To deposit pollen on a plant or flower, enabling fertilization.

proboscis In many insects, an elongated (long) sucking part of the mouth, similar to a tongue.

reciprocate To exchange or give back what one has received.

reproduce To produce or make a copy of; to breed.

scopa A small brush or tuft of hairs on some insects, such as bees, where pollen often collects.

solitary Existing or living alone or by itself.

species A group of living organisms that can mate with each other and produce offspring. As a category, a species ranks below a genus.

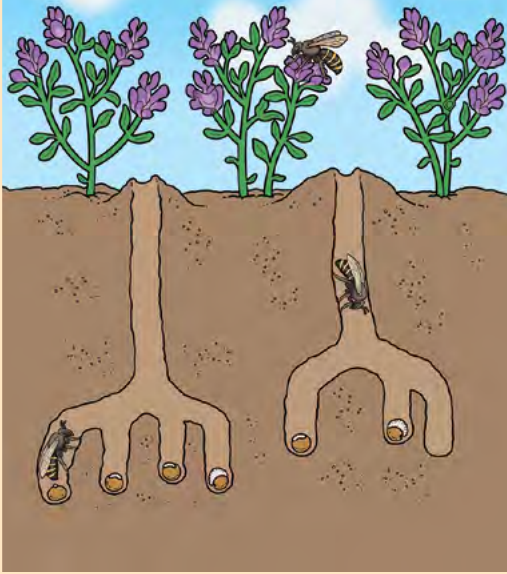
spoil To destroy the value or quality of something. When food spoils, it is not safe to eat.

trophallaxis The mutual exchange of regurgitated (spit up) liquids between adult social insects or between them and their larvae.

verb A word that identifies an action or a state of being.



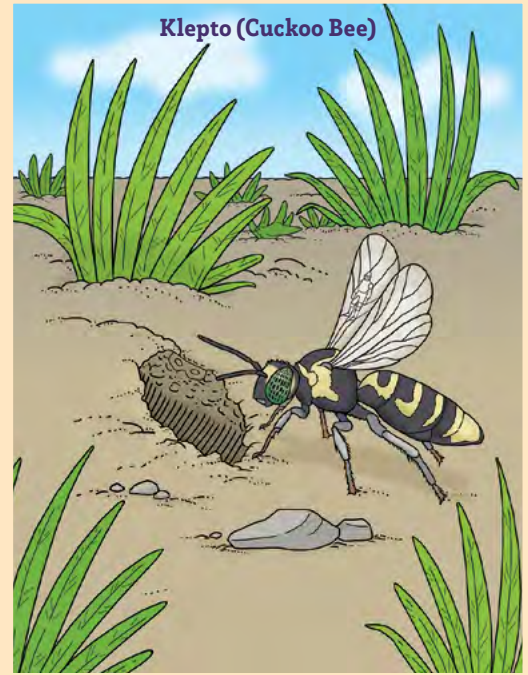
Salty Dog (Alkali Bee)



Bumbles (Bumble Bee)



Klepto (Cuckoo Bee)



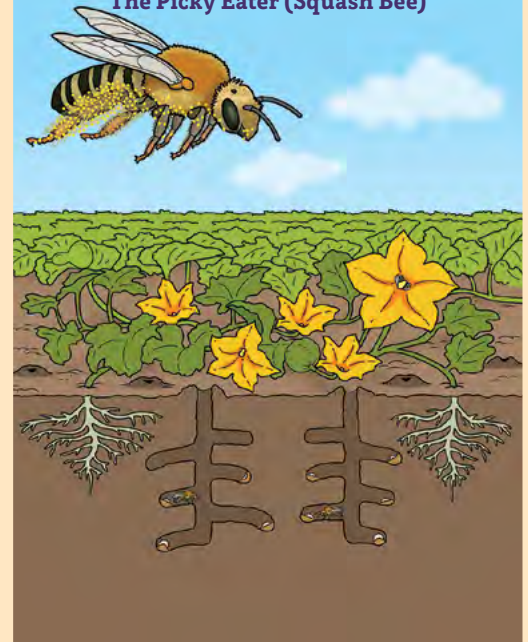
Waggle Dancer (Honey Bee)



Bling Bee (Green Metallic Sweat Bee)



The Picky Eater (Squash Bee)



Scissor Head (Leafcutter Bee)



Long Horns (Long-Horned Bee)



The Mason (Mason Bee)



“Bee” a Food Hero!

A Food Hero leads by example! Food Heroes teach their friends and family members about bees. They also help prepare meals and snacks using a variety of fruits and vegetables and other foods that depend on bees. This bee activity book is a great tool for Food Heroes! It was created by experts on bees, gardens and healthy eating. Native American Indigenous experts, farmers, elementary school teachers and students all helped to make this book special for you! It includes:

- Lots of information about bees, how they help us and how you can help them!
- Coloring pages for nine Oregon bees. Learn how to “ID the bee” and match it to the healthy foods it helps make. Plus, bees are paired with recipes that include an ingredient they help make!
- Over 25 activities, including word games, reading challenges, drawing, coloring, search the image, poetry and more.
- Twelve Bee Trading Cards to help you identify the bees you see outdoors. Plus, you can play a game with them!

Recipes Connected to Bees



Coloring Pages

Activity Pages



OREGON BEE ATLAS
oregonbeatlas.org



Oregon State University

