Explore the Bees of Oregon

and how they help make our food

THE OREGON BEE PROJECT

OREGON HARVEST for SCHOOLS

Oregon State University Extension Service

FOOD HERO FoodHero.org

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OREGON HARVEST for SCHOOLS

Oregon State University

OREGON BEE ATLAS
oregonbeeatlas.org

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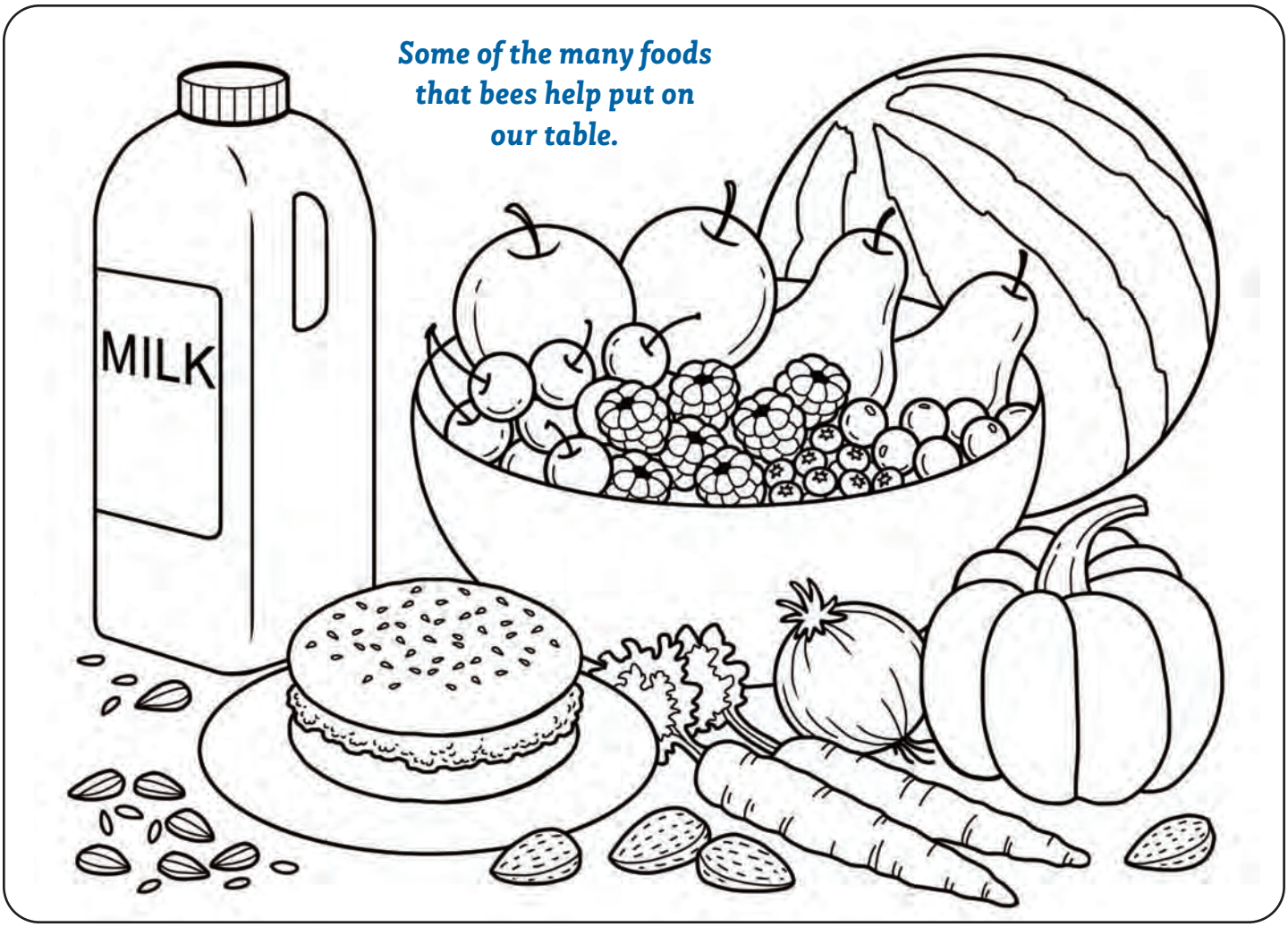
What Bees Do for Us

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? Through a process called ***pollination***. Bees pollinate many different crops, including types of fruits, vegetables, grains, nuts and seeds. Many of these crops are grown in the state of Oregon, and Oregon bees pollinate them. Some 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 600 different types of bees. In this book, you will get to know some of these bees and learn why they are so important to farmers in Oregon, across the United States, and around the world.



Some of the many foods that bees help put on our table.

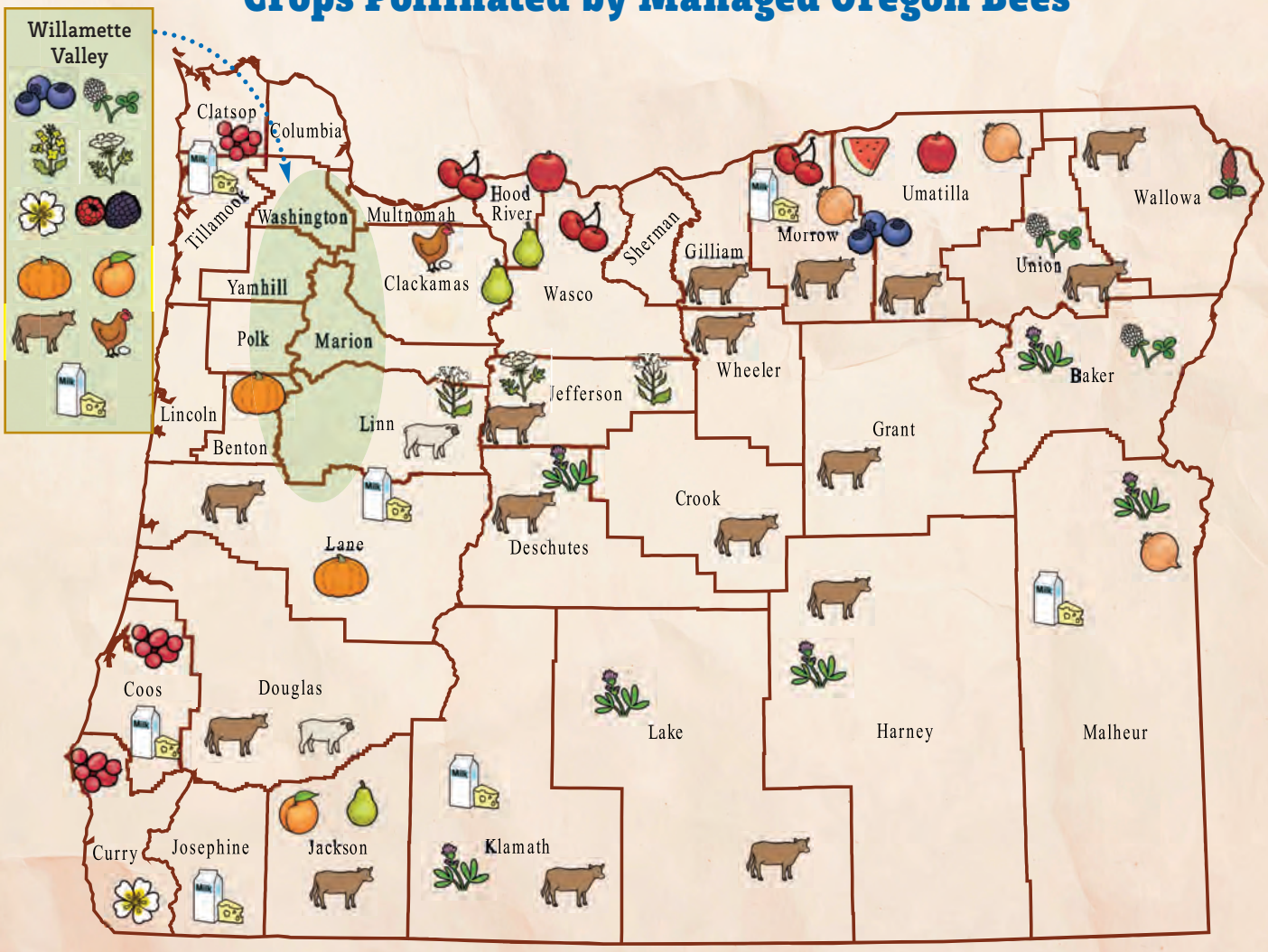
What Bees Do for Oregon Crops

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. Use the legend below to connect each crop with the counties where it most often grows.

Map Legend

- Alfalfa seed
- Apples
- Beef
- Blackberries
- Blueberries
- Carrot seed
- Caneberries
- Cherries
- Clover seed
- Chickens/eggs
- Cranberries
- Crimson clover seed
- Dairy
- Meadowfoam
- Mustard seed
- Onions
- Peaches
- Pears
- Pumpkins
- Sheep
- Vegetable/flower seed
- Watermelon

Crops Pollinated by Managed Oregon Bees



Adapted from the Oregon Agriculture in the Classroom Foundation's Grown in Oregon map.

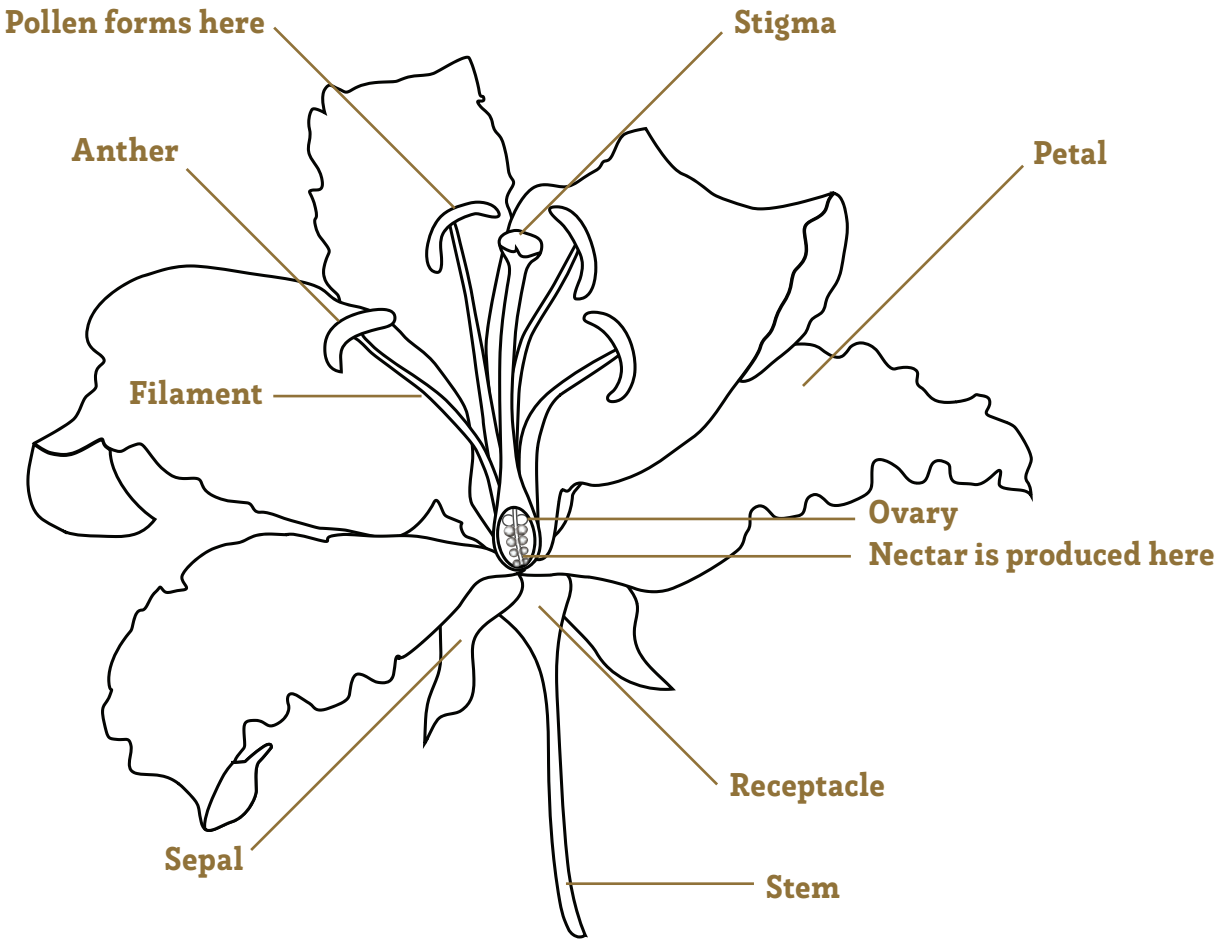
Pollination: How Does It Work?

Bees visit flowers to collect ***pollen*** and ***nectar*** to feed themselves and their ***offspring*** (babies).

Pollen is a powdery dust that forms on the ***anthers*** of flowers. Pollen provides bees with nutrients, including all the protein they need to feed their offspring. Pollen also helps plants make the seeds that grow into fruits we like to eat. Bees collect pollen in a process called ***foraging***. When bees forage, the fuzzy hairs on their bodies help them pick up tiny grains of pollen. As bees travel from flower to flower, some of the pollen they've been collecting is left behind. If the pollen from one flower makes it to the ***stigma*** (a special pollen-catching platform) of another flower of the same type, and conditions are just right, the flower is ***fertilized***. This process is called ***pollination***. The flower then starts making seeds. Seeds are one of the ways that plants make more plants (reproduce).

Nectar is a sweet liquid that is most often produced at the base of flowers. Nectar provides bees with all the daily calories they need to fly around and look for pollen.

Parts of a Flower



Squash Bee and Squash Flower

Three Sisters Soup

What are first foods? First foods are traditional foods eaten by Indigenous Peoples. Some important first foods include: squash, corn, beans, pumpkins, sunflowers, wild rice, sweet potatoes, tomatoes, peppers, cranberries, blueberries, salmon and turkey. Many first foods rely on wild bees like the squash bee to reproduce. Enjoy this Food Hero recipe, which includes some first foods.

Ingredients

1 1/2 Tablespoons **vegetable oil**

3/4 cup diced **carrot**

1 cup chopped **onion**

1 teaspoon **garlic powder** or 4 cloves **garlic**, minced

2 cups diced **summer** or **winter squash** (fresh or frozen)

1 1/2 cups **corn** (fresh or frozen) or a 15-oz can (drained and rinsed)

1 1/2 cups **cooked beans** (any type) or a 15-oz can (drained and rinsed)

1 can (15 ounces) diced **tomatoes** or 2 cups diced fresh

3 1/2 cups low sodium **broth** (any type)

1 teaspoon **cumin**

1/4 teaspoon **pepper**

Makes 8 cups
Prep time: 15 minutes
Cook time: 30 minutes

Directions

1. Wash hands with soap and water.
2. Heat oil in a large pan on medium heat. Add carrot and onion and saute until onions have begun to turn slightly brown, about 8 to 10 minutes.
3. Add garlic, squash and corn and continue to stir for another 3 to 4 minutes.
4. Add beans, tomatoes, broth, cumin and pepper.
5. Allow soup to come to a boil and then 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.

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 0	
Cholesterol 0mg	0%
Sodium 130mg	6%
Total Carbohydrate 28g	10%
Dietary Fiber 7g	26%
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.

Thanks to the Food Hero Indigenous Peoples work group for this recipe.

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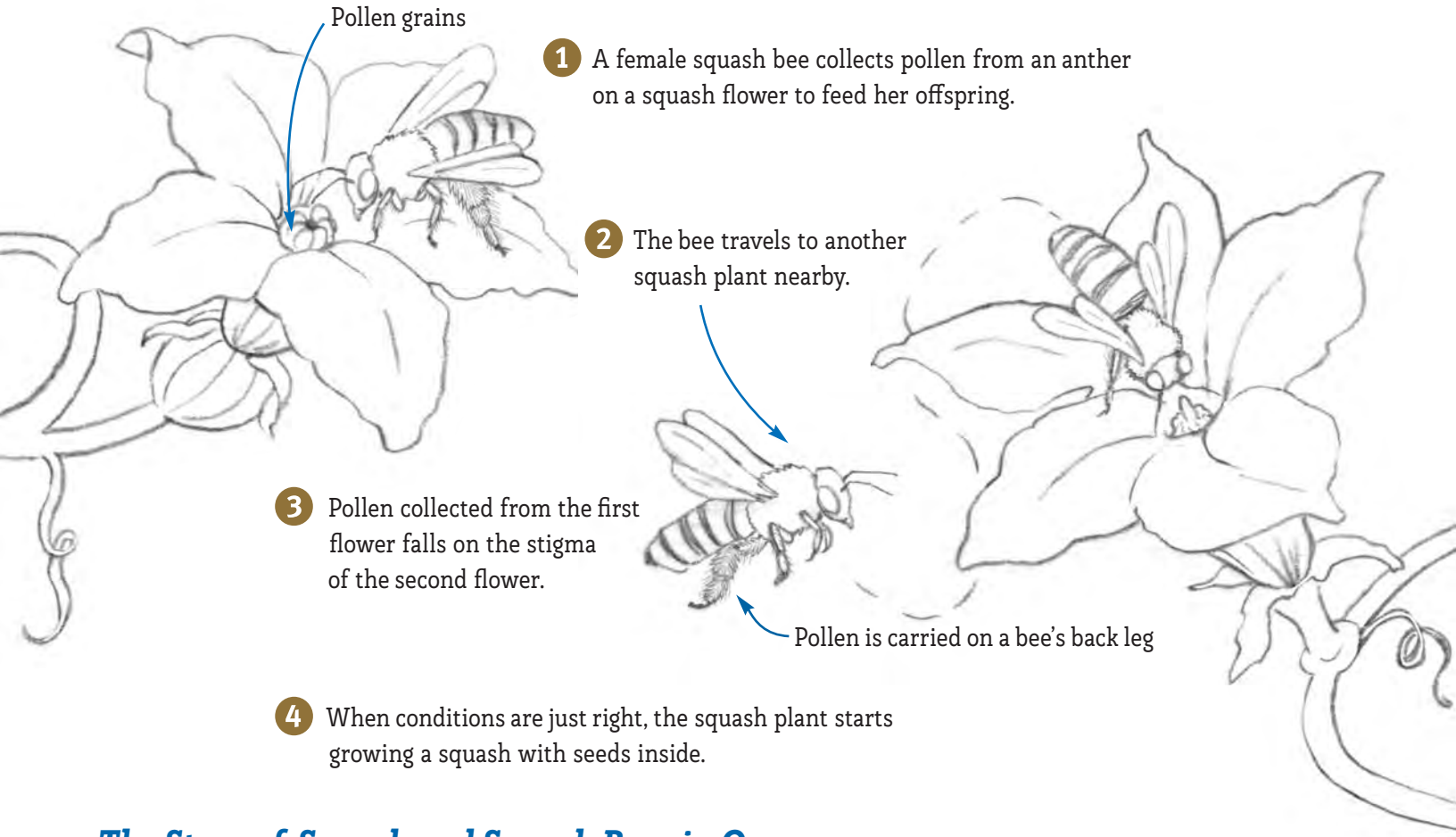
Pollination in Action

The Pollination of a Squash Plant

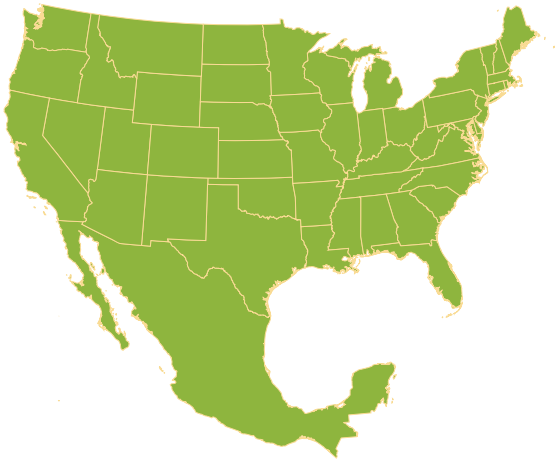
Follow this species of squash bee, ***Peponapis pruinosa***, as it pollinates a squash flower.



1. A female squash bee collects pollen from an anther on a squash flower to feed her offspring.
2. The bee travels to another squash plant nearby.
3. Pollen collected from the first flower falls on the stigma of the second flower.
4. When conditions are just right, the squash plant starts growing a squash with seeds inside.

The Story of Squash and Squash Bees in Oregon

Squash bees are medium-sized, fuzzy bees that feed only on the nectar and pollen of squash plants. Squash bees have a close link to Indigenous Peoples, who brought squash-growing to what is now North America from what is now Central and South America around 5,000 years ago. The bees followed Indigenous Peoples as they traveled north, planting squash as they moved. Indigenous Peoples and European colonizers for many years never grew enough squash in the Pacific Northwest (Idaho, Oregon and Washington) to attract the bee, so the squash bee had never been spotted in Oregon. In 2017, kids at a summer camp in Ashland spotted the squash bee in a garden for the first time. See if you can find this bee in your community!



Fruits vs Vegetables:

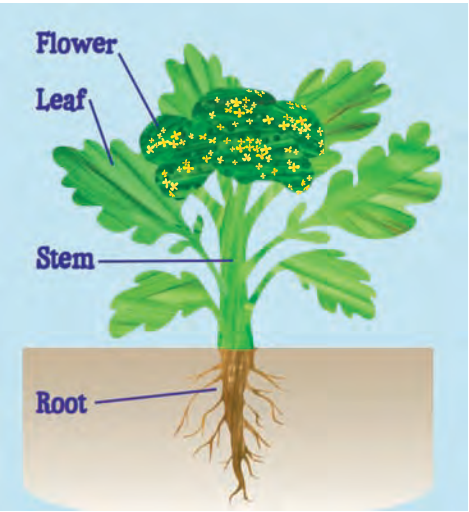
What's the Difference?

Fruits and vegetables are plant parts that are good to eat. Vegetables include roots, leaves, stems, and even flower buds (see image below). Examples of vegetables are lettuce, potatoes and broccoli.

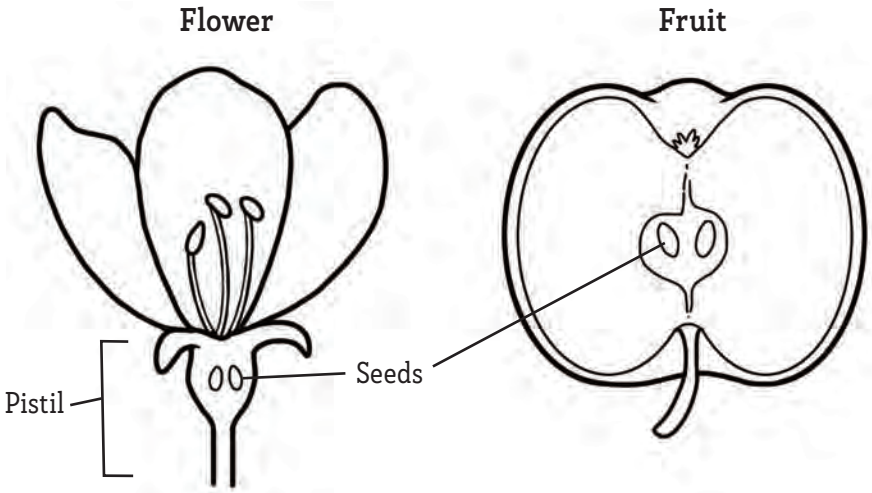
Fruits all start as flowers. After the flowers of some plants have been pollinated, the flower then grows around the seed and forms a fruit. Examples of fruit include apples, cherries, and squash. In nature, fruit helps plants spread their seeds for miles: animals come to the plant to eat the tasty fruit and then spread its seeds in their poop.

Some fruits, such as tomatoes, green beans, peppers, avocados, and squashes, also get called vegetables. We call them vegetables in cooking and nutrition because they are more similar to other vegetables than fruits when it comes to how they taste and the nutrients they provide.

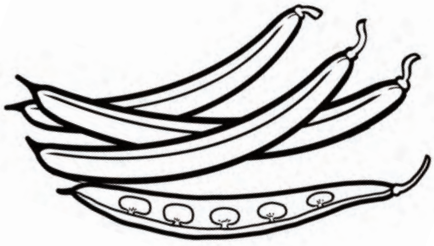
The Parts of a Plant



The Part of an Apple Flower that Turns into a Fruit



Did you know that when you eat broccoli you are eating the plant's little immature flower buds? Heads of broccoli are made up of many little flowers that have yet to open. Broccoli is botanically and nutritionally a vegetable, and people enjoy eating its stem and flowers.



Also called string beans, green beans are green, fleshy pods that grow around the seeds of a bean plant. Most people think of green beans as a vegetable; however, they are botanically a fruit.

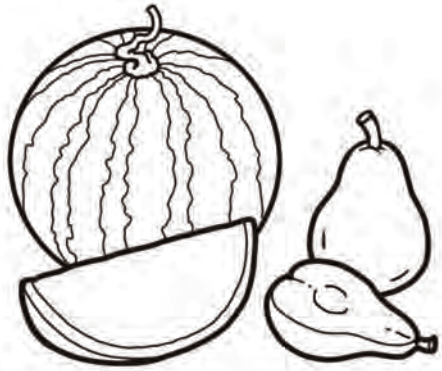
Whether we call them fruits or vegetables, the plant parts we eat are packed with different nutrients and we need bees to help them grow!

All About Seeds

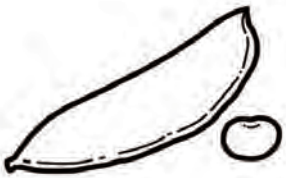
Sunflowers are a plant with seeds we can eat.

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 grow into plants that make pollen.

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.

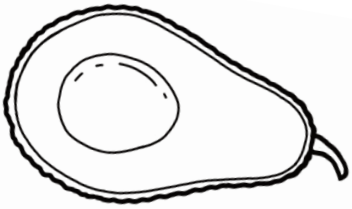


How come some fruits don't have seeds? There are two main reasons: Some fruits, like seedless watermelons, have been bred to produce as few tiny seeds as possible. Other plants, like pears, are able to produce fruit without being pollinated. When this happens, the resulting fruit won't have any seeds.

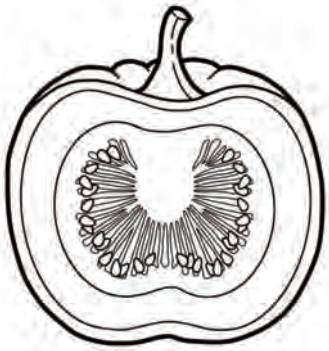


Do you think beans are seeds? You likely don't think of beans (like kidney, pinto and black beans) as seeds, but they are the seeds of a bean plant. They grow inside a green, fleshy pod. Nutritionally, beans are unique: they are considered both a vegetable and a protein food.

Many plants have seeds we can eat. You can carve a pumpkin and roast and eat its seeds, or dry the seeds out and save them to plant.



How big are seeds? Seeds come in all shapes and sizes. Avocados have one large seed.



Can you think of some other seeds we can eat? How about sesame and sunflower seeds? Seeds are packed with nutrients our bodies can use because they have those nutrients stored inside them to grow into a plant!

Mason Bee and Cherry Flowers

Cherry Crumble

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. Think of mason bees hard at work while you enjoy this gooey, cherry-packed Food Hero recipe!

Ingredients

1/4 cup **sugar**

1 Tablespoon **cornstarch**

4 cups pitted **tart cherries** (fresh, frozen, or canned and drained)

1/2 teaspoon **vanilla**

1/3 cup **whole-wheat flour**

1/3 cup **old fashioned rolled oats**

2 Tablespoons packed **brown sugar**

2 Tablespoons **margarine** or **butter**, melted

Makes 3 cups
Prep time: 15 minutes
Cook time: 30 to 45 minutes

Directions

1. Preheat oven to 350 degrees F.
2. In a large bowl, mix together the sugar and cornstarch. Add the cherries and vanilla and mix well.
3. Pour the fruit into an 8x8-inch baking dish.
4. In a medium bowl, mix together the flour, oats and brown sugar. Add the melted butter and stir until the texture is coarse with some clumps. Sprinkle the oat topping over the fruit.
5. Bake for 30 to 45 minutes, or until the juices are bubbling and the oat topping is golden brown.
6. Refrigerate leftovers within 2 hours.

Notes

• No tart cherries? Use sweet cherries (or another fruit such as blueberries or chopped apricots, peaches or plums) and reduce the sugar added to the fruit in step two to 1 or 2 Tablespoons.

Nutrition Facts

6 servings per container

Serving size	1/2 cup (135g)
Amount per Serving	
Calories	**180**
	% Daily Value*
Total Fat 4.5g	6 %
Saturated Fat 1g	5 %
Trans Fat 0g	
Cholesterol 0mg	0 %
Sodium 40mg	2 %
Total Carbohydrate 34g	12 %
Dietary Fiber 3g	11 %
Total Sugars 22g	
Includes 13g Added Sugars	26 %
Protein 3g	
Vitamin D 0mcg	0 %
Calcium 22mg	2 %
Iron 1mg	6 %
Potassium 177mg	4 %
Vitamin A 83mcg	9 %
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.

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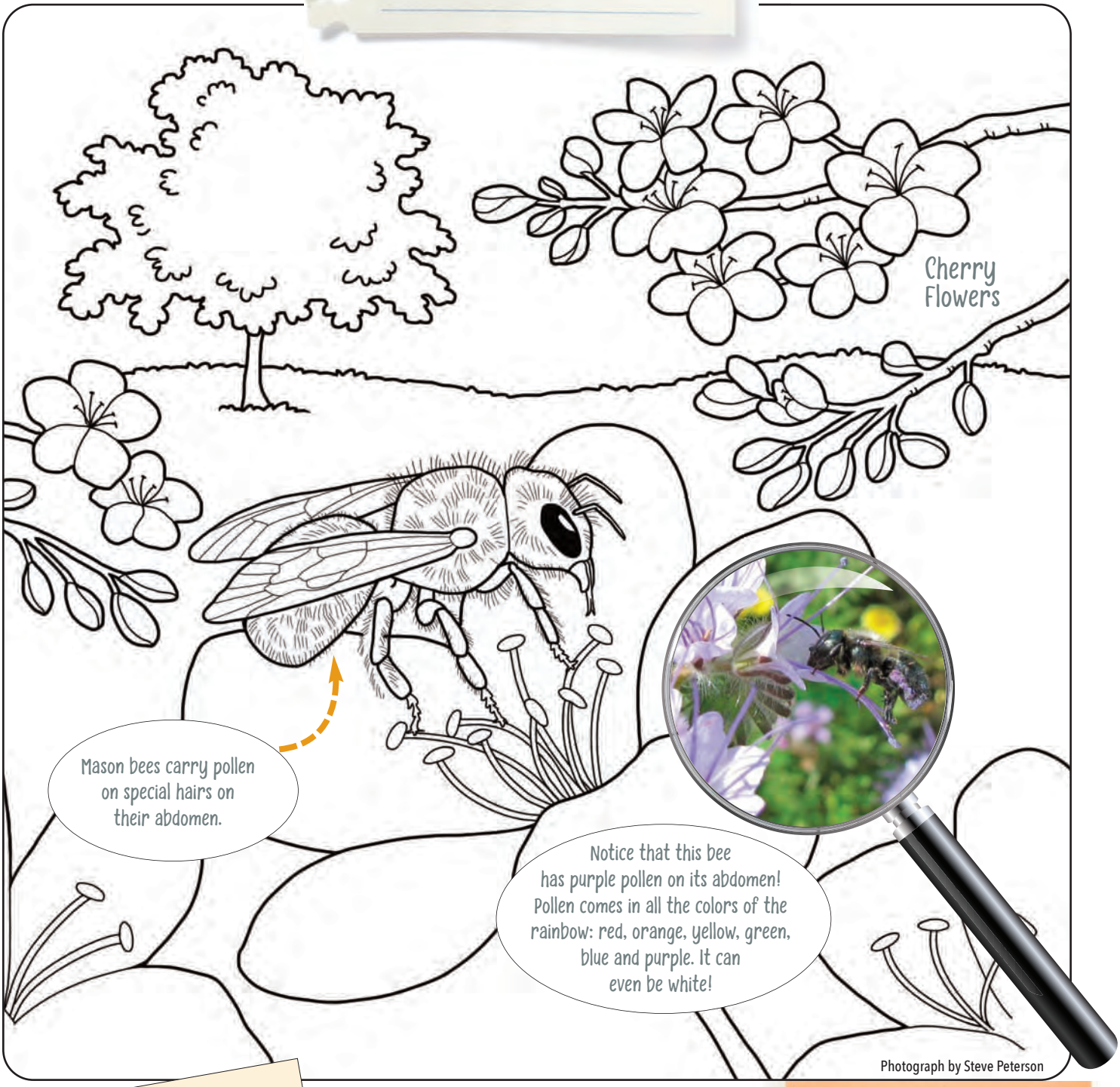
Mason Bee Photo: Oregon Department of Agriculture

Mason Bees

Genus: Osmia



Photograph by Steve Peterson

Field Notes:

Mason bees belong to the genus ***Osmia*** (pronounced OZ-me-a). Some 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, which 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: In the same amount of time, one female mason bee can pollinate three times as many flowers as a single honey bee.

The next time you eat a cherry, thank a mason bee!

Garden Herbal Tea

Green Metallic Sweat Bee and Mint

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

Ingredients

1 to 2 Tablespoons dried or 2 to 4 Tablespoons fresh **herbs** (see **Notes**)

boiling **water**

Directions

1. Wash hands with soap and water.

2. Place herbs at the bottom of a drinking cup or mug.

3. Fill the cup with water to cover the herbs. Let sit for 10 minutes. This is called "steeping."

4. Strain the herbs from the water (see **Notes**) and enjoy the tea warm or cold.

5. Refrigerate leftovers within 2 hours.

Makes 1 cup of tea
Prep time: 10-15 minutes

Notes

- **Ideas for tea ingredients:**
  - Leaves: basil, bee balm, cilantro, lemon balm, lemon verbena, lavender, lemongrass, mint (any type), parsley, rosemary, sage, stevia, thyme
  - Flowers: calendula, chamomile, echinacea, hibiscus, lavender, rose (petals and hips), yarrow
  - Seeds: cardamom, coriander, fennel (grind or chop first)
  - Roots: chicory, ginger (chopped)
  - Fruit: fresh berries (any type), fresh or dried citrus peel (any type)
- Try blending ingredients, such as lemon balm and mint. Have fun trying new blends.
- Ways to strain tea: put ingredients into a tea strainer or any strainer that fits into your cup, such as a coffee filter, paper towel or empty tea bag, or pour steeped tea through a strainer into a clean cup.
- For a stronger or lighter flavor, try different amounts of ingredients and steeping time.
- Use only tea ingredients that you know are safe to consume.
- Try growing your own plants for tea, in the ground or in pots.

Nutrition Facts

1 servings per container

Serving size	1 cup (240g)
Amount per Serving	
Calories	**0**
	% Daily Value*
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 8mg	0%
Total Carbohydrate 0g	0%
Dietary Fiber 0g	0%
Total Sugars 0g	
Includes 0g Added Sugars	0%
Protein 0g	
Vitamin D 0mcg	0%
Calcium 14mg	0%
Iron 0mg	0%
Potassium 22mg	0%
Vitamin A 7mcg	0%
Vitamin C 0mg	0%

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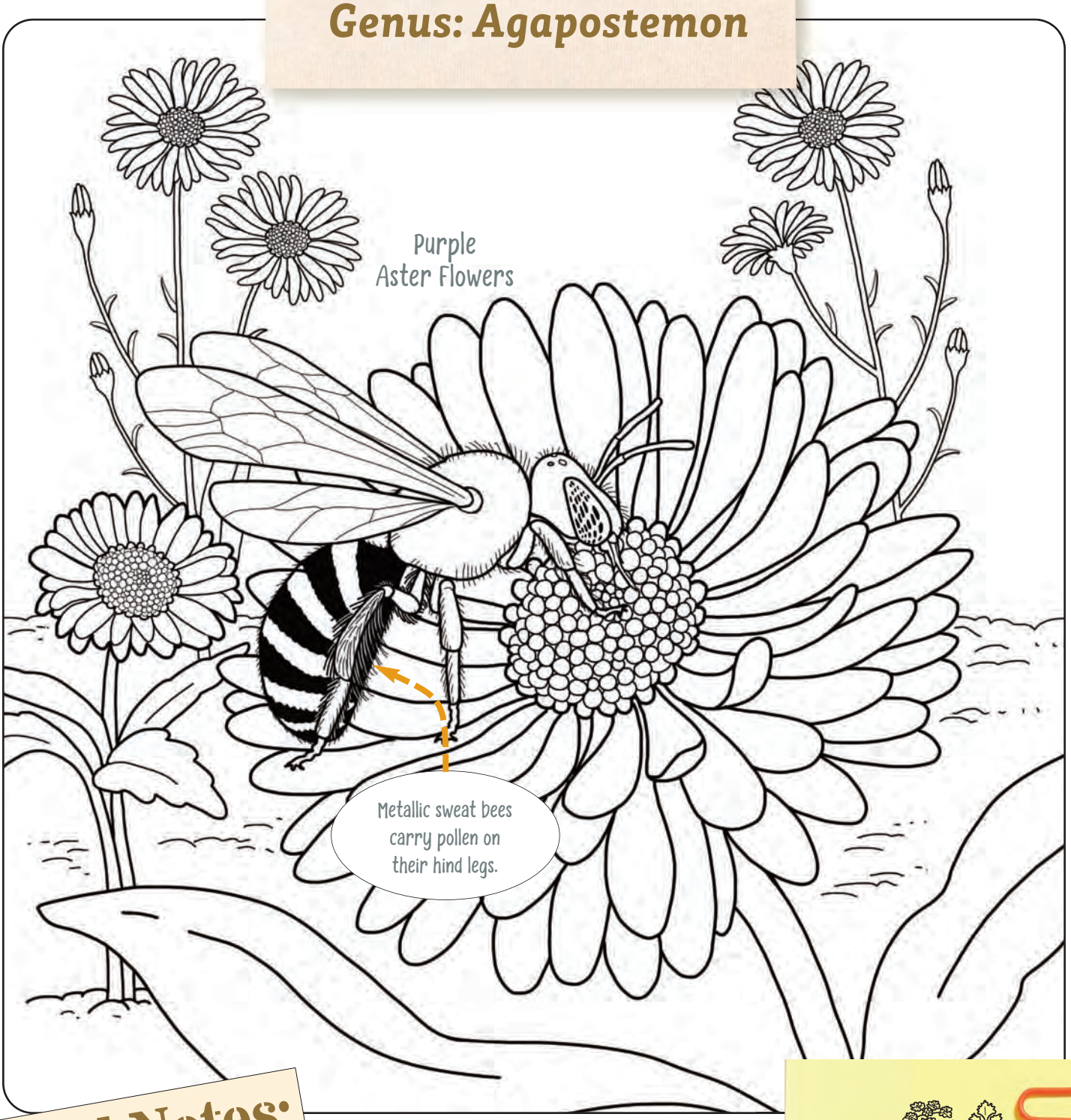
Green Metallic Sweat Bee Photo: US Department of Agriculture

Green Metallic Sweat Bee

Genus: Agapostemon



Field Notes:

Green metallic sweat bees belong to the genus ***Agapostemon*** (pronounced a-ga-POSS-ta-mon). They pollinate the flowers of many cultivated plants (plants grown on purpose) as well as many wildflowers. Sweat bees get their name from the fact that they collect salt by licking the sweat of mammals. 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 flowers. They love purple asters, a plant grown by many Oregon nurseries (places where plants are grown on purpose).

Cilantro

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

Leafcutter Bee and Alfalfa Flowers

Tasty Hamburger Skillet

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

1 pound lean **ground beef** (15% fat)
1/3 cup chopped **onion** (1/3 medium onion)
1/3 cup chopped **green pepper**
2 cups **water**
1 cup long grain **white rice**
1 teaspoon **garlic powder** or 4 cloves of garlic
1 Tablespoon **chili powder**
1/4 teaspoon **salt**
1/4 teaspoon ground **pepper**
1 can (15 ounces) **diced tomatoes**, with juice
1 1/2 cups **corn** (canned and drained, frozen, or fresh cooked)
1 can (15 ounces) red **kidney beans**, drained and rinsed
1/2 cup grated **cheddar cheese**

Makes 9 cups
Prep time: 10 minutes
Cook time: 30 minutes

Directions

1. Cook ground beef, onion and green pepper in a large skillet over medium heat (300 degrees F in an electric skillet) until the hamburger is no longer pink. Drain excess fat from pan.
2. Add water, rice, garlic powder, chili powder, salt, pepper, tomatoes with juice, corn and beans.
3. Cook covered, for about 20 minutes or until rice the is soft.
4. Remove from stove top, sprinkle with grated cheese, and serve hot.
5. Refrigerate leftovers within 2 hours.

Notes

- Garnish this dish with a Tablespoon of low-fat sour cream.
- Boost the flavor with: green chilis, jalapeños, more garlic, or other seasonings.

Nutrition Facts

9 servings per container

Serving size	1 cup (246g)
Amount per Serving	
Calories	**280**
	% Daily Value*
Total Fat 8g	10%
Saturated Fat 3g	15%
Trans Fat 0g	
Cholesterol 35mg	12%
Sodium 220mg	10%
Total Carbohydrate 36g	13%
Dietary Fiber 6g	22%
Total Sugars 3g	
Includes 0g Added Sugars	0%
Protein 16g	
Vitamin D 0mcg	0%
Calcium 63mg	4%
Iron 2mg	10%
Potassium 333mg	8%
Vitamin A 32mcg	4%
Vitamin C 6mg	6%

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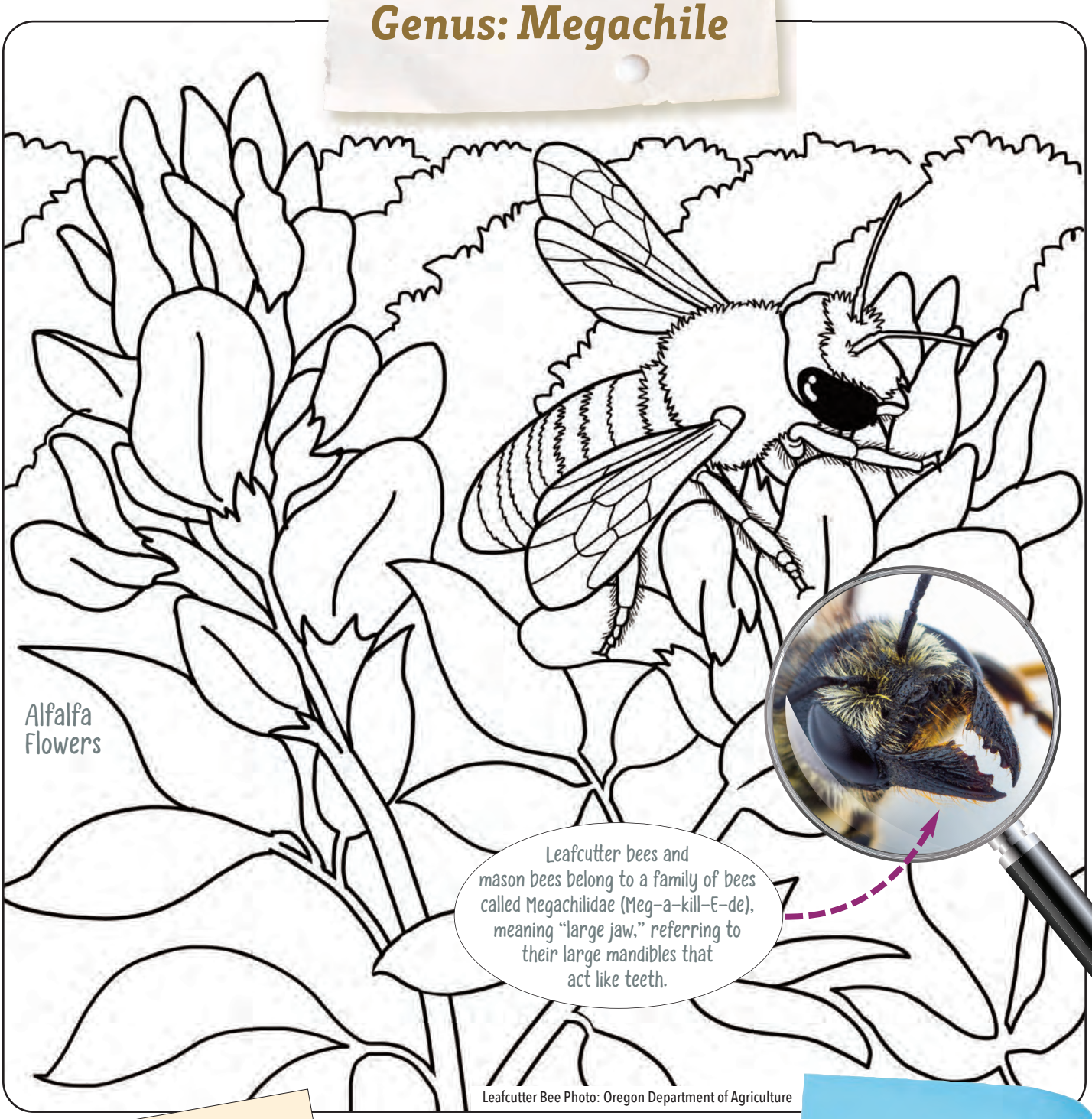
Leafcutter Bee Photo: New Zealand Arthropod Collection

Leafcutter Bees

Genus: Megachile



Leafcutter Bee Photo: Oregon Department of Agriculture

Field Notes:

Leafcutter bees, which belong to the genus ***Megachile*** (pronounced mega-KY-lee), 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 and meat.

The next time you eat beef, thank a leafcutter bee!

Bumble Bee and Clover

Baked Tomatoes with Cheese

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

2 large **tomatoes**, cut into 1-inch thick slices
1/3 cup shredded **cheese** (any type)
1 teaspoon **oregano**
1/4 teaspoon **salt**
1/4 teaspoon **pepper**
1/4 teaspoon **garlic powder** or 1 clove of **garlic**, minced

Directions

1. Wash hands with soap and water.
2. Preheat oven to 400 degrees F.
3. Lightly grease a shallow baking dish and place the tomato slices in a single layer on the bottom of the dish.
4. In a small bowl, combine the rest of the ingredients. Sprinkle the mixture over the tomatoes.
5. Bake 5 to 10 minutes, or until the cheese turns golden brown and starts to bubble. Serve warm.
6. Refrigerate leftovers within 2 hours.

Makes 8 1-inch slices
Prep time: 5 minutes
Cook time: 10 minutes

Notes

- Try parmesan, Swiss or cheddar cheese.
- Try other herbs, such as basil or dill.

Nutrition Facts

4 servings per container

Serving size	2 slices (99g)
Amount per Serving	
Calories	**45**
	% Daily Value*
Total Fat 2g	3%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 5mg	2%
Sodium 270mg	12%
Total Carbohydrate 5g	2%
Dietary Fiber 1g	4%
Total Sugars 2g	
Includes 0g Added Sugars	0%
Protein 3g	
Vitamin D 0mcg	0%
Calcium 74mg	6%
Iron 0mg	0%
Potassium 238mg	6%
Vitamin A 56mcg	6%
Vitamin C 12mg	14%

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Bumble Bees

Genus: Bombus

Field Notes:

Bumble bees belong to the genus ***Bombus*** (pronounced BOM-bus). They 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. 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 (animals raised on a farm) that give us milk and meat.

Next time you eat some cheese, thank a bumble bee!

Long-Horned Bee and a Sunflower

Cranberry Oatmeal Balls

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**
3 Tablespoons **honey (see Notes)**
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 mixture into 18 balls about 1-inch wide.
4. Place balls on a baking sheet. Refrigerate for 30 minutes.

Notes

- Honey is not recommended for children under 1 year old.
- To avoid sticky fingers, keep the oatmeal balls cool until ready to eat.
- Use sunflower seed butter or other nut butters instead of peanut butter.

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

Nutrition Facts

8 servings per container
Serving size 2 balls (43g)

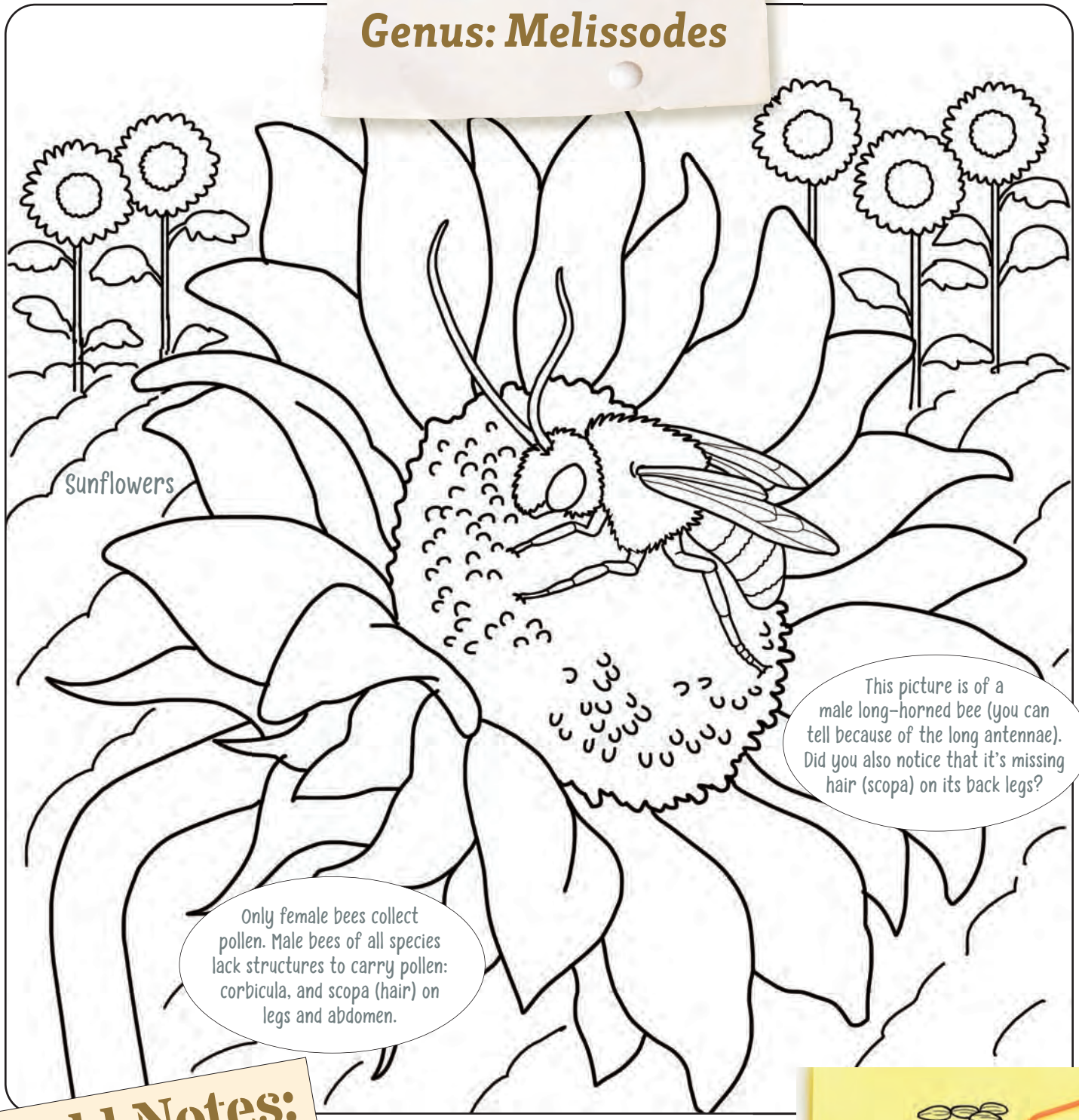
Amount per Serving	
Calories	**180**
	% Daily Value*
Total Fat 7g	9%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 65mg	3%
Total Carbohydrate 24g	9%
Dietary Fiber 3g	11%
Total Sugars 12g	
Includes 6g Added Sugars	12%
Protein 6g	
Vitamin D 0mcg	0%
Calcium 23mg	2%
Iron 1mg	6%
Potassium 84mg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

This material was funded in part by USDA's Supplemental Nutrition Assistance Program - SNAP. For information on nutrition assistance through Oregon SNAP, contact Oregon SafeNet at 211. USDA is an equal opportunity provider and employer.

Long-Horned Bees

Genus: Melissodes



Field Notes:

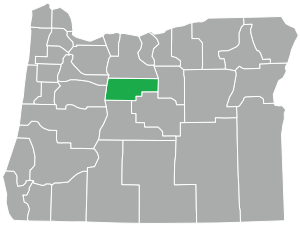
Long-horned bees belong to the genus ***Melissodes* (pronounced mel-eh-soh-dees).** They are beautiful medium-sized bees that are very fuzzy. They are dark colored with yellow, black, or white hairs. Males have long antennae (horns) like the bee shown. Females have large, brush-like hairs on their back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

The next time you eat a sunflower seed, thank a long-horned bee!

Healthy Carrot Cake Cookies

Honey Bee and Carrot Flower

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



Makes 48 cookies
Prep time: 20 minutes
Cook time: 15 minutes

Ingredients

1/2 cup packed **brown sugar**
1/2 cup **sugar**
1/2 cup **vegetable oil**
1/2 cup unsweetened **applesauce** or fruit puree
2 **eggs**
1 teaspoon **vanilla**
1 cup **all-purpose flour**
1 cup **whole-wheat flour**
1 teaspoon **baking soda**
1 teaspoon **baking powder**
1/4 teaspoon **salt**
1 teaspoon **cinnamon**
1/2 teaspoon **nutmeg**
1/2 teaspoon **ground ginger**
2 cups **old fashioned rolled oats**
1 1/2 cups finely grated **carrot** (about 3 large carrots)
1 cup **raisins** (or any type of dried fruit)

Directions

1. Wash hands with soap and water.
2. Preheat oven to 350 degrees F. Lightly grease a baking sheet.
3. In a large bowl, stir together the sugars, oil, applesauce, eggs and vanilla. Mix well.
4. In a separate bowl, stir together the dry ingredients.
5. Blend the dry ingredients into the wet mixture. Stir in the carrots and raisins.
6. Drop the dough by teaspoon onto the baking sheet.
7. Bake 12 to 15 minutes until golden brown.
8. Store in an airtight container.

Nutrition Facts

24 servings per container
Serving size 2 cookies (55g)

Amount per Serving	
Calories	**170**
	% Daily Value*
Total Fat 6g	8 %
Saturated Fat 0.5g	3 %
Trans Fat 0g	
Cholesterol 15mg	5 %
Sodium 110mg	5 %
Total Carbohydrate 28g	10 %
Dietary Fiber 2g	7 %
Total Sugars 13g	
Includes 8g Added Sugars	16 %
Protein 3g	
Vitamin D 0mcg	0%
Calcium 22mg	2 %
Iron 1mg	6 %
Potassium 134mg	2 %
Vitamin A 64mcg	7 %
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.

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Honey Bees

Genus: Apis

Field Notes:

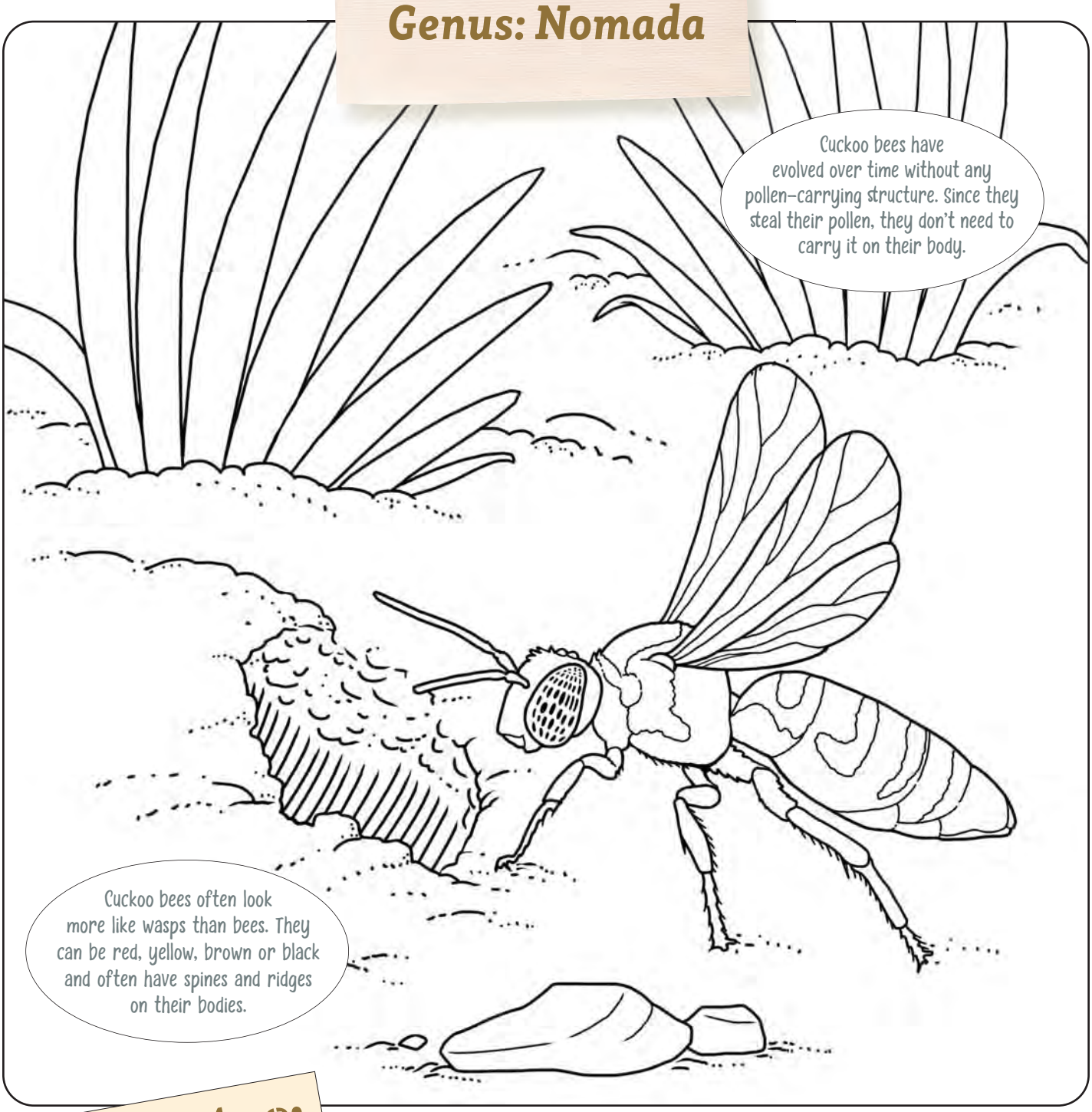
Honey bees, which belong to the genus ***Apis*** (pronounced AY-pis), are pollinators of agricultural crops worldwide. That's because 1) they pollinate many different types of plants (some other bee species are very picky eaters), and 2) they are so easy to manage.

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 a medium-sized bee that ranges 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. Farmers from around the world grow carrots from Oregon carrot seeds.

The next time you eat a carrot, thank a honey bee!

Cuckoo Bees

Genus: Nomada



Field Notes:

Not all bees are pollinators or help make food. For example, bees in the genus ***Nomada*** (pronounced no-MA-da) are a type of bee called a ***cleptoparasite***. ***Clepto*** means "to steal" and a ***parasite*** is a living creature that feeds off another living creature. These bees don't forage for pollen. Instead, they have found a way to steal it from others. When it comes time for a Nomada female to ***reproduce*** (have babies), she looks for a nest that is being built by a female bee closely related to her. Once she finds a nest, the Nomada female waits for the female bee who made the nest to go forage for pollen and nectar. When she does, the Nomada female sneaks inside and quickly lays her own eggs, right next to some of the other bee's eggs. Each one of her eggs will hatch into a ***larva*** (the immature stage of a bee that looks like a caterpillar or grub) and will destroy the offspring of the other female. The Nomada larvae are then free to eat up all the pollen left by the female who made the nest. As they grow, the Nomada bees take over the nest. **Cuckoo bees** got their name from cuckoo birds, which lay their eggs in other birds' nests.

Wild Bees' Nests

Where do bees live?

In Oregon, most of our wild bees prefer to nest in the ground, making their nests in small tunnels. Some of the other places that bees like to nest include: in old beetle holes, hollowed-out plant stems, tree cavities, cliff faces, rodent nests and in between rocks.

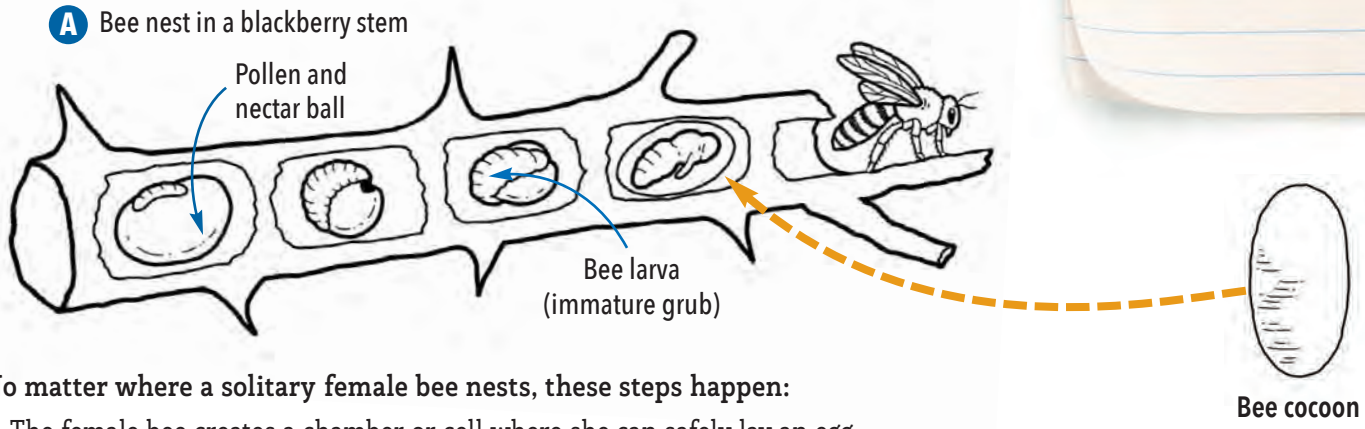
What do bees use to make their nests?

Depending on the species, bees use all kinds of different materials for nest building, such as: twigs, leaves, flower petals, mud, stones, wax, plant resin, and even snail shells!

Solitary Bees

Solitary bees are bees that live alone – not in a hive or with other bees.

Mason, leafcutter, long-horned bees, and alkali bees are some examples of solitary bees. Most bees found in Oregon are 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, and (C) an old tree stump.



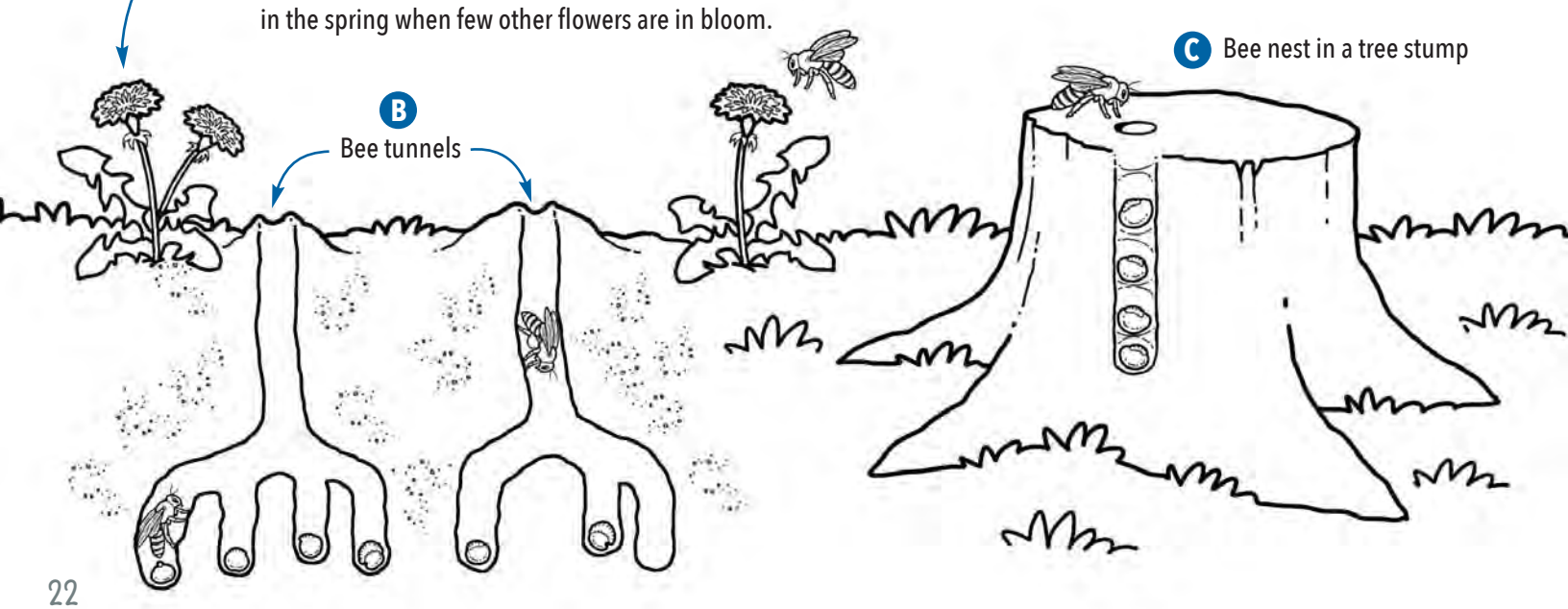
No matter where a solitary female bee nests, these steps happen:

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 word that means a change in shape. The bee larvae slowly change from immature grubs to adult bees. Just like caterpillars, some 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.

We must protect wild bees' nests so that bees can *thrive* (live healthy lives) and pollinate our food.

Common dandelions *(Taraxacum officinale)*

Some species of dandelion are native to North America. The common dandelion, however, is not. European colonizers brought it with them. Indigenous People then and now use the sweet and tender young leaves, stems and roots of dandelions medicinally and for foods such as tea and salads. Dandelions are also an important food source for bees early in the spring when few other flowers are in bloom.



Social Bees

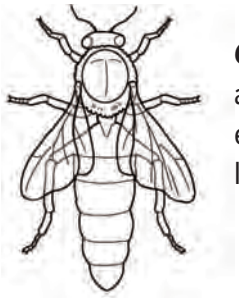
Social bees are bees that live together.

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.

The Life of a Honey Bee

Honey bees live together in a hive. A hive is an above-ground structure where a group of bees nest together. A hive can be made by people (look on the *Managed Bees* page for a picture), or it can be made by bees themselves in the wild. Inside the hive, honey bees use wax to make honeycomb that they use to raise their young and store honey and pollen.

Honey bees living in a hive have a caste system made up of a queen bee, drones, and worker bees. These three types of bees play different roles in the hive.



Queen bee: The queen is the mother of all the bees in the hive. Her job is to lay eggs to make more bees. Typically, she only leaves the hive once in her life to mate.

Drones: Drones are all male. They are produced in the summer and their job is to mate with queens from other hives.

Worker bees: Worker bees are all female. When they are young, they start off cleaning the hive and then caring for and feeding young larvae. Once they are older, they become foragers, bringing in nectar and pollen to feed the bees in the hive.

Honey Bees

Honey bees have a superpower. Can you guess what it is?

They make honey, and they are some of the only bees that can do this!

1. Older worker bees collect nectar from flowers and take it back to the hive. There, they spit out the nectar into an open honeycomb.

2. The worker bees' spit contains special enzymes (chemicals that change molecules). As the nectar sits in the honeycomb, these enzymes make its sugars easier to digest.

3. Young worker bees take turns fanning the nectar with their wings. This causes water in the nectar to evaporate. The nectar becomes sweeter and stickier, turning into honey after a few days. Unlike nectar, which can spoil easily, honey can stay good to eat for a very long time if it is sealed.

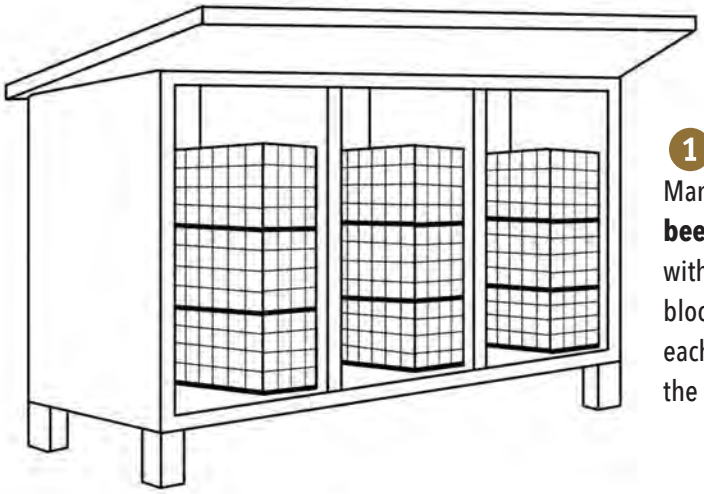
4. Worker bees cover the honey in the honeycomb with wax to keep it safe for the winter. The honey will provide all the food the bees need to make it through the winter when no flowers are in bloom and it is too cold to go outside. Storing honey allows honey bees to stay active year round. That is why we sometimes see a honey bee flying on a warm day in December. Because honey bees never "go to sleep," they can be ready to pollinate some of our earliest crops, like almonds.

Managed Bees of Oregon

and Where They Live

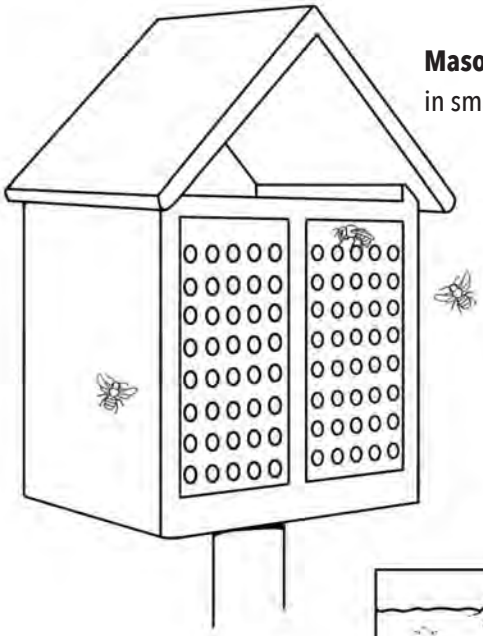
For over 9,000 years, humans have been collecting wild bee nests. From these nests they would gather things like wax and honey. The bees in the nests would also help them pollinate their crops. Over time, people figured out how to raise some wild bee species using structures they built themselves. These bees are called **managed bees**. In Oregon we have four types of managed bees: **honey bees**, **leaf-cutter 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:

Fun Fact!
Honey comes in different colors, depending on which flower/s the nectar comes from.



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.



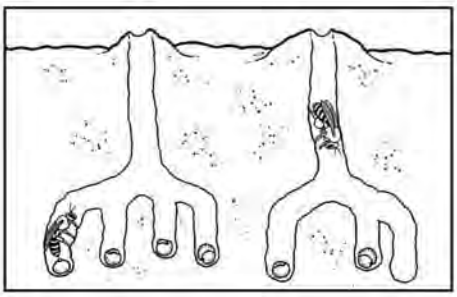
Mason bees nesting in small tubes.

2 Hives

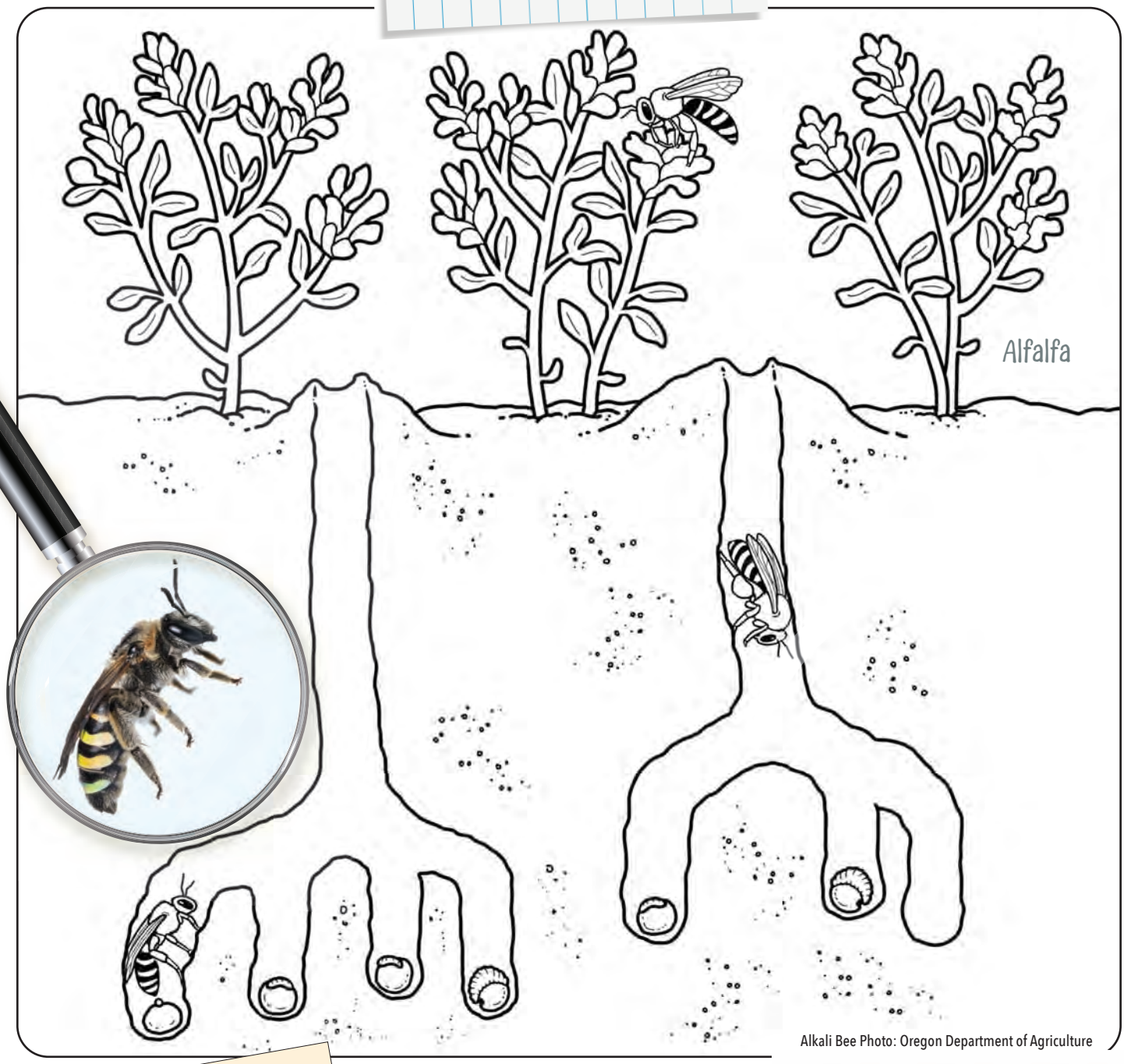
Honey bees are kept in boxes called hives and are the most common managed bee worldwide.

3 Underground nests

Alkali bees are raised in underground nests.



Alkali Bee Nests



Alkali Bee Photo: Oregon Department of Agriculture

Field Notes:

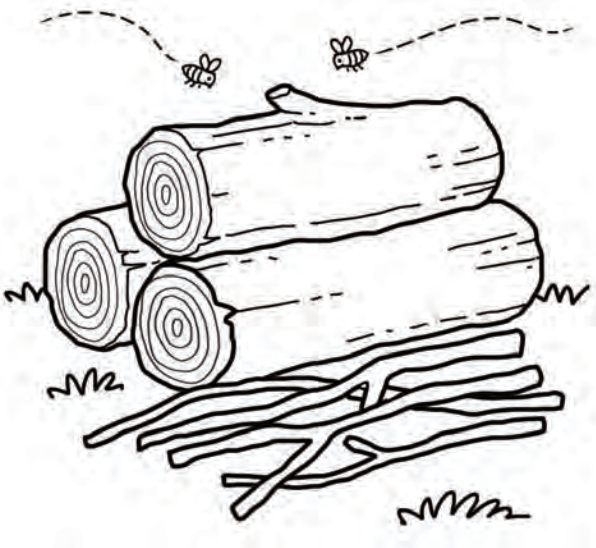
Alkali bees, like alfalfa leafcutting bees, pollinate alfalfa flowers to make alfalfa seed. These bees nest in the ground and are very picky; they love salty, moist and crumbly soil. Some farmers have figured out how to create the same conditions on their farms that these bees like in the wild. At these 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. The alkali bees of the Pacific Northwest region (Oregon, Washington, Idaho) are the only ground-nesting bees in the world managed by farmers.

The next time you eat a chicken egg, thank an alkali bee!

What You Can Do for Bees

Now that you know how amazing bees are and how much we need them to produce healthy foods, here are four things you can do to help them:

1 Plant flowers and flowering trees. If possible, choose types that produce lots of pollen and nectar. Some of our favorite easy-to-grow plants that bees love are clover, sunflowers, phacelia, purple aster, oregano, thyme, cilantro, mint, California lilac, big leaf maple trees, apple, cherry and willow trees.



2 Leave sticks, twigs and woody debris in your yard to provide a place for bees to nest.

3 When plants that flower are healthy, they help keep bees healthy! Make sure to plant pollinator plants in parts of your garden with the right amount of sunlight and drainage. If any of your plants have pest or disease problems, reach out to your local Master Gardener **(https://beav.es/JxN)** for advice on how to bring them back to health using methods that don't harm bees.

4 Learn more about bees! For example, when plants are flowering, take a walk outside, find a bee and watch it work! Visit **www.foodhero.org/bees** for more kid-friendly bee info.

Bee Word Search

Instructions: ***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

Word Bank:

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

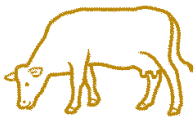
Talk with your family and friends about how bees make healthy food!

Bees make healthy food!


Bumble Bee


Honey Bee


Mason Bee


Leafcutter Bee


Green Metallic Sweat Bee


Long-Horned Bee


Squash Bee

Find recipes by ingredient at www.FoodHero.org

This material was funded in part by USDA's Supplemental Nutrition Assistance Program - SNAP. For information on nutrition assistance through Oregon SNAP, contact Oregon SafeNet at 211. USDA is an equal opportunity provider and employer.

Fun Facts About Bees

and How to Safely Watch Them

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

Too afraid to think about going near a bee?

You are not alone – it makes sense to feel afraid of insects that can sting. Let's go over a few facts that might help you and your friends feel more confident around bees and observe them safely.

Bees would rather not sting you!

Bees sting to protect themselves from creatures that want to eat them. You may not have thought about it, but many animals in the wild eat bees. Birds, frogs, toads, lizards, spiders and some larger insects depend on bees for protein and other nutrients. Most humans do not threaten bees, so bees rarely sting them. When stings do happen, it's often because someone accidently 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.

Bees help make food.

Bees help make lots of our foods, from fruits and vegetables to nuts and even cheese! When bees pollinate plants in the wild, they also help make the flowers, fruits and seeds that many animals depend on for food.

Bees help make new plants.

Bees help make seeds, which provide the world with new plants. Farmers use seeds to help grow our food. Seeds are also important to forests, prairies, wetlands, riverways and other ecosystems in Oregon and around the world. Ecosystems depend on new plant growth every year and could not survive without bees!

An ecosystem is a group of living and non-living things that share an environment.

We need bees!

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.

In the Field with Bees

Bee Watching Worksheet

You can learn a lot about bees by watching them!

A good way to start watching bees is to first find a patch of blooming flowers. Take a few minutes to watch the flowers to see if any bees appear. If they do, observe what they are doing. Remember to follow the tips below to keep you and the bees safe!

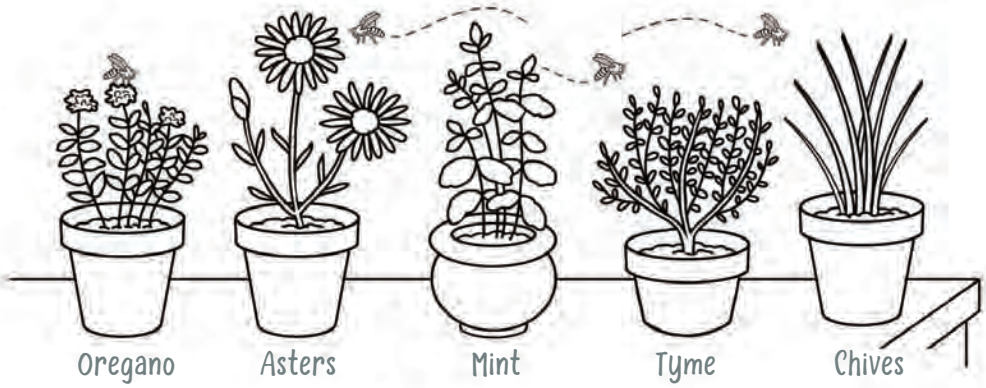
Here are four tips for watching bees safely:

A Move slowly and watch what's going on around you so you avoid crushing or stepping on the bees.

B Do not pick bees up! If one lands on you, wait for it to leave on its own or gently brush it away.

C Do not run away from bees or swat them.

D 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.



Questions to ask while watching bees:

sketch or write down what you observe as you sit near flowers!

How many types of bees do you see in this spot?

Do different bees prefer different types of flowers?

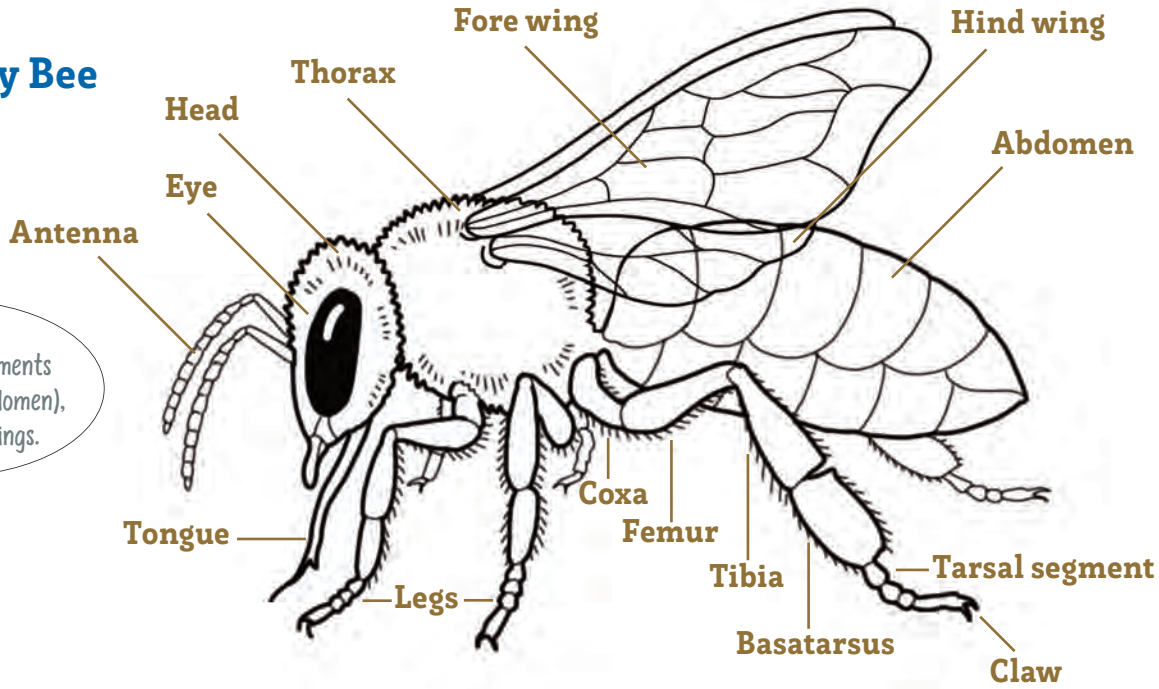
How do bees collect pollen?

How do bees drink nectar?

Parts of a Bee

In Oregon there are over 600 unique types of bees. Each type of bee is called a ***species***. Scientists who study bees 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 learned about a few of the most common ***genera*** (plural of genus) in Oregon.

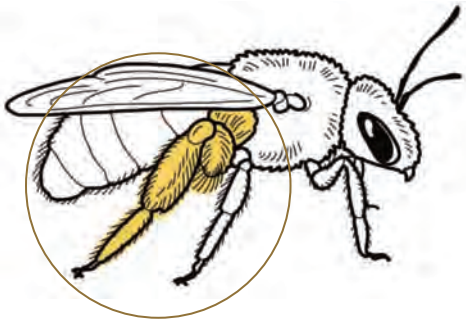
Honey Bee



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

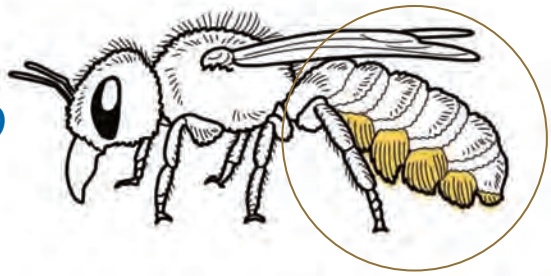
Three Different Types of Pollen-Carrying Structures:

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



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

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



What is your favorite bee of Oregon?

Draw it here, along with a plant it loves to pollinate.
Add a nest if you want!

Bee Body-Part Checklist

3 body segments

Head
Thorax
Abdomen

3 sets of legs

2 sets of wings

This material was funded in part by USDA's Supplemental Nutrition Assistance Program - SNAP. For information on nutrition assistance through Oregon SNAP, contact Oregon SafeNet at 211. USDA is an equal opportunity provider and employer.

We hope you enjoy these bee trading/recipe cards! Cut them out and keep them for recipe ideas and to help you identify bees you see outdoors, or trade them. For more about bees, and to see all the cards and more great recipes, visit www.foodhero.org/bees.

Grumpbee is a mining bee. Females dig a hole in bare ground and build their nests in the soil. Males have markings on their face. The marking on this species looks like a frown. But like Grumpy Cat, he isn't grumpy at all. He is gentle and kind-natured. Some people even call the bees in this family "tickle bees." There are over 200 species of mining bees in Oregon, making his the biggest family in the state. This specific bee was found by Atlas volunteer Debra Brimacombe, in her efforts to help inventory all the bee species in Oregon.

Grumpbee

Photo by Lincoln Best

OREGON BEE ATLAS
oregonbeeatlas.org

OREGON DEPARTMENT OF AGRICULTURE

Bumbles is a bumble bee queen. She is one of the biggest bees in Oregon. The queens of Morrison Bumble Bees, which are found in Eastern Oregon, are particularly big. Like other bumble bees, these queens will build a small nest, helped a month later by their daughters (called "workers"), in an abandoned mouse nest. Workers are a lot smaller and may even have different color patterns than queens. The nest dies out by the end of summer, but not before new queens fly off to hibernate. Oregon has over 25 different species of bumble bees.

Bumbles

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The Salty Dog is also known as the alkali bee. She has lovely yellow-green stripes and she makes her nests in a tough place, alkali salt beds in Eastern Oregon. Thousands of females flock to these beds to build underground nests. Each female rolls pollen into 12 to 24 little balls and lays an egg on each. Alfalfa seed growers have learned to build these beds for the bees, helping them set more seed, which turns into hay that is fed to livestock to make things like smoothies (with milk or yogurt) and meatballs. Cool!

The Salty Dog

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WAGGLE DANCER is the well-known worker honey bee. Brought from Europe to the Americas in the 1600s, she lives in the most complex society of any bee in Oregon. She can have 50,000 sisters, all sharing the same mom (called "the queen"). She is also the only bee that makes honey. The taste and color of honey varies depending on what flowers she visits (and Oregon has some delicious honey). Incredibly, she uses a waggle dance to give her sisters directions to the best flowers in the neighborhood.

WAGGLE DANCER

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Bees help make healthy food

Bumbles pollinate clover for dairy cows.

Tomato + cheese + seasoning =
Food Hero Baked Tomato with Cheese
https://foodhero.org/recipes/baked-tomatoes-cheese

Bees help make healthy food

Grumpbees pollinate apple and pear trees.

Plain yogurt + peanut butter =
Food Hero Peanut Butter Yogurt Dip
Serve with apple or pear slices.
https://foodhero.org/recipes/peanut-butter-yogurt-dip

Bees help make healthy food

WAGGLE DANCERS pollinate carrots.

Tomato + cheese + seasoning =
Food Hero Baked Tomato with Cheese
https://foodhero.org/recipes/baked-tomatoes-cheese

Bees help make healthy food

Salty Dogs pollinate alfalfa for beef cows.

Sauteed vegetables + protein choice + brown rice + shredded cheese =
Food Hero Rice Bowl Southwestern Style
https://foodhero.org/recipes/rice-bowl-southwestern-style

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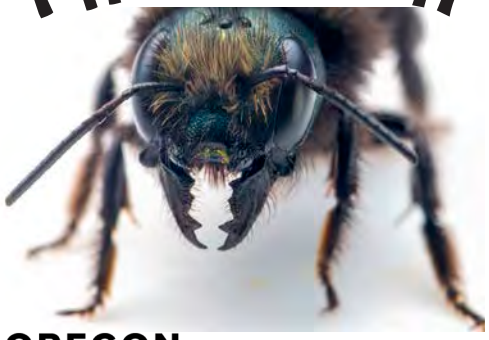
The Mason is a female blue orchard bee. She emerges in the spring from a cocoon hidden in a raspberry stem. She collects pollen from thousands of apple, pear and cherry flowers, causing them to fill up with fruit. She takes this pollen back to a new hollow stem, piles it up and then lays an egg on it. To protect her offspring, she builds a little mud house around each cell, using her fancy mouth-parts to collect and shape the mud. Secure, the baby eats the pollen, turns into an adult and flies out the following year.

The Mason



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Scissor Head Bee (*Megachile rotundata*) knows how to cut perfect circles on the edge of a leaf. She can do this because of her scissor-like mouth-parts. She will take the cut leaf back to her nest. As many as 50 leaf discs harden into a nest around each developing bee, protecting them from parasites. Alfalfa seed growers remove the nests in fall. The following spring they incubate the nests just in time for the bees to emerge and pollinate alfalfa flowers. The cleverness of alfalfa seed growers has made the scissor head bee the most widely managed solitary bee in the U.S.

Scissor Head

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Bling Bee stands out in a crowd! Oddly, she belongs to a family of bees (*Halictidae*, or the sweat bees) that are rather drab. There are five different species of these brilliant emerald bees in Oregon (all in the genus *Agopostemon*). A single female will dig a long, narrow tunnel in the ground to nest. She makes holes in the walls of these tunnels where she leaves a ball of pollen for her young to eat. These bees are very common and are some of the last bees you will see at the end of the summer. Look for them on purple asters in your garden.

Bling Bee

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oregonbeeatlas.org

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Lil' Lumberjack is a bee you might miss if you're not paying attention. This metallic-colored bee (in the genus *Ceratina*) is literally everywhere, but it's so small that you are likely to miss it. The bees live in dead twigs. They bore into the twigs and use the sawdust to make little chambers to protect their young. The mothers also raise one small daughter—a Cinderella daughter—who helps with the housekeeping and protects the nest from predators while the mother is out gathering nectar and pollen. Oregon has five different species of Lil' Lumberjacks.

Lil' Lumberjack

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OREGON DEPARTMENT OF AGRICULTURE

Bees help make healthy food

Scissor Heads pollinate alfalfa for dairy cows.

Cauliflower + egg + flour + cheese =
Food Hero Baked Cauliflower Tots

https://www.foodhero.org/recipes/baked-cauliflower-tots

Bees help make healthy food

The Masons pollinate cherries.

Banana + cereal + yogurt =
Food Hero Breakfast Banana Split
Top with fresh cherries.

https://foodhero.org/recipes/breakfast-banana-split

Bees help make healthy food

Lil' Lumberjacks pollinate berries.

Berries + yogurt =
Food Hero Raspberry Fruit Dip
Serve with fresh fruit.

https://foodhero.org/recipes/raspberry-fruit-dip

Bees help make healthy food

Bling Bees pollinate radishes.

Yogurt + radishes + cucumber + seasoning =
Food Hero Radish and Cucumber Salad

https://foodhero.org/recipes/radish-and-cucumber-salad

“Bee” a Food Hero!

A Food Hero leads by example! Food Heroes teach their friends and family members about the importance of bees, and help to prepare meals and snacks using a variety of fruits and vegetables 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. It includes:

- Lots of information about bees, how they help us, and how you can help them!
- Coloring pages for seven Oregon bees. Learn how to “ID the bee” and match it to the healthy foods it helps make. Plus, each bee is paired with a recipe!
- Four activity sheets, including a Bee Word Search, a drawing page, and more.
- On the inside back cover, you’ll find four Bee Trading/Recipe Cards. They’ll help you identify the bees you see outdoors and give you ideas for easy, tasty recipes. You can also trade them with your friends!

Recipes Connected to Bees

Coloring Pages

Activity Pages

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