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, we sell great tasting lunches to customers from our truck. My little sister, Jocelyn, and I help our parents. We work in our garden to grow many of the foods we need for ingredients. We also help order the foods we don’t grow. Jocelyn and I go to school during the day. We help when there is no school and on the weekends. It’s hard work but we all love it.

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

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

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!
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.

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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).

**Parts of a Flower**

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

- (agismt) ________________ pollen-catching platform
- (teap) ________________ color attracts pollinators
- (pelas) ________________ leafy plant part that protects the flower bud
- (tesm) ________________ supports the flower and carries nutrients from the soil to different plant parts
- (inloep) ________________ a dusty powder that gives bees all the protein they need to feed their offspring, plus other nutrients
- (tanerh) ________________ where the pollen forms
- (laftimen) ________________ holds up the anther
- (rovya) ________________ develops into fruit after plant is fertilized. The small ovules develop into seeds within the fruit.
- (ancret) ________________ a sweet liquid made in the nectary glands. It gives bees all the energy (calories) they need to forage for pollen. It is their main carbohydrate source.
- (clatepecre) ________________ the thickest part of the stem, from which the flower grows

**Word Bank:**

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

**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.

**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.

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

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

Cool-weather blossoms

Helped to grow by mason bees

At cherries fresh or in fruit salad or parfait!

Ruby red

Ripe in midsummer

You 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. 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.

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.

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 __________.

Bees need Bee __________!
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.

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

Adapted from the Oregon Agriculture in the Classroom Foundation’s Grown in Oregon map of the leading and unique commodities grown. https://oregonaitc.org/
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!

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.

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]
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.
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.

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 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.

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

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?

Name a synonym for fuzzy: ____________________

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

The Story of Squash and Squash Bees in Oregon

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!

1. Squash plants are in bloom! The flowers are open and the anthers are exposed.
2. A female squash bee travels to a squash plant to collect pollen from an exposed anther of a squash flower.
3. When conditions are just right, the squash plant starts growing a squash with seeds inside.
4. The bee travels to another squash plant nearby.
5. Pollen collected from the first flower falls on the stigma of the second flower.
6. After the squash is harvested, seeds can be planted to start the process over.

Pollen is produced on anthers and nectar is made at the base of the flower on floral nectaries. Through pollination, plants make new seeds and more plants.

The Story of Squash and Squash Bees in Oregon

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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

### 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.

### 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 __________

### Nutrition Facts

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*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.
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.

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

-Erin Angus
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.

**Field Notes:**

A trait of this bee is that it is a fast pollinator.

Name a synonym for fast:

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**Color this page online and more at:** FoodHero.org/bees
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*
- ⅔ cup chopped *peaches* (fresh, frozen, or canned and drained)
- ⅔ 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!

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 ⅓ cups of fresh chopped peaches! We decide to substitute frozen peaches for the fresh peaches.

(STAR) How many more cups of peaches will we need to make this recipe?

![Mason Bee and Cherry Flowers](https://beav.es/TJ3)

Watch the Oregon cherry harvest in action:

Visit FoodHero.org for a tasty Skillet Granola recipe!

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<td><strong>Dietary Fiber</strong></td>
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<tr>
<td><strong>Total Sugars</strong></td>
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<tr>
<td><strong>Includes 1g Added Sugars</strong></td>
</tr>
<tr>
<td><strong>Protein</strong></td>
</tr>
</tbody>
</table>

*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.*

[Food Hero Logo]

[FOOD HERO]

[FOOD HERO]

**Mason Bee and Cherry Flowers**

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.

Visit FoodHero.org for a tasty Skillet Granola recipe!
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.
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.
**Solitary Bees**

**Long-Horned Bees**

*Genus: Melissodes*

(pronounced mel-eh-SOH-dees)

*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.

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

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

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

Nutrition Facts
6 servings per container
Serving size 2 balls (43g)

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</table>

*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.
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.

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

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

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

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

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

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.

Nutrition Facts

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<tr>
<td>Protein</td>
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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 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!
Can you guess what honey bees’ superpower is? They make and store honey!
In fact, they are some of the only bees that can! Honey making is an amazing process. First, older worker bees collect nectar from flowers. They swallow the nectar and fly back to the hive. There, they spit it out and pass it off to another, younger worker bee. The younger bee takes the nectar and swallows it herself. This process is called trophallaxis (tro-ful-AK-sis). The younger bee travels to an open section of honey comb and spits the nectar out into an open honeycomb! Ewwwww! How can something so gross taste so good? Well, the bees’ spit has special chemicals called enzymes. As the nectar sits in the honeycombs, the enzymes make its sugars easier to digest (break down when they are eaten).

Younger worker bees take turns fanning the nectar with their wings. This causes water in the nectar to evaporate (dry up and change to gas). The nectar becomes sweeter and stickier. After a few days, it turns into honey. Unlike nectar, which can easily spoil (go bad), honey can stay good to eat for a long time if it doesn’t get wet.

Next, the worker bees cover the honey in the honeycombs with wax. Do they do this to keep it warm? No! The wax keeps water out of the honey. That’s important because the honey is the bees’ food. All winter, when there are no flowers blooming and it is too cold to go outside, they will eat it for energy. Storing honey allows bees to stay active year round! Have you ever seen honey bees flying on a warm day in December? They aren’t out to play! They are probably pollinating an early crop like almonds.

Honey bees don’t wear masks or fight crime. But now you know why they’re superheroes!
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 ¾ 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 ½ 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.

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!
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.

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

**Nutrition Facts**

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<thead>
<tr>
<th>Serving size</th>
<th>Calories</th>
<th>% Daily Value*</th>
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- **Saturated Fat**: 0g  
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- **Cholesterol**: 0mg  
- **Sodium**: 50mg  
- **Total Carbohydrate**: 31g  
- **Dietary Fiber**: 3g  
- **Total Sugars**: 25g  
- **Protein**: 2g

*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 __________

Makes 3 cups  
Prep time: 5 minutes
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.

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

____________________

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

**Nutrition Facts**

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**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**

*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?
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.

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.
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.

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 ____________ for plants with lots of blooms or ____________. If the ____________ weather is ____________ and there are bees around, I ____________ move ____________ to avoid ____________. I make sure to be ____________ so I don’t injure or ____________ disrupt them. I know to stay at least ____________ feet away from them, especially if they are ____________ into or out of a ____________ in the ground, a ____________ in a tree or a ____________ in a building.

---

**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!

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**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.

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?

Add a garden sign or mural below!

Watch a family in Oregon at a community farm

https://beav.es/Twb

Can you find the four bees?
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!

1. 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!

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

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

4. 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.

5. Be a Bee Hero!
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?

<table>
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<tr>
<td>Abdomen</td>
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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.

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?

Bees make healthy food!
What I learned about bees
and how they help make healthy food

Notes:
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.

trochophore 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.
“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!