



Simply Summer Lesson Plan for Homeschool

Overview

Raddish is designed by a dedicated team of teachers and chefs who believe the kitchen classroom is the tastiest place to learn. We love watching learning come alive when kids mix math, stir science, and taste culture!

Paired with the materials found in your Simply Summer box, this lesson plan divides your box into 3 45-90 minute lessons you can use and adapt to support your homeschool study, pre-k – middle school. Depending on your timeframe and child's age and engagement, these can be taught together or separated for a longer lesson. Please refer to the curriculum provided in your box: recipe guides, activity card, and introduction card. Happy cooking! Happy learning!

Lesson 1: Sunshine Lemon Bars and Measuring Acidity

Activity Time: 60-90 minutes

Learning Outcomes

- Students will learn the terms: acid, neutral, base.
- Students will learn and use the pH scale.
- Students will make their own pH indicator.
- Students will hypothesize whether a variety of substances are acid, neutral or base and then experiment to test those hypotheses.
- (Optional) Older Students can do an environmental study to test the health of water in their neighborhood.
- Students will make and share Sunshine Lemon Bars.

Materials

- Recipe guide, ingredients, and tools listed within.
- For the pH Indicator Experiment:
 - How to Make Purple Cabbage Indicator (included)
 - Acid, Base or Neutral Experiment Worksheet (included)
 - Purple cabbage



- Lemons
- Warm distilled water
- Funnel
- Coffee filter
- 3 or more clear glass containers (glasses or jars)
- Acidic substances for testing (examples: apple juice, vinegar)
- Base substances (examples: baking soda, Tums/Rolaids, cream of tartar, laundry detergent)

Resources

- Experiment adapted from The Sci Guys: Science at home- SE2- EP4: Red Cabbage pH Indicator (6:22) <https://www.youtube.com/watch?v=I18K2upEHLc>
- Chart of the pH scale and common household items: <http://www.ctec-chemicals.com/en/tips-tricks/concept-ph>
- <http://www.coaleducation.org/lessons/primary/properties/ph.pdf>
- <http://www.sciencekiddo.com/red-cabbage-ph-indicator/>

I. Introduction

Bring some lemons to the lesson for students to observe.

- Allow students to explore with the lemons. Some examples:
 - Do a still life drawing or painting.
 - Taste, and then describe the sensations in their mouth.
 - Write a descriptive sentence about how a lemon looks or tastes.
- Read the Parts of a Lemon section of the Recipe Guide. Provide each student with a slice.
 - Have students identify all the parts
 - Take away the recipe guide. Either read the description of one of the parts and have the students identify it on their slice or name the part and have them describe it. This could be a competitive or cooperative game.
- Have students taste their lemon slice. Ask them to describe the flavor.
 - Ask: Do you know what makes lemon taste sour? (It is the citric acid.)
- Tell the students that today they are going to learn that liquids can be measured and categorized by how acidic they are.

2. Acid, Neutral, or Basic

- It is important to know the acidic or basic nature of a liquid because the nature of the liquid often determines what it can be used for, such as, making invisible ink! (See the Citrus Secrets section of the Recipe Guide)
- Explain how to know if a liquid is acidic or basic.
 - Substances can be measured on something called the pH scale. This scale goes from zero to 14.



- ii. The low end of the scale is for acidic solutions, a 7 is neutral and anything higher than 7 is basic (also called alkaline).
- c. **NOTE: You can taste something to identify whether it is an acid or a base, but that is not a safe way to test all substances! Make sure, especially with young students, that you stress this point.**

Acid

- a. Acids are usually sour and have a pH below 7.
- b. Examples:
 - a. Coffee, cola and lemon juice.
 - b. Our stomach liquids are acidic so that we can digest food.
 - c. Car battery fluids are acidic so that electrical energy can be produced.
 - d. Lactic acid is used as a moisturizer or food preservative, can help fabrics be prepared to take on dyes, and can turn milk into yogurt!

Basic

- a. Bases are substances that are slippery to the touch (when in water) and taste bitter. They have a pH above 7.
- b. Examples:
 - a. Household products like baking soda (sodium bicarbonate), laundry detergents, and oven cleaner are all basic. They are useful for removing fatty and oily messes.

Neutral

- a. Distilled water is neutral and would score a 7 on the scale.

Now that you know a bit about acids and bases are you curious to examine some solutions around your house and discover where they fit on the scale?

3. Create a pH Indicator and Experiment

- a. Preparation: For more background information, watch the following video:
 - i. The Sci Guys: Science at home- SE2- EP4: Red Cabbage pH Indicator (6:22) <https://www.youtube.com/watch?v=I18K2upEHLc>
 - ii. **Don't show the video to students** prior to running the experiment!
- b. Let your students know that there is a vegetable that they can use to test the solutions from around their home. Purple cabbage!
 - i. This cruciferous vegetable contains a chemical called *anthocyanin* that changes color depending on the acidity of its environment. In an acidic environment it is reddish-pink, in a neutral environment it is purple, and in a basic (or alkaline) environment it turns bluish-green.
- c. It is time to turn your Purple Cabbage into a pH indicator! See the Purple Cabbage Indicator Instruction Sheet (attached).



- d. You can have students brainstorm and collect solutions that they want to test or have a list ready for them to collect. A good range of solutions would include:
 - i. Distilled water
 - ii. Tap water
 - iii. Lemon juice
 - iv. Distilled vinegar
 - v. Baking soda
 - vi. A fizzy antacid
 - vii. Older kids with proper safety equipment (goggles and gloves) with adult supervision could also test ammonia or other cleaning supplies.
- e. Have the students make a tag or label (on a Post-It or masking tape) for each solution that they want to test so that they can keep their results straight.
- f. Fill different glasses with a half cup of indicator solution you have prepared from your worksheet.
- g. Have students fill in the first two columns of the Acid, Base or Neutral Experiment Worksheet (included)
- h. Add the test ingredients to the indicator solution. Record the color that the indicator turns, does that color tell you whether it is greater than or less than 7 on the pH scale, and is the solution an acid, a base, or neutral.
- i. Older students may want to watch the video The Sci Guys: Science at home- SE2-EP4: Red Cabbage pH Indicator (6:22)
<https://www.youtube.com/watch?v=I18K2upEHLc>

Extension Ideas

- i. Older students can do research about acid rain and test water from their communities. They will need to purchase a more specific pH measuring tool. (These can be found from online retailers, home improvement stores, or swimming pool supply stores.)
- ii. Younger students- Add a little vinegar to the concentrated purple cabbage juice and use it to paint with!
- iii. Create your own colorful pH scale poster. See an example here:
<http://www.ctec-chemicals.com/en/tips-tricks/concept-ph>

4. Kitchen Prep

- a. Read the Sunshine Lemon Bars recipe card together.
- b. Identify and gather ingredients.
- c. Gather tools.
- d. Discuss kitchen safety. Specifically, oven safety (Visit Raddishkids.com/pages/safety)

5. Prepare Sunshine Lemon Bars

- a. Ask children to read or describe each step.



- b. Together, follow the steps in the recipe.
- c. Give each child a turn to measure, juice, and mix.
- d. While the students are working with the lemons, have them share what they remember about the parts of the lemon.
- e. While the bars are baking, students can display the results of their acidity experiment.
- f. When the Sunshine Lemon Bars are ready, eat, taste and share!

Lesson 2: Crispy Tostadas with Peach Salsa and Stone Fruit

Activity Time: 45-90 minutes

Learning Outcomes

- Students will learn what makes a fruit a stone fruit.
- Students will learn the botanical term *drupe* and the agricultural term *chill hours*.
- Students will learn what stone fruit need to grow.
- Younger students will create a matching game to test the stone fruit knowledge of their friends and family.
- Older students will choose one stone fruit to research and share what they have learned in either written or oral format.
- Students will make Crispy Tostadas with Peach Salsa to share with their friends and family.

Materials

- Recipe guide, ingredients, and tools listed within
- A variety of stone fruit, examples include:
 - Peach
 - Nectarine
 - Plum
 - Cherry
 - Apricot

For Younger Students (Matching Game):

- Fruit pits/stones- save these when you are eating them and give them a wash and a dry
- Transparent tape
- Cardboard or cardstock
- Markers

For Older Students (Stone Fruit Research):

- Stone Fruit Research Worksheet (included)
- Access to the internet



- Books
- (Optional) Field trip to a farmer's market or garden store

Resources

- www.abc.net.au/gardening/stories/sl900633.htm
- <https://en.wikipedia.org/wiki/Drupe>
- Video- Explains drupes and the seed inside the stone:
 - Katherine Preston How to Cut a Peach (7:20)
<https://www.youtube.com/watch?v=6T27wXyCjd0&feature=youtu.be>

I. Introduction

- a. Place a variety of stone fruits out for students to observe. (Assess what your students already know.)
 - i. Ask: What do you notice about the items on the table?
 - ii. Ask: Can you name them all?
 - iii. Ask: Do you like to eat any of them? Why or why not?
 - iv. Ask: Do you have a favorite? What about it do you like?
 - v. Ask: What do they have in common?
- b. Read the Peach Varietals section of the Crispy Tostadas with Peach Salsa recipe guide with your students.
- c. Ask: Have you tasted any of these kinds of peaches? Do you like one more than the others? (If they have not actually tried them) Ask: Can you decide which one you would like based on the flavor descriptions?
- d. Do the Food For Thought Activity. You could take a field trip to the grocery store or farmer's market and see how many different types of peaches and stone fruit you can find. Students can make lists or draw pictures of the different varieties.

2. What makes a fruit a stone fruit?

- a. What is a stone?
 - i. A stone fruit, also called a **drupe**, is a fruit with a large "stone" inside, also called a pit. Although you may think the stone is the seed, the seed is actually inside the stone.
 - ii. Seeds can be eaten, like those from an apple or a cucumber. Stones cannot be eaten; however, you could swallow one by mistake!
- b. Examples of stone fruit:
 - i. Peaches, nectarines, plums, lychees, mangoes, olives, and cherries.
 - ii. Raspberries are called **drupelets** because the many small parts that make a raspberry fruit have a similar structure with a very small pit inside.
- c. Stone fruit characteristics:
 - i. Grown in the summer.



- ii. The fruit does not become any sweeter after it's picked. They are often picked early, however, so that they do not bruise during transport to stores.
- iii. When buying stone fruit, look for fruit with good color that is still firm. Take them home to soften.
- d. *Optional- Watch the video- Katherine Preston How to Cut a Peach (7:20)
<https://www.youtube.com/watch?v=6T27wXyCjd0&feature=youtu.be>

What do stone fruit need to grow?

- a. Temperature
 - a. Stone fruit like cold winters and warm dry summers to grow. Different varieties of stone fruit need exposure to a certain amount of **chill hours**. **Chill hours** are a measure of the minimum hours below 45°F (7°C) needed to produce flowers and fruit. Cherries require the most chill hours (700-1400 hours).
- b. Growing conditions
 - a. Stone fruit need plenty of sun and good air circulation to minimize disease.
 - b. Trees need protection from strong winds that can bruise fruit and make it difficult for pollinating bees.
 - c. Stone fruit like deep well drained soil with a preferred pH of 6-7 (which means just slightly acidic- see the Sunshine Lemon Bars Lesson Plan)
 - d. Most fruit trees produce their first decent crops after 3 or 4 years.

Optional

- i. Use a pair of pliers and open up a peach stone for the students to see.

3. Stone Fruit Matching Game and/or Research

Younger Students- Matching Game

- a. Provide students with a variety of stones from different stone fruits.
- b. Ask students to guess which fruit each stone comes from and why.
 - i. For example: I think this is a cherry pit because it is tiny and round.
- c. Once the students have identified and described each of the stones (assist where necessary), have them Scotch tape the stones to a piece of cardboard or cardstock.
- d. Have students write or draw pictures (which you then label) of the different fruits scrambled around the same cardstock.
- e. Have students invite others to play the matching game. The object of the game is to match the stone to the fruit.

Older Students- Stone Fruit Research

- a. Provide Students with the Stone Fruit Research Worksheet
- b. Support them with resources.

Extension

- i. Research how a hybrid is created - like the cross between an apricot and a plum. There are two: a pluot and an aprium.

4. Kitchen Prep



- a. Read the title page together.
- b. Identify and gather ingredients and tools.
- c. Read the **Featured Culinary Skill – How to Fry** on the Crispy Tostadas with Peach Salsa recipe guide.

5. Prepare Crispy Tostadas with Peach Salsa

- a. Ask children to read or describe each step.
- b. Give each child a turn to dice, mince, and squeeze.
- c. Once the Crispy Tostadas with Peach Salsa are ready, Eat, Taste and Share!
- d. While you are eating, teach your friends and family what you have learned about what a stone fruit is and what they need to grow. Younger students can challenge their friends and family to play their matching game.

Lesson 3: Roasted Corn Salad and Seasonality Brought To You By Pollination

Activity time: 45-60 minutes

Learning Outcomes

- Students will use their senses to observe and explore seasonal foods.
- Students will discuss whether foods taste different when they are out of season.
- Students will learn what plants require to be in season (climate, soil, light, water, and pollination).
- Students will learn what pollination is and who pollinators are.
- Students will learn ways in which species interact and depend on one another in an ecosystem (For example, in the case of pollination it is a mutually beneficial relationship.)
- Students will understand the importance of pollen for plant reproduction.
- Students will make Roasted Corn Salad.

Materials

- Recipe guide and ingredients and tools listed within.
- Chart paper and markers
- Videos
 - For young children (up to Grade 2) but with accurate scientific information:
 - Parts of a flower and Pollination | The Dr. Binocs Show | Learn series for kids (3:55) https://www.youtube.com/watch?v=djPVgip_bdU
 - A silly and fun basic description of pollination with a bee that talks like a Californian surfer!
 - "Pollen" a Stop Motion Science animation video: Pollination, Flower, Nectar Lesson for Kids (2:40) https://www.youtube.com/watch?v=zy3rIzIC_IU
 - Actual footage of a variety of pollinators doing their job.



- The Beauty of Pollination (4:23)
<https://www.youtube.com/watch?v=07zt1SILTXg>

- (Optional Book) The Magic School Bus: Inside a Beehive by Joanna Cole
Younger Students- Pollination Activity

- A snack food that leaves visible crumbs stuck to fingers (Examples: Cheetos, Doritos, etc.)
- Apple Juice and cups
- Straw
- Colorful construction paper for flowers
- Scissors
- (Optional) A pollinator costume for students - a head band with feelers, wings, etc.

- **Older Students- Pollination Survey Activity**

- Access to a garden with a variety of flowers in bloom.
- Clipboard and pencil
- Pollination Observation Chart (included)
- Graphing materials (chart paper etc.)

Lesson plans adapted from

- Pollination Survey Activity- Garden at School Blog
- Cheetos Pollination Activity- www.elementaryshenanigans.com

Resources

- <http://www.gentians.be/index.php?page=articles&art=12>
- <http://www.edenproject.com/learn/for-everyone/what-is-pollination-a-diagram-for-kids>
- www.sciencelearn.org.nz/Contexts/Pollination/Science-Ideas-and-Concepts/Attracting-pollinators
- www.elementaryshenanigans.com
- <https://www.buglife.org.uk/sites/default/files/B-Lines%20-%20How%20plants%20attract%20pollinators.pdf>

I. Introduction- Summer Senses Game

- Bring some foods that are in season to the lesson.
- Ask: What are your five senses? How can you use them to investigate the food on the table?
- Read the Summers Senses Game on the Roasted Corn Salad Recipe Guide.
- Have each student choose a food and explore it with all five of their senses and describe what they discover.
- Answer the Food for Thought question: Do you think these foods will taste the same in the winter when they are “out of season?” Why or why not?
 - Ask: Would these foods grow near where you live in the winter?
 - Ask: Where would they grow? How far away is that from you?



- iii. Ask: How would the food get to you from where it is grown?
- iv. Ask: How would these foods taste different?

2. What needs to happen for a fruit or vegetable to be in season?

- a. Pose this question to students and have them share their ideas. Young students may need to be reminded that food comes from plants.
- b. Record answers for students to see. Some answers may be:
 - i. Climate
 - ii. Temperature
 - iii. Sunshine
 - iv. Water/rain
 - v. Pollination
- c. Once you see what your students already know you can start your teaching from there. This lesson focuses on pollination.

3. Pollination

- a. Explain to students that pollination is how insects (and other animals) help plants to make seeds.
- b. For a fun pictorial representation of pollination see:
<http://www.edenproject.com/learn/for-everyone/what-is-pollination-a-diagram-for-kids>
- a. Read the “Pollination of a Flower by a Bee” information sheet (included).
- b. (Optional) Watch any or all of the following videos:
 - i. For younger kids:
 - 1. Parts of a flower and Pollination | The Dr. Binocs Show | Learn series for kids (3:55) https://www.youtube.com/watch?v=djPVgip_bdU
 - 2. "Pollen" a Stop Motion Science animation video: Pollination, Flower, Nectar Lesson for Kids (2:40) https://www.youtube.com/watch?v=zy3rIzIC_IU
 - 3. The Beauty of Pollination (4:23) <https://www.youtube.com/watch?v=07ztISILTXg>
- c. Discussion questions:
 - i. Ask: What attracts bees and other pollinators to flowers? (scent, color, petal shape)
 - ii. Ask: What part of the flower do bees eat?
 - iii. Ask: How does the bee help the plant?
 - iv. Ask: How does the flower help the bee?
 - v. Ask: Once the flower is pollinated what happens?

4. Pollination Activities

Younger Students- Be a Bee



Turn your young students into pollinators! You can even make a bee costume.

- a. Make simple colorful construction paper flowers 4"-5" in diameter (one for each student and extras for around the room). You can trace on paper and have the students cut them out.

Example pattern:



- b. Give each student a napkin with a few Cheetos on it. Place an apple juice drink with the flower on top nearby.
- c. Provide each student with a straw and costume (if using.)
- d. Tell students that the straw is their proboscis (bee tongue) for getting nectar (apple juice.)
- e. Tell the students that their fingers are the bees legs used to collect pollen (Cheetos.)
- f. They are going to use their proboscis to drink the nectar and touch and eat the pollen. Then fly over to another flower that attracts them and land on it by touching/wiping their fingers on the flower. They should visit as many flowers around the room as they are attracted to. Then have them return to the hive (your group meeting area) and provide them with hand wipes.
- g. Show the students the flowers from all around the room and ask discussion questions to assess for understanding.
 - i. Ask: Did all the flowers get pollinated? How can you tell?
 - ii. Ask: Were any not pollinated? How can you tell?
 - iii. Ask: Which flower(s) were you attracted to? Why?
 - iv. Ask: Did you enjoy your nectar? What will you do with it back at the hive?
 - v. Ask: When you were being a bee what senses did you use to choose the flowers you would visit? How is that similar or different to the senses you use to choose the food you eat?

Bees are most attracted to purple flowers, and butterflies are most attracted to bright colors such as yellow, pink, and orange. Butterflies particularly like flowers with strong fragrances and petals that are long, like a landing strip, for them to rest on while feeding. Hummingbirds are usually attracted to red or dark pink flowers with deep throats they can easily stick their beaks into. Bats and moths do a lot of pollination at night so they rely on fragrance more than colors. And green flowers are usually wind-pollinated. Some flowers that are pollinated by flies will even smell like trash, to better attract their pollinators!

Older Students- Pollinator Census



Turn your older students into pollinator census takers! Once your students are well acquainted with the process of pollination, charge them with taking a survey of pollinators in a flower garden in your city/town.

- h. Provide your students with a clipboard, pencil and the Pollination Observation Chart (included)
- i. Students should walk around the garden and observe using all of their senses. When they find an insect or animal pollinating a flower, they should mark the following on their chart:
 - i. What type of pollinator is it?
 - ii. What color, shape, and scent is the flower?
- j. After exploration time, come back together as a class and use the observations to make a graph/chart of which color flowers each pollinator preferred and any information they gathered about scent or shape of petals.
- k. Assess your findings. While looking at the chart:
 - i. Discuss what colors you might plant if you were trying to attract a certain pollinator.
 - ii. Ask: How do flowers make themselves attractive to pollinators?
 - iii. Ask: How could farmers use this information?

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For more information about how different plants attract specific pollinators visit

- www.sciencelearn.org.nz/Contexts/Pollination/Science-Ideas-and-Concepts/Attracting-pollinators
- <https://www.buglife.org.uk/sites/default/files/B-Lines%20-%20How%20plants%20attract%20pollinators.pdf>

Extensions

- i. Get involved in supporting pollinators-
www.greatpollinatorproject.org/education
- ii. Make a poster about how kids can help pollinators. Example:
<http://pollinator.org/Resources/5%20things%20kids%20kids%20do.pdf>
- iii. Plant flowers that attract pollinators to your yard or neighborhood green space.



5. Kitchen Prep

- a. Read the title page together.
- b. Identify and gather ingredients and tools.
- c. Discuss kitchen safety, in particular Knife Safety and refer to **Cooking with Corn in the Featured Culinary Skill** section of the recipe guide. (Visit Raddishkids.com/pages/safety)

6. Prepare Roasted Corn Salad

- a. Ask children to read or describe each step.
- b. Give each child a turn cutting, mincing and slicing.
- c. Once the Roasted Corn Salad is ready, gather your family and friends together to Eat, Taste and Share!
- d. If the weather is nice, take your Roasted Corn Salad on a picnic to a spot with colorful flowers. Have students point out pollinators to your friends and family and teach them what the pollinators are doing and why.

How to Make Purple Cabbage Indicator

Materials

- a few large leaves of a purple cabbage
- blender
- coffee filter
- funnel
- 4 cups of warm distilled water

To make the indicator solution:

1. Peel a few large leaves off of your head of cabbage.
2. Pour the water into your blender.
3. Add the cabbage leaves.
4. Make sure the lid is on tight. Then pulse until the cabbage is well blended.
5. Place a coffee filter into the funnel and pour the cabbage water through it into a jar, pitcher or large liquid measuring cup.
6. Your indicator is now ready!

Stone Fruit Research Worksheet

1. Choose which stone fruit you would like to research: _____

2. Gather your research tools:

- i. Internet sites
- ii. Books
- iii. Visit to a farmer's market or garden center
- iv. Videos

3. What makes this fruit a stone fruit?

4. What climate is ideal for your stone fruit?

5. How many chill hours does it require? _____

6. What type of soil does it grow best in?

7. Where in the world does this fruit grow?

8. What time of year is it in season? For how long is it in season?

9. How much fruit does one tree yield? _____

10. How much does it cost to buy one piece of your fruit? Does it cost the same in summer as it does in winter? Why?

11. How are you going to share your research?

- a. Write a research paper
- b. Make a poster including a drawing of your tree and fruit and the information you learned
- c. Make a recipe using your fruit. Invite people to share it with you and while you are enjoying it together teach them about the key ingredient.
- d. Make a video to teach others about your stone fruit.

Pollinator Census

Pollinator	How Many? IIII IIII II	Color(s)	Scent (sweet, fresh, cloying)	Petal Shape (round, pointy, deep)
Bee				
Bird				
Butterfly				
Moth				

Pollination of a Flower by a Bee

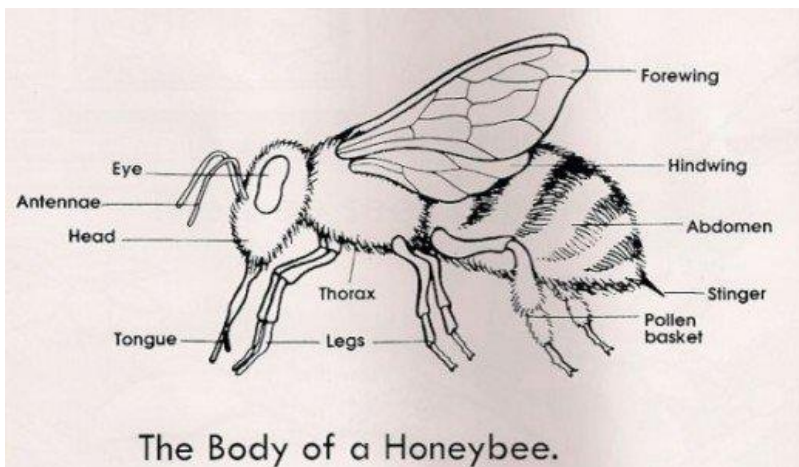
When a honey bee lands on a flower, it uses its long tube-shaped tongue (called a proboscis) like a straw to drink the sweet nectar inside the flower. This nectar is eventually turned into honey by the bees at the hive.

While the bee is busy getting a drink, tiny grains of pollen often get stuck to the bee's legs. These grains of pollen come from the male part of the flower (the stamen.)

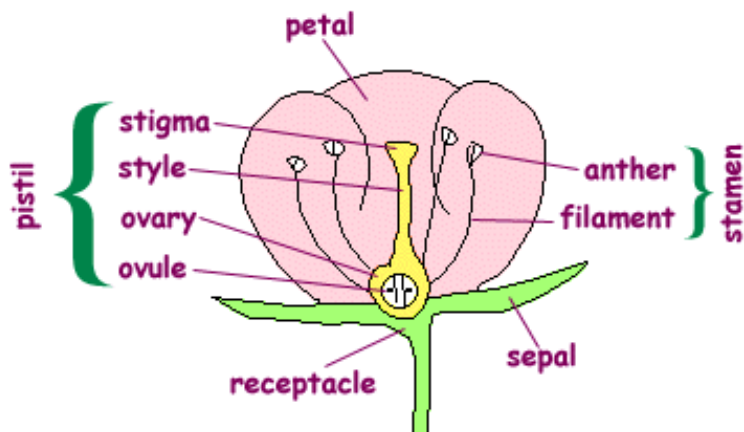
When a bee flies to a different flower to get more nectar, some of the pollen grains will fall off of the bee and onto the new flower.

If the pollen grains land on the female part of the flower (the pistil), then the flower gets pollinated and will be able to create a fruit and seed.

The plant provides nectar for the bees, and the bees allow the flower to reproduce – it's a mutually beneficial relationship! In addition to bees, birds, butterflies, moths, bats, and flies can also pollinate flowers.



https://www.tes.com/lessons/KXweNGwE2hk__Q/honey-bees



<http://www.gentians.be/index.php?page=articles&art=12>