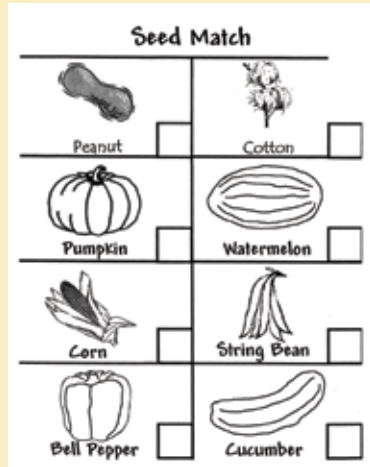




## UNDERSTANDING HOW PLANTS BEGIN AS SEEDS

### Seed Match

Make one copy of the seed match worksheet for each student. Create your own based on the model or download from [www.LearnAboutAg.org/seedmatch](http://www.LearnAboutAg.org/seedmatch).



1. Have students look at the commodities on the worksheet. Discuss the name of each, determine how each one is part of a healthy diet or used in daily life.
2. Present students with corresponding seeds in an egg carton or sorting box. Discuss the size, shape and appearance of each seed.
3. Challenge students to select seeds from the sorter and place each seed on the picture of the commodity to which it corresponds.
4. Cut or break open each whole commodity and locate the seeds within. Allow students to make corrections on the worksheets by moving seeds.
5. Have students glue seeds in correct locations on their worksheets and color each commodity correctly.



### Materials:

- Seed Match worksheet
- Commodities depicted on worksheet
- Seeds from selected commodities
- Egg carton or sorting box
- Crayons or markers
- Glue

### Vocabulary:

Help your students brainstorm adjectives to describe seed characteristics.

**Coat:** smooth, rough, dry, wet, spiky, soft, hard, sticky, etc.

**Color:** dark, light, black, brown, white, tan, grey, etc.

**Shape:** oval, round, teardrop, etc.

**Size:** small, medium, large, inches, centimeters, compare to size of a coin, a pencil's eraser, a water drop, etc.

### Objective:

Students will understand that the fruits and vegetables we eat and many materials we use come from flowering plants, and that all flowering plants begin as seeds.

### California State Board of Education Content Standards

**Grade 1:** Science: 2a, 2b, 2c, 2e, 4a, 4b  
ELA: Listening and speaking 1.0

**Grade 2:** Science: 2a, 2f, 4c  
ELA: Listening and speaking 1.0

**Grade 3:** Science: 3a, 5d  
ELA: Listening and speaking 1.0

This lesson can be easily adapted to meet the educational standards for a variety of grade levels. You can also incorporate these seeds into math lessons!

**Other questions:** Does it have a scent? What does it sound like when I shake it in a cup?

This lesson has been adapted from California Foundation for Agriculture in the Classroom curriculum. For additional educational resources, visit [www.LearnAboutAg.org](http://www.LearnAboutAg.org).



## FOLLOWING FOOD FROM FARM TO FORK

### My Life as a Fruit or Vegetable

1. Explain to students that the goal of this activity is to write a fictional, creative story about life as a fruit or vegetable from the farm to the table.
2. Brainstorm with the class a list of questions that students will need to answer as they write their story about the production and development of a specific produce item. Questions might include: How am I planted? Where am I grown and why? How am I harvested? How am I transported? What good things (nutrients) can I offer? How am I prepared/cooked?
3. Ask each student to select a different fruit or vegetable that will be the main character or theme of their story.
4. Instruct students to use the county statistical data from CDEA, the list of questions brainstormed by the class and other resources to create a rough draft. The story should be written in first person narrative, with the fruit or vegetable telling the story.
5. Instruct students to edit each other's work. Students can be assessed on the editing as well as the writing part of the lesson.
6. Have students write final drafts of their stories. The final versions can also include illustrations, a title page and publisher and copyright information. Use this assignment when school starts and submit the top five stories from your class to the *Imagine this...* Story Writing Contest. Visit [www.LearnAboutAg.org](http://www.LearnAboutAg.org) for contest details.

#### Objective:

Enhance your students' writing skills while they learn about the production and distribution of California produce. The writing process will include brainstorming, writing rough drafts, peer editing, and illustrating.

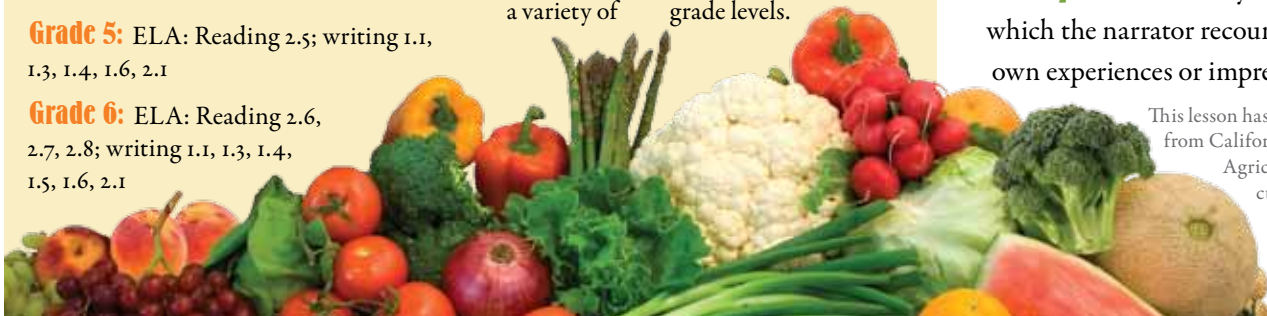
#### California State Board of Education Content Standards

**Grade 4:** ELA: Reading 2.2, 2.5; writing 1.0, 2.1

**Grade 5:** ELA: Reading 2.5; writing 1.1, 1.3, 1.4, 1.6, 2.1

**Grade 6:** ELA: Reading 2.6, 2.7, 2.8; writing 1.1, 1.3, 1.4, 1.5, 1.6, 2.1

This lesson can be easily adapted to meet the educational standards for a variety of grade levels.



#### Materials:

- County statistical data from CDEA [www.cdifa.ca.gov/statistics.html](http://www.cdifa.ca.gov/statistics.html)
- Fresh produce resources: books, magazines, articles and encyclopedias
- California Produces map [www.LearnAboutAg.org/caproduces](http://www.LearnAboutAg.org/caproduces)
- Writing paper
- Pens or pencils
- Blank paper for illustrations
- Butcher or chart paper
- Commodity fact and activity sheets [www.LearnAboutAg.org/factsheets](http://www.LearnAboutAg.org/factsheets)

#### Vocabulary:

**CDEA:** the California Department of Food and Agriculture is responsible for ensuring the state's food safety, the protection of the state's agriculture from invasive species, and promoting the California agricultural industry.

**Commodity:** article of trade or commerce, especially an agricultural product that can be processed and resold.

**First person:** literary style in which the narrator recounts his or her own experiences or impressions.

This lesson has been adapted from California Foundation for Agriculture in the Classroom curriculum. For additional educational resources, visit [www.LearnAboutAg.org](http://www.LearnAboutAg.org).



## EATING GARDEN PRODUCE FOR A HEALTHY BODY

### Eat Your Plants

Collect an assortment of at least six different foods, one example from each plant part (roots, stems, leaves, flowers, fruits, seeds). Place bite-sized food samples from each plant part into bags.

1. Brainstorm favorite fruits and vegetables with the class. As students share their ideas, record the information on the board. List all the root foods at the bottom; stem foods in the middle; and leaf, flower, fruit and seed foods near the top. Ask students to determine why you placed each food in its designated group. Draw an illustration of a plant next to the list as a hint.

2. Explain that the flavorful and nutritious fruits and vegetables we eat are all part of a plant. Use a broccoli crown to illustrate the concept. One broccoli crown has stems, flowers and leaves. Discuss some of the nutritional benefits of a diet rich in plant parts. Emphasize that more than half of the students' diet should come from plants.

3. Distribute paper bags with food samples to each of the groups. Instruct students to take turns reaching inside the bag and without looking, identify the food. After the first student guesses, they may remove the food item and decide as a group which plant part it is. The next person in the group repeats the process, first guessing by touch, then removing the food from the bag and categorizing it.



**MyPyramid.gov**  
STEPS TO A HEALTHIER YOU

4. Have each group share the food items they found in their bag. Highlight the nutritional value of each of the food items. Instruct students to work in groups planning a meal that includes at least one of each plant part. Students may draw illustrations of their meal and present their illustration to the class, explaining their healthy choices.

#### Materials:

- Paper bags, one per group
- Assortment of food representing each plant part group
- Food pyramid diagram [mypyramid.gov](http://mypyramid.gov)

#### Vocabulary:

**Leaf:** an above-ground plant organ specialized for photosynthesis.

**Flower:** the colorful and often fragrant reproductive structure found in flowering plants.

**Fruit:** the seed-bearing part of a plant, often edible and colorful, produced from a floral ovary after fertilization.

**Root:** an underground plant organ that lacks buds, leaves or nodes; absorbs water and minerals from the soil.

**Seed:** a small embryonic plant enclosed in a covering called the seed coat, usually with some stored food.

**Stem:** a slender or elongated plant structure that supports and elevate leaves, flowers and fruits.

#### Objective:

Students will identify plant parts and understand how they are connected to the food we eat. Students will discover how to make healthy eating choices.

#### California State Board of Education Content Standards

**Grade 1:** Science: 2a, 2b, 2c  
Health: 1.1.G, 1.3.G

**Grade 2:** 2f  
Health: 1.4.N, 1.7.N, 7.2N

**Grade 3:** Science: 3a  
Health: 7.1.G

This lesson can be easily adapted to meet the educational standards for a variety of grade levels.

This lesson has been adapted from TWIGS curriculum, Marilyn Johns and UC Cooperative Extension by California Foundation for Agriculture in the Classroom. For additional educational resources, visit [www.cesarmateo.ucdavis.edu](http://www.cesarmateo.ucdavis.edu).



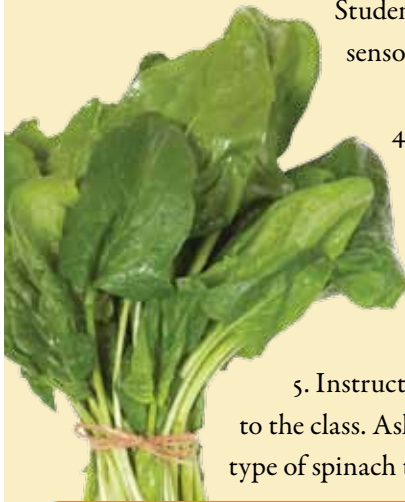
## TASTING AND TESTING THE HARVEST

### Frozen, Canned or Fresh?

Cook three different kinds of spinach. The fresh spinach should be well washed, drained and cooked. Give each student group an equal share of frozen, canned and fresh spinach.

1. Show students a package of frozen spinach, a can of spinach and a bunch of fresh spinach. Discuss the nutritional value of spinach. Explain that each group will design an experiment that will examine the visual appearance, taste, texture and smell of all three types of spinach.
2. Brainstorm with the class possible methods of observing and recording the different features of the spinach. Set clear objectives for the experiments, such as experimental design, time restraints and data organization. Allow students time to develop their plan.
3. Have students present their plan to you (and/or the class) for approval. Provide feedback for each group and allow students to revise their plan.

Students shall wash their hands, conduct their sensory experiments and record observations.



4. Ask students what conclusions they can make based on the information they gathered. Discuss with the class different ways to present the information. Students create graphs and charts to represent their findings.

5. Instruct groups to present their findings to the class. Ask students to explain which type of spinach they liked best and why.

#### Objective:

Students will design an experiment to compare the flavors and textures of spinach, interpreting their findings with charts and graphs.

#### California State Board of Education Content Standards

**Grade 4:** Science: 6a, 6e  
Math: Statistics data analysis and probability 1.1, mathematical reasoning 1.0  
Health Education: 2.1.N, 5.1.N

**Grade 5:** Science: 6c, 6g  
Math: Statistics data analysis and probability 1.2, mathematical reasoning 1.0  
Health Education: 5.1.N

**Grade 6:** Science: 7b, 6d  
Math: Mathematical reasoning 1.0

This lesson can be easily adapted to meet the educational standards for a variety of grade levels.

#### Materials:

- 3 frozen packages of spinach
- 3 cans spinach
- 3 bunches fresh spinach
- 3 medium-sized pots
- Hot plate
- Water
- Forks
- Plates
- Napkins

#### Vocabulary:

Encourage students to use these words when making observations.

**Aftertaste:** the persistence of a sensation of flavors when food is no longer present.

**Mouthfeel:** food's physical and chemical interaction in the mouth, used often in the testing and evaluating of foodstuffs.

**Pungent:** having a strong odor that stings the nose, especially in acidic or spicy substances.

**Vibrant:** of bright color.

This lesson has been adapted from California Department of Education curriculum by California Foundation for Agriculture in the Classroom. For additional educational resources, visit [www.cde.ca.gov](http://www.cde.ca.gov). Duplication for educational uses only.



GATHERING,  
GROUPING AND  
GUESSING GARDEN  
OBJECTS

## Six of One, Half Dozen of the Other

On the bottom of each egg carton, write two adjectives. One should be a likely quality of a garden object, such as “wet.” The other should be the opposite (“dry”). Use a variety of words that will encourage students to use their senses, such as dark/light, rough/smooth, scented/unscented, etc.

1. Ask the class what senses can be used to explore opposites in the garden. Ask students to share examples of opposites. Explain that in a few moments, they will be searching for objects that have a specific quality and those that have the opposite quality.
2. Divide the class into groups of three. Tell the class that each group will get a container for collecting 12 items. They should not let any other group see the secret information on the bottom of the carton.
3. Distribute the cartons and demonstrate to each group how the opposites will be placed, with six of each category in a long row. On the bottom of the carton are secret words that describe what kind of objects to collect. Each group will be collecting different opposites.
4. Remind students to handle everything gently and take only small specimens. Allow enough time for students to explore the site and gather objects.
5. When groups are finished, have them exchange cartons and determine the opposite adjectives the other groups collected without looking on the bottom of the carton.
6. Discuss strategies groups used to identify the other groups’ classification. Ask each group to share how they used their senses during this activity.

**Objective:** Students will use their senses to identify and classify objects in the garden laboratory.

### Materials:

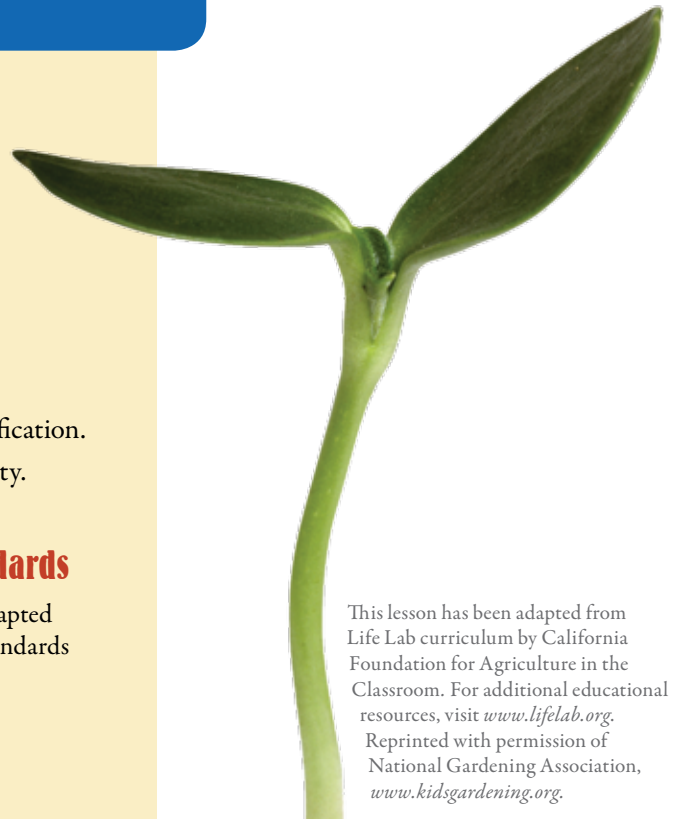
- One egg carton for each group of three

### Vocabulary:

**Adjective:** the part of speech used to limit or describe the noun or pronoun it modifies, as in “wet” leaf.

**Classification:** the act of distributing things into classes or categories of the same type.

**Specimen:** a sample, especially one used for diagnostic analysis.



This lesson has been adapted from Life Lab curriculum by California Foundation for Agriculture in the Classroom. For additional educational resources, visit [www.lifelab.org](http://www.lifelab.org). Reprinted with permission of National Gardening Association, [www.kidsgardening.org](http://www.kidsgardening.org).

### California State Board of Education Content Standards

**Grade 1:** Science: 1a, 2a  
Math: Statistics, data analysis, and probability 1.1

**Grade 2:** Science: 2d, 4a, 4c, 4g

**Grade 3:** Science: 5c  
Math: Measurement and geometry 1.1

This lesson can be easily adapted to meet the educational standards for a variety of grade levels.



## NOURISHING AND NURTURING SOIL WITH COMPOST

### Let's Make Compost Cake

Select a permanent compost area for the garden that can be observed throughout the year. The area should be a minimum of three square feet. Begin collecting compost materials.

1. Review the nutrient cycle and ask students if they think it is possible to create a nutrient cycle in the garden. Create a list of materials that decompose with the class.
2. Demonstrate building a miniature compost cake with samples of browns, greens and soil (or old compost). Stress the importance of size, ingredients and moisture.
3. Go to the garden and equip students with shovels, tools and a wheelbarrow. Have students use their spading forks to loosen the ground where the compost pile will be.
4. Divide students into three groups: browns, greens and soil. Begin with a browns layer of stalky material to allow drainage. Groups rotate, adding layers of browns, greens and soil repeatedly until the pile is at least three feet tall. Browns and greens layers should be 4"-6" thick, soil layers should be 1"-2" thick.
5. Water each layer as it is added to the pile. Maintain a rectangular shape and keep the pile's corners square. Each layer must become a solid base for the next, or the pile may collapse and the heat needed for decomposition will be lost.
6. Instruct students to measure and record the dimensions and temperature of the pile. Have them draw the compost cake and make predictions about how the appearance will change over time. Check your pile monthly and make sure it is moist enough, adding water during dry periods.

#### Objective:

Students will observe the process of decomposition and the nutrient cycle by creating a compost cake.

#### Materials:

- Compost materials
- Shovels and spading forks
- Wheelbarrow
- Water access and hose with spray nozzle
- Meter or yard stick
- Compost thermometer

#### Vocabulary:

**Browns:** carbon-rich materials such as dead plants, leaves or straw.

**Decomposition:** the process by which tissues of dead organisms break down into simpler forms of matter.

**Greens:** nitrogen-rich materials such as grass clippings, fresh plant matter or food scraps.

This lesson has been adapted from Life Lab curriculum by California Foundation for Agriculture in the Classroom. For additional educational resources, visit [www.lifelab.org](http://www.lifelab.org). Reprinted with permission from National Gardening Association, [www.kidsgardening.org](http://www.kidsgardening.org).

#### California State Board of Education Content Standards

**Grade 4:** Science: 2a, 2b, 3d, 6b, 6c  
Math: Measurement and geometry 1.1

**Grade 5:** Science: 6a, 6f, 6g  
Math: Measurement and geometry 1.3

**Grade 6:** Science: 3d, 5a, 5b, 5e, 7h

This lesson can be easily adapted to meet the educational standards for a variety of grade levels.





## ANALYZING SOIL COMPOSITION FOR PLANT HEALTH

### Shake, Raffle & Roll

1. Explain to the class that soil is made of three different types of particles: sand, silt and clay. The perfect soil will contain an even mixture of all three. This is called a loam soil.
2. Give each student a small sample of sugar, representing sandy soil. This soil does not usually grow plants well, as it dries out quickly and does not let the roots get enough water. Have the students describe the texture. Next, allow students to feel a small sample of dry flour and rub it between their fingers. This is the powdery, silky texture of silt. Finally, add a small amount of water to the flour. This is the texture of clay. Clay particles clump together and compact when dry and drain poorly when wet. Have the students describe the texture.
3. Determine the type of soil in the garden by filling a large jar half-full with soil. Fill the remaining space with water. Have the students take turns vigorously shaking the jar until the larger clumps are broken apart. Let the jar sit for two minutes. Use a permanent marker to draw a line to mark each layer. Allow at least 24 hours for the soil to settle completely. The top layer will be clay, which includes the smallest, lightest particles. The middle layer will be silt, and the heaviest particles fall to the bottom, sand. Have the students identify the thickest layer to determine the soil type.
4. Have students measure and graph the separate layers in centimeters. Divide the class into groups to duplicate the activity with soil from different areas of the campus. Students can record, graph and compare their findings. Ask the students how this activity might influence where they plant a garden.



### Materials:

- Flour
- Sugar
- Water
- Large glass jar with lid
- Soil
- Water
- Permanent marker
- Ruler

### Vocabulary:

**Clay:** fine granular material composed of closely packed particles.

**Loam:** ideal garden soil that has a well-balanced mixture of sand, silt and clay.

**Sand:** coarse granular material composed of finely divided rock and mineral particles.

**Silt:** sedimentary material composed of fine mineral particles in size between sand and clay.

### Objective:

Students will investigate soil texture and properties, determining the type of soil found in the garden.

### California State Board of Education Content Standards

**Grade 1:** Science: 2b, 2c, 4b, 4c  
Math: Measurement and geometry 1.1, 2.4;  
Statistics, data analysis and probability 1.0

**Grade 2:** Science: 1a, 1b, 2c, 3c, 3e, 4b, 4c, 4e  
Math: Measurement and geometry 1.1, 1.3;  
Statistics, data analysis and probability 1.4

**Grade 3:** Science: 3d, 5a, 5c, 5e  
Math: Measurement and geometry 1.1

This lesson can be easily adapted to meet the educational standards for a variety of grade levels.

This lesson has been adapted from Junior Master Gardener® Program curriculum by California Foundation for Agriculture in the Classroom. For additional educational resources, visit [www.jmgkids.us](http://www.jmgkids.us).



## CONSERVING RESOURCES BY WATERING EFFICIENTLY

### Read the Roots

Collect and rinse clear 2-liter plastic bottles with the labels removed. Use a utility knife to cut the top off the bottles below the spout.

1. Explain that lawns are composed of millions tiny plants that grow from tiny seeds. To have a healthy lawn, or any other plant, it must be watered adequately during dry periods.
2. Divide the students into groups. Instruct each group to fill two 2-liter bottles one inch from the top with potting soil and pack it down firmly. Level the soil surface. Sprinkle two tablespoons of ryegrass seed in a uniform layer over the top of the soil. Cover the seed with two tablespoons of additional potting soil. Use a spray bottle to spray 30 milliliters of water evenly over the surface of each bottle to wet the seed.
3. Place the bottles in a sunny location. After the seed begins to germinate, (about three days) use a permanent marker to label one bottle “less frequent” and the other bottle “more frequent.”
4. Use a spray bottle to apply 30 ml of water over the soil in “less frequent.” Apply the same amount of water every day for 12 days. Use a spray bottle to apply 120 ml of water over the soil in “more frequent.” Apply the same amount of water every four days, for three applications.
5. After 12 days, evaluate the two sections of grass. Instruct students to observe grass thickness, root development and grass color. Challenge students to use their observations to draw a conclusion about watering frequency.

**Objective:** Students will determine a watering schedule that encourages longer, deeper roots and healthier plants.

### California State Board of Education Content Standards

**Grade 4:** Science: 3b, 6a, 6b, 6d

**Grade 5:** Science: 2e, 6e, 6f, 6h

**Grade 6:** Science: 5e, 7b, 7e

This lesson can be easily adapted to meet the educational standards for a variety of grade levels.

### Materials:

- 2-liter bottles, two per group
- Tablespoons, one per group
- 100 ml beaker, one per group
- Potting soil
- Ryegrass seed
- Water spray bottles
- Permanent markers
- Water

### Vocabulary:

**Frequency:** the number of occurrences within a given time period.

**Germinate:** the process whereby seeds or spores sprout and begin to grow.

**Irrigation:** an artificial application of water to the soil usually for assisting in growing crops.

**Ryegrass:** a genus of nine species of tufted grasses, often used for lawns or pastures.

This lesson has been adapted from Junior Master Gardener® Program curriculum by California Foundation for Agriculture in the Classroom. For additional educational resources, visit [www.jmgkids.us](http://www.jmgkids.us).

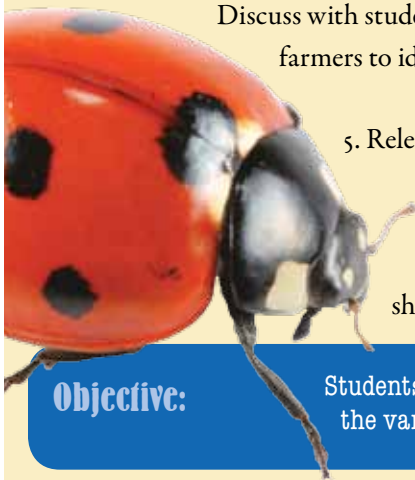


## OBSERVING AND IDENTIFYING GARDEN INSECTS

### Bug Sweep

1. Explain to the class that there are countless insects found in the garden. Some insects are beneficial, while others are considered pests. Distribute one hanger, tape and a gallon zipper-type plastic bag or panty hose to each student group. Tell students to stretch the bag (or panty hose) across the frame of the hanger to create a bug sweeper to collect garden pests.
2. Give students 15 minutes to collect as many different bugs as possible in the garden area. Encourage students to gently examine the leaves of plants to locate bugs. Transfer each group's collection to a clear jar with holes.
3. Ask students to count and categorize the insects according to physical attributes. Students may select their own criteria to categorize their findings. This may include the number of legs, winged or non-winged, color, weight, body structure, size, antennae, etc. Encourage students to share their discoveries with the class.
4. Instruct students to closely observe their pests and draw realistic pictures of their pest in an insect journal. Challenge students to make their drawings as detailed as possible. Students may need to use a magnifying glass or in some cases, a microscope, to make their observations. Once groups have completed their drawings, they can use an insect guide to identify their collection. Try to determine if each insect is a beneficial insect or a pest.

Discuss with students why it is important for gardeners and farmers to identify the insects in their growing area.



5. Release the insects outside when the study is completed. Students can gently tip their collecting jar on its side and remove the lid. The insects should crawl or fly out of the jar.

#### Objective:

Students will collect, observe and categorize the various insects in the garden.

#### California State Board of Education Content Standards

**Grade 1:** Science: 2a, 4a, 4b  
Math: Statistics, data analysis and probability 1.0

Visual Arts: 1.1, 1.3

**Grade 2:** Science: 2c, 2d, 4c, 4f

Visual Arts: 1.1, 1.3

**Grade 3:** Science: 3a, 3c  
Visual Arts: 2.1, 2.4

This lesson can be easily adapted to meet the educational standards for a variety of grade levels.

#### Materials:

- Gallon zipper-type plastic bag or panty hose, one per group
- Coat hangers, one per group
- Tape
- Notebook or journal
- Jars and lids with holes
- Insect identification book
- Magnifying glass
- Pest identification resources  
[ipm.ucdavis.edu](http://ipm.ucdavis.edu)

#### Vocabulary:

**Antennae:** a feeler organ on the head of an insect, crustacean, or other animal.

**Beneficials:** organisms that provide a benefit to crop production, applied especially to natural enemies of pests and to pollinators such as bees.

**Entomologist:** a person who studies the classification, life cycle and habits of insects and related life forms.

**Pest:** any unwanted and destructive insect or other animal that attacks food, crops or livestock.

This lesson has been adapted from National 4-H Cooperative System, Inc. curriculum by California Foundation for Agriculture in the Classroom. For additional educational resources, visit [www.n4hccs.org](http://www.n4hccs.org).

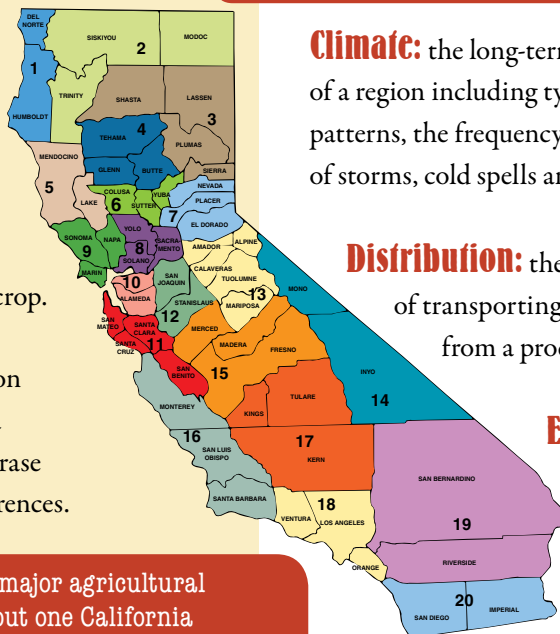


DISCOVERING  
WHAT GROWS  
WHERE IN THE  
GOLDEN STATE

## California Crops

Use grocery advertisements to find, cut out and laminate 15 different California grown commodities. Place a strip of double-sided tape on the back of each photo.

1. Show students a large map of California. Explain that each commodity grown in California has unique needs and grows best in certain regions of the state. Have the students locate where they live and determine what products are grown locally. Discuss how climate, water and soil affect an area's agricultural growing capacity.
2. Distribute laminated photos of California grown commodities to student pairs. Instruct students to work together to determine where the commodity is produced and why. Ask students to approach the map in pairs and place the commodity where they think it is grown. Use the California Produces map to locate the correct growing areas.
3. Have each student select one fruit or vegetable and write a formal business letter to a corresponding agricultural commodity board. Prior to writing the letter, brainstorm with the class a list of information they wish to obtain from the activity. This list may include questions about production, distribution, harvest, growing locations and conditions, nutritional benefits and economic value of the crop.
4. Mail the letters. Challenge students to use the information received from agricultural commodity boards to assemble a written report. Encourage students to use quotes or paraphrase information from various sources and give credit to all references.



### Materials:

- Large wall map of California
- Reference books on fruits and vegetables
- Commodity cut-outs
- Double-sided tape
- California Produces map  
[www.ciaifc.org/caproduces](http://www.ciaifc.org/caproduces)

### Vocabulary:

**Climate:** the long-term average weather of a region including typical weather patterns, the frequency and intensity of storms, cold spells and heat waves.

**Distribution:** the commercial activity of transporting and selling goods from a producer to a consumer.

**Economic Value:** the amount of profit received for a specific good and its impact on the surrounding economy.

### Objective:

Students will appreciate California as a major agricultural state, gather production information about one California grown commodity and create a written report.

### California State Board of Education Content Standards

**Grade 4:** Science: 3b  
ELA: Reading 2.2, 2.5; writing 1.1, 1.2, 1.4, 1.5, 1.7, 1.10, 2.3, written and oral language conventions 1.0  
History-Social Science: 4.1.3, 4.1.5

**Grade 5:** ELA: Reading 2.1; writing 1.1, 1.3, 1.6; written and oral language conventions 1.0

**Grade 6:** Science 5e  
ELA: Reading 2.1; writing 1.1, 1.2, 1.4, 1.6, 2.3; written and oral language conventions 1.0

This lesson can be easily adapted to meet the educational standards for a variety of grade levels.

**California is the #1 agriculture producing state in the nation.**

This lesson has been adapted from California Foundation for Agriculture in the Classroom curriculum. For additional educational resources, visit [www.LearnAboutAg.org](http://www.LearnAboutAg.org).



## INVESTIGATING THE POLLINATION CYCLE

### Busy Bees

Fruit trees must be pollinated to produce fruit. Pollen grains are transferred from the male flower part to the female flower part by wind, water, birds, bees and other insects. Bees are attracted to the nectar and pollen of fragrant flowers. The bee stops at a flower to suck the nectar, and the pollen grains get stuck to the bee's body. When the bee moves to another flower, the pollen grains are transferred to the second flower. More than 80 percent of crop pollination is accomplished by bees.



1. Write the following journal prompt on the board: "Do you think bees are helpful or harmful? Describe." After students brainstorm and write their answers down, ask them to share with the class.

2. Distribute green paper plates and craft supplies. Instruct students to illustrate and narrate the pollination cycle of bees on the paper plates. Use yellow pom-poms to depict the bee. Each quadrant of the plate should explain a different step of the pollination cycle:

- a. The bee is looking for food.
- b. The bee lands on the flower and sips the nectar. Pollen gets stuck on its body.
- c. The bee flies away, looking for more food.
- d. The bee lands on a new flower with pollen from the last flower. The pollen is transferred.

3. Use brown construction paper to create a tree trunk. Attach to the bottom of the plate with tape.

4. Ask each student to explain the pollination story to a partner using their completed visual aid.

### Materials:

- Green paper plates
- Circle template, divided into quadrants
- Brown construction paper
- Crayons, colored pencils or markers
- Tape
- Yellow pom-poms

### Vocabulary:

**Nectar:** a sweet liquid reward for pollinators that is produced by flower glands called nectaries.

**Pistil:** the female part of the flower including the stigma, style and ovary.

**Pollen:** the fine, powder-like material produced by the anthers of flowering plants.

**Pollen basket:** a smooth, slightly concave surface of the outer hind leg of a bee that is fringed with long, curved hairs that hold the pollen.

**Stamen:** the male part of the flower consisting of the anther and filament.

### Objective:

Students will identify each step of the pollination cycle and appreciate the importance of bees in agriculture production.

### California State Board of Education Content Standards

**Grade 1:** Science: 2a, 2b  
ELA: Listening and speaking 1.o

**Grade 2:** Science: 2f, 3e  
ELA: Listening and speaking 1.o

**Grade 3:** Science: 3a  
ELA: Listening and speaking 1.o

This lesson can be easily adapted to meet the educational standards for a variety of grade levels.

This lesson has been adapted from Virginia Agriculture in the Classroom curriculum. For additional educational resources, visit [www.agintheclass.org](http://www.agintheclass.org).