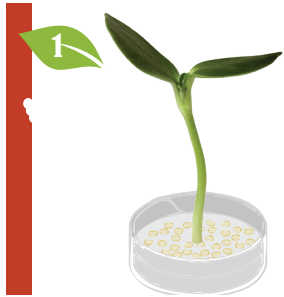
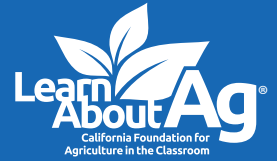


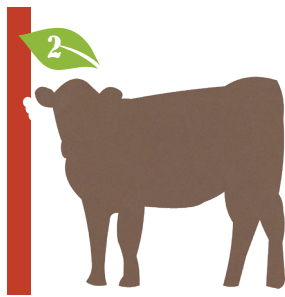
# Ag-Bites...

Bite-sized activities for bringing agriculture into your classroom.

These one-page, standards-aligned sheets explain how to perform hands-on learning activities with students in grades K-12.



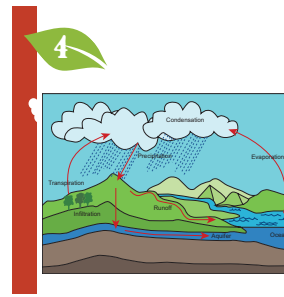
Desktop Gardens (2-5)



Cowboy Brands (3-4)



Ice Cream in a Bag (1-5)



Water Cycle in a Cup (5-8)



Making Recycled Paper (K-3)



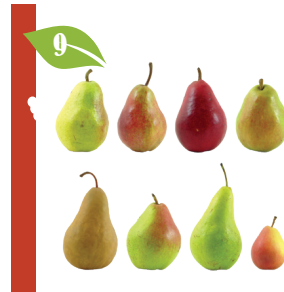
Apples and Earth (3-5)



Link 'Ems (6-8)



Tops or Bottoms (K-3)



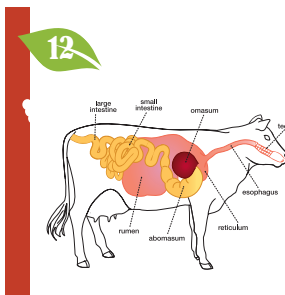
Tasty Testing (9-12)



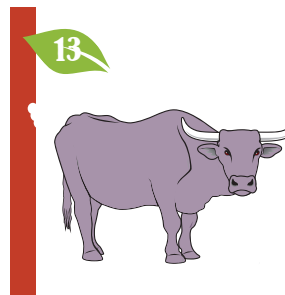
A Journey Through a Rice Mill (9-12)



Asparagus (4-6)



Got Guts? (3-5)



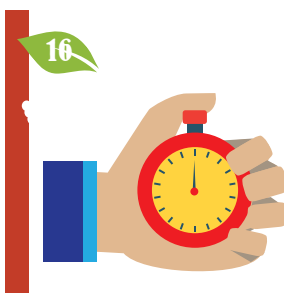
Roll of the Genes (3-5)



Say Cheese (9-12)



Drive Through Nutrition (3-6)



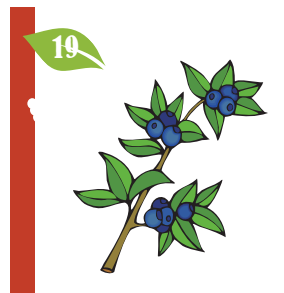
Track Your Nutrition (9-12)



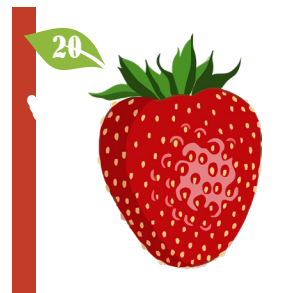
Garden in a Glove (3-8)



Ag TransPORTation (5-8)



Blueberries (5-8)



Strawberry pHun (6-8)

## California Foundation for Agriculture in the Classroom

**Vision:** An appreciation of agriculture by all.

**Mission:** To increase awareness and understanding of agriculture among California's educators and students.



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# Desktop Gardens

Create a tiny garden for your students' desktop! Add small toys, rocks, labels or marbles to this oasis in a lid.

Grades 2-5

## Preparing your garden plot

1. Take a clean lid from a peanut butter jar or use a plastic soup-cup lid.
2. Fit paper towel into lid, covering any tiny holes.
3. Moisten paper towel with water.
4. Sprinkle seeds on the area where you want growth to occur.
5. Cover the lid with a thick piece of cardboard or aluminum foil to block the light and allow seeds to germinate.
6. Check your garden every day until you see little shoots growing, then remove the cover. Be sure to keep the paper towel damp.
7. Once the seeds have sprouted, let them grow by regularly watering the desktop garden. Decorate with small cars, rocks, or even marbles.

## Materials

- Clean lid
- Paper towel
- Seeds
- Aluminum foil or cardstock to block light
- Water

## Tip

Use mustard seeds or cress seeds. They are speedy growers and will sprout anywhere as long as they are damp!

## Watch Online!

See a video of this Ag-Bite at  
[LearnAboutAg.org/  
resources/bites](https://www.learnaboutag.org/resources/bites)

## Classroom Activities

### Math

- Find out what percentage or fraction of each student's desk is covered by the garden plot.

### English Language Arts

- Have students keep a journal of the growth stages of the garden plot.
- Ask students to create a poem about their garden plot.
- Have students write a story about their plot and submit the top five stories from your class to the *Imagine this...* Story Writing Contest. Visit [LearnAboutAg.org/imaginethis](https://www.learnaboutag.org/imaginethis).

### Science

- Create an experiment with the desktop gardens. Separate gardens into groups and see how they do with less water or more water, less light or more light. Compare growth of mustard seeds to tomato seeds.

## California Standards:

### Grade 2

ELA CC: W.2.3, 7  
Math CC: 2.MD.1, 9  
NGSS: 2-LS2-1

### Grade 4

ELA CC: W.4.3, 7

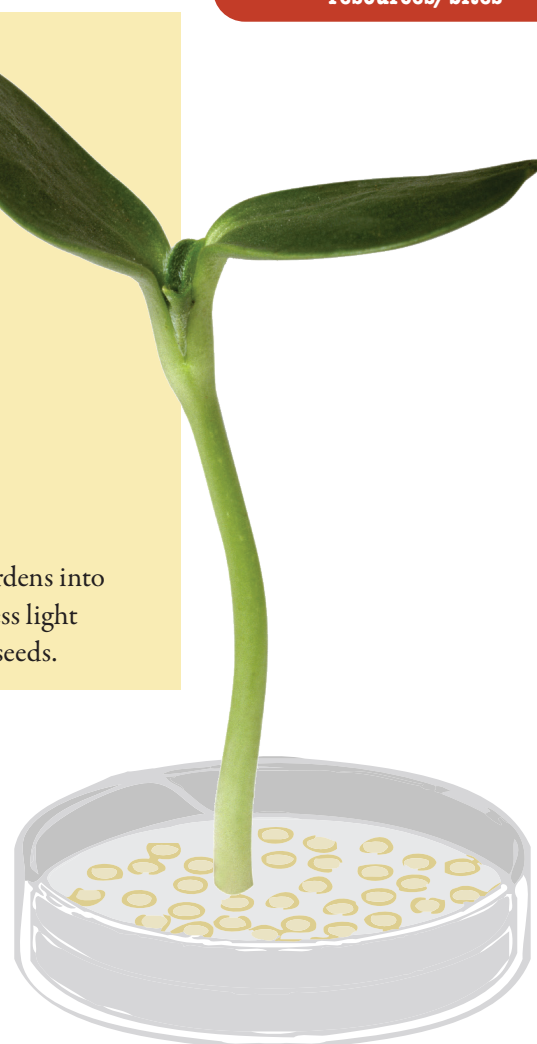
### Grade 3

ELA CC: W.3.3, 7  
Math CC: 3.MD.4  
NGSS: 3-LS1-1

### Grade 5

ELA CC: W.5.3, 7  
NGSS: 5-LS1-1

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



*Adapted from The Gardening Book by  
Jane Bull*



## Cowboy Brands

Explore the importance of brands to identify a rancher's cattle.

Grades 3-4

### Making your own brand

Hand out information sheets with examples of brands. Create your own or download from [LearnAboutAg.org/resources/bites](https://LearnAboutAg.org/resources/bites).

1. Have students read the information sheets. Discuss the variety of shapes used, how brands would imprint the cow's hide to distinguish ownership, and how brands have handles—often with a loop at the top—making it easier for the rancher to hold onto the brand.
2. Have students design their brand on a piece of paper. Advise students to keep designs simple, like the examples.
3. Distribute chenille stems. Have students use two stems to create their brand shape and the third for the handle.
4. To create the handle, bend a chenille stem in half. Holding a finger inside the bend, twist the stem creating a loop at the top. Continue to twist, finally attaching the ends opposite the loop to the center of the brand shape.

### Materials

- Three 12" chenille stems per student
- Pencil
- Construction paper
- Paint
- Sample of brands from [LearnAboutAg.org/resources/bites](https://LearnAboutAg.org/resources/bites)

### Tip

Brands can be dipped into paint to "brand" construction paper cattle.

### Classroom Activities

#### Visual and Performing Arts

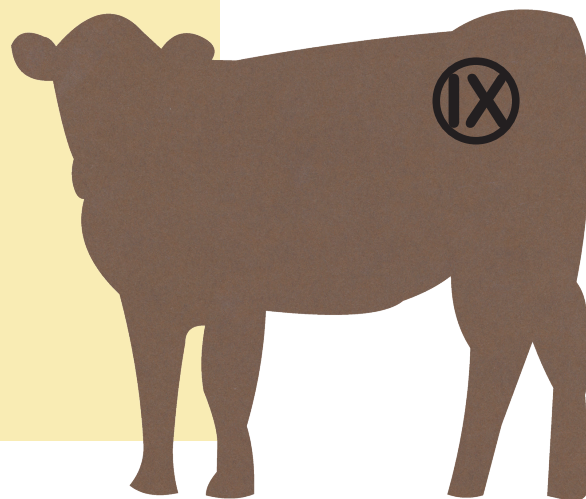
- Have students draw a scene with a cow or cattle and use their brand to brand the cow, showing ownership.

#### English Language Arts

- Explain how brands are used in other parts of the world. Compare and contrast using a Venn Diagram.
- Write a personal letter describing what was learned about brands.

#### History-Social Science

- Have students research and create presentations: What is the history of brands? Where and how are brands used? How are brands made?
- Describe how California's economy changed from a hunter/gatherer economy to an agricultural economy. Discuss the importance of identifying cattle ownership and the roles brands played in California Missions.



### California Standards:

#### Grade 3

Visual Arts Content: 1.5, 2.4  
ELA CC: RI.3.2; W.3.2

#### Grade 4

Visual and Arts Content: 3.2, 3.3  
ELA CC: RI.4.2; W.4.2

*Adapted from materials by the California Beef Council*







# Ice Cream in a Bag

Explore the history of ice cream and dairy products, and the chemistry of ice, salt, and exothermic reactions.

Grades 1-5

## Recipe

1. Fill the large bag half full of ice and add the rock salt. Seal the bag.
2. Put milk, vanilla, and sugar into the small bag and seal it. You can use two bags to prevent leaking.
3. Place the small bag inside the large one, sealing it again, carefully.
4. Shake until the mixture is ice cream, which takes about 5 minutes.
5. Wipe off the top of the small bag, then open it carefully. Enjoy!

## Classroom Activities

### English Language Arts/History

- Identify an ice cream processing facility near your community and try a few of their flavors.
- Have students research the history of ice cream or other dairy products and present their findings to the class.

### Math

- Determine the cost per serving to make ice cream in a bag. Calculate the cost of each ingredient and the total cost overall.
- Have students multiply and divide fractions to determine the amount of supplies needed for 1 scoop of ice cream for each person in the whole class, half the class, etc.

### Science

- Create a food chain or food web with cows and humans and explain the relationships.
- Have students write down their observations and discuss the process of how milk turned into ice cream, describing the physical and chemical properties.

## Materials

- 1 gallon-size plastic food storage bag
- Ice cubes
- 6 tablespoons rock salt
- 1 pint-size resealable plastic food storage bag
- ½ cup milk or half & half
- ¼ teaspoon vanilla
- 1 tablespoon sugar

## Tip

A ½ cup of milk will make about 1 scoop of ice cream; double the recipe if you want more.



## California Standards:

### Grade 1

CC ELA: RI.1.10, SL.1.1  
CC Math: 1.OA.1, 1.MD.4

### Grade 2

CC ELA: RI.2.10, SL.2.1  
CC Math: 2.OA.1, 2.MD.8  
NGSS: 2-PS1-1

### Grade 3

CC ELA: RI.3.10, SL.3.1, SL.3.4  
CC Math: 3.OA.1, 3.MD.2

### Grade 4

CC ELA: RI.4.10, SL.4.1, SL.4.4  
CC Math: 4.NF.4c, 4.MD.2

### Grade 5

CC ELA: RI.5.10, SL.5.1, SL.5.4  
CC Math: 5.NF.1, 5.NF.2  
NGSS: 5-PS1-3, 5-PS1-4, 5-PS3-1

*Adapted from "Acres of Adventures Activity Guides" by 4-H*



# Water Cycle in a Cup

Investigate how water, a limited resource, moves from Earth to clouds and back again.

Grades 2-8

## Make your own Water Cycle

Water evaporates from oceans, rivers, and lakes and rises into the atmosphere in its gas form where it condenses to form clouds. Precipitation then falls to the earth as rain or snow where it flows into rivers, lakes and oceans and the process begins again.

1. Color the landform handout.
2. Tape the landform drawing to the back of the cup.
3. Add 60 ml ( $\frac{1}{4}$  cup) of water to the earth cup and cover with plastic to keep the water from evaporating.
4. Mark the starting water level with a crayon with the current time.
5. Place the cup outside in the sun for  $\frac{1}{2}$  hour.
6. Observe and discuss changes.

## Materials

- Plastic cup
- Plastic wrap
- Landform cut out from [LearnAboutAg.org/resources/bites](http://LearnAboutAg.org/resources/bites)
- Plastic wrap
- Water
- Tape
- Crayons

## Tip

This activity can also be done using plastic bags and taping them to a window.

## Classroom Activities

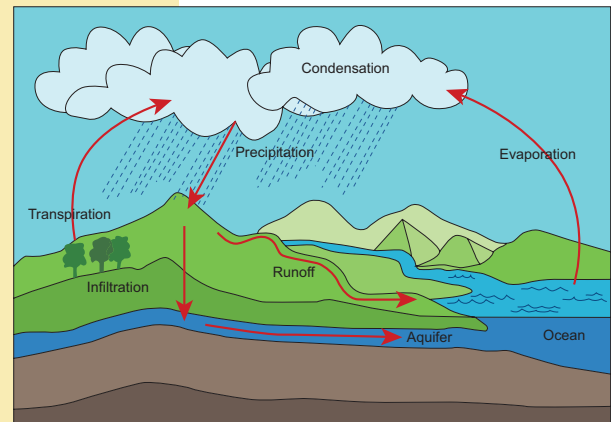
### Science

- Create an experiment with water cycle in a cup. Use the scientific method and write up a report. Make observations over a period of  $\frac{1}{2}$  hour, one hour, one day and two days. Measure the amount of water that is left after observations.
- Discuss the following:
  - When and why does it rain?
  - What happens to the rain water once it reaches the ground?
  - What happens to the water when the sun comes out?
  - What happens to the vapor in the air when it gets cold?
- Define the following terms:

Evaporation	Collection
Condensation	Watershed
Precipitation	

### English Language Arts

- Create a story about the water cycle. For an example, go to [LearnAboutAg.org/imaginethis](http://LearnAboutAg.org/imaginethis) and read past winning stories like "The Journey of Robby the Raindrop" from the 2010 contest.



## California Standards:

### Grade 2

ELA CC: W.2.3, 7, 10  
NGSS: 2-PS1-4, 2-ESS2-2, 3

### Grade 3

ELA CC: W.3.3, 7, 10

### Grade 4

ELA CC: W.4.3, 7, 10

### Grade 5

ELA CC: W.5.3, 7, 10  
NGSS: 5-ESS2-1, 2

### Grades 6-8

ELA CC: W.6-8.3, 7, 10; RST.6-8.3;  
WHST.6-8.2, 7  
NGSS: MS-ESS2-4

*Adapted from California Department of Water Resources*





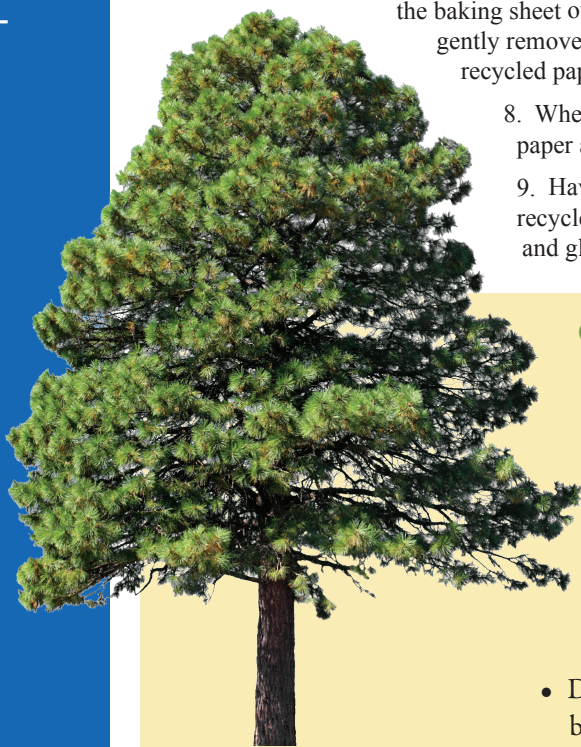
# Making Recycled Paper

Create recycled paper—a forest product.

Grades K-3

## Activity

1. Tear eight pages of a newspaper (or one full *What's Growin' On?* newspaper) into small strips of one inch or less.
2. Put the paper strips into a large bowl and add 1 cup of water to it. Stir and tear the paper in the bowl using your hands, making the paper as small as possible. Continue to add more paper or water until the pulp mixture is the consistency of cookie dough.
3. Place your baking sheet upside down on a flat surface. Cut a piece of plastic wrap and lay it across the bottom of the baking sheet, tucking the ends underneath the baking sheet. Take a second piece of cut plastic wrap and wrap the rolling pin.
4. Grab a handful (about half of the pulp) of the pulp and place the pulp in the center of the pan, shaping into pulp into a square.
5. Place multiple layers of newspaper on top of the pulp ball, using the rolling pin prepared earlier, roll the ball from left to right and top to bottom twice removing all excess water.
6. Remove the newspaper from the pulp and discard wet newspaper. Drain any excess water in the lip of the pan. If the mixture sticks to the newspaper, use a butter knife to scrape it back onto the pile.
7. Apply multiple dry sheets of newspaper onto square pulp. Flip the baking sheet over and set on flat surface. Using a butter knife, gently remove the plastic wrap from the pulp. Let the new recycled paper dry completely.
8. When it is thoroughly dry, peel your new recycled paper away from the newspaper.
9. Have students make a greeting card out of their recycled paper. They can draw designs or use glitter and glue to write a message.



## Materials

- Large baking sheet
- Large bowl
- Measuring cup
- Water
- A large section of newspaper
- Rolling pin
- Butter Knife
- Plastic wrap

## Tip

Recycle paper in your classroom and encourage students to recycle at home too!

## Classroom Activities

### English Language Arts

- Have students write a message in the card using proper grammar, salutations, dates, etc.
- Have students create a skit, rhyme, or song about the importance of recycling.

### Science

- Identify the parts of a tree and the nutrients needed for survival.
- Discuss the importance of trees, what they can be used for, and how they reproduce.
- Have students bring items to class that can be reduced, recycled, and reused. Start a recycling program in your classroom.

## California Standards:

### Kindergarten

- ELA CC: W.K.7  
NGSS: K-LS1-1, K-ESS2-2,  
K-ESS3-1, K-ESS3-3

### Grade 1

- ELA CC: W.1.7  
NGSS: 1-LS1-1, 1-LS3-1

### Grade 2

- ELA CC: W.2.7  
NGSS: 2-PS1-2, 3

### Grade 3

- ELA CC: W.3.4  
NGSS: 3-LS1-1, 3-LS3-2, 3-LS4-2

## Did You Know?

The word paper comes from the Latin word "papyrus," named after the Egyptian reed from which paper was first made.

*Adapted from "Forests Today, Tomorrow and Forever" by The Forest Foundation*





# Comparing Apples and... Earth?

Grades 3-5

Explore how much of the Earth's surface is needed for growing food for a world of people.

## Activity

1. Hold up an apple to the class and tell the students that it represents planet Earth.
2. Slice the apple into four equal pieces. Set aside three of the fourths. They represent the area of the Earth covered in water.
3. Cut the remaining slice into thirds. Set aside one of the thirds. This represents inhospitable lands: deserts, mountains, and polar regions.
4. Set aside another third. This represents habitable land that is not suited for crop production: roads, houses, and public lands.
5. The remaining slice represents Earth's agricultural land. Cut the slice into fourths. Set aside three of the pieces. They represent land that is used for livestock feed and grazing.
6. The single remaining piece is 1/48 of the original apple. Hold up the piece and explain that it represents the land that is available for producing the world's food supply.

## Classroom Discussion



- What is the key message underlying the activity?
- What actions can students take to care for their patch of this precious Earth—as individuals, as a class and school, with their families, in their community?
  - How are farmers stewards of the land?
- What is sustainability? Introduce the concepts without using the word itself, which can be difficult to define. Produce concept maps based on discussion.
- How do natural resource management, farming techniques, feeding the world, land care, and environmental management play a role in food production in California or your specific region?

## Materials

Enough for each student:

- Apple (or a paper cutout of an apple)
- Knife
- Chopping board or plates
- Paper towels or wet wipes

## Tip

A demonstrator could cut one apple and students eat an approximate amount.

## Watch Online!

See a video of this Ag-Bite at [LearnAboutAg.org/resources/bites](https://LearnAboutAg.org/resources/bites)

## California Standards:

### Grade 3

Math CC: 3.NF.1

NGSS: 3-LS4-4

### Grade 4

Math CC: 4.NF.3a, 3b

NGSS: 4-ESS3-1

### Grade 5

Math CC: 5.NF.2

NGSS: 5-ESS3-1

## Classroom Activities

### English Language Arts/History

- Have students journal about this activity, what they learned from the demonstration, and different ways they can take care of the Earth.
- Research different farming practices used in the past and create a chart with the pros and cons of each one. Report your findings to the class.

### Visual and Performing Arts

- Create art stamps using different tools (paperclip, toothpick, popsicle stick) to make designs in the apple pieces. Mix paints to produce different colors and dip the stamps in paint to create art.
- Use the activity as a prompt or an example for students to produce a game, puzzle, poster or other means of delivering a similar message.

*Adapted from materials by the Natural Resources Conservation Service*





## Link 'Ems

Determine how well you know your by-products. Link each raw commodity with commonly used products.

### Activity

1. Collect samples of each of the raw commodities (walnut, wood, corn, wool, soybean) and each of the by-products (sandpaper, rayon, packing peanut, lotion, crayon). Put one of each sample into a bag and mix them together.
2. Separate students into small groups and ask them to sort the raw commodities from the by-products.
3. Challenge students to use reasoning and deduction to link the raw commodities and their by-products. If teams don't agree, suggest an impromptu debate in which each team defends its conclusion. Use the information below to explain the links.
4. Challenge students to identify the chemical processes used to create the by-products. For example, how does the molecular compound for cellulose differ from that of rayon? What caused the change?

### Walnuts

Walnut meat isn't the only part of the walnut fit for human consumption. Its oils are used in cosmetics, and the shells are used in many abrasives for sand blasting roads and cleaning engines. The shells are also used in the production of sand paper, snow tires, and pet litter.

### Wood

More than 5,000 products are made from trees. Rayon, a silk-like fabric, is made from cellulose acetate, which comes from wood pulp. The cellulose is dissolved by chemicals, forced through tiny holes in a metal spinneret, and then twisted into silky yarn.

### Corn

According to the *National Corn Growers Association*, there are uses for every part of the cornstalk—husks, kernels, and even the water the kernels are processed in. Many “packing peanuts” are nearly 100% corn. They dissolve in water, making them environmentally friendly.



## Materials

- Multiple samples of the raw commodities, such as walnut, wood, corn, wool, and soybean.
- A sample of products made from each commodity, such as sandpaper, rayon, packing peanuts, lotion, and crayons.

## Tip

Have students bring in their own products and ask the class to determine from what the product originated.

### Wool

Wool from sheep contains lanolin, which helps the wool repel water. During processing, the lanolin is removed from the wool for use as a moisturizer in many soaps, facial creams, and lotions.

### Soybeans

Soybeans, used in the production of tofu, also make great crayons. *Prang Fun Pro* makes a crayon that is 85% soybean oil. One acre of soybeans can make 82,368 crayons!

## Classroom Activities

### Science

- Research the origin of the raw commodities used in this project. Present your findings to the class.
- Research products that you use daily. What are they made of? What commodity are they a by-product of?

### English Language Arts

- Identify the geographical regions that produce the raw commodities. Discuss where and why products come from these areas.

### Math

- Determine what percentage of the class linked the right products. Create a graph with the class results.

## California Standards

### Grade 6-8

ELA CC: RST.6-8.1;  
WHST.6-8.7, 9; SL.6-8.1, 4  
NGSS: MS-PS1





# Tops or Bottoms

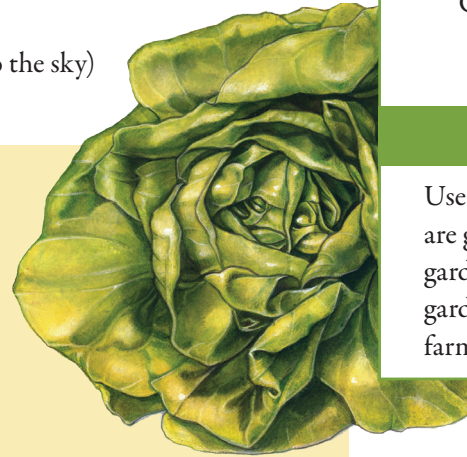
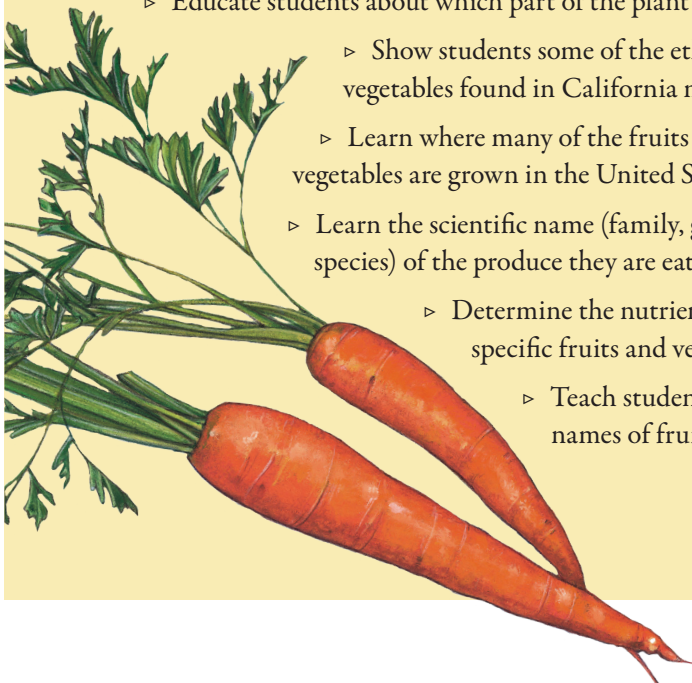
Encourage students to eat more fruits and vegetables by familiarizing them with the plant parts we eat.

## Activity

1. Read the book "Tops and Bottoms" by Janet Stevens.
2. Have all of the fruits and vegetables from the book in a basket. Discuss the fruits and the vegetables with the students.
3. As you pull random fruits and vegetables from the basket or grocery bag have students make the following gestures based on how the fruit or vegetable grows:
  - grows underground (touch their toes)
  - grows in the middle (crouch)
  - grow on top of the soil (stand tall with hands to the sky)

## Classroom Activities

- Divide a piece of paper into TOP, MIDDLE, and BOTTOM. Brainstorm fruits and vegetables for each category.
- Define these plant parts: stem, roots, fruits, flowers.
- Use California Department of Education's Fresh Fruit and Vegetable Photo Cards to enhance the activity:
  - ▷ Distribute one card per student and instruct them to sort themselves based on plant part we eat, color, calories (highest to lowest), major producing states, or alphabetically.
  - ▷ Introduce students to some of the less well-known fruits and vegetables.
  - ▷ Educate students about which part of the plant is commonly eaten.
    - ▷ Show students some of the ethnic fruits and vegetables found in California markets.
    - ▷ Learn where many of the fruits and vegetables are grown in the United States.
    - ▷ Learn the scientific name (family, genus, species) of the produce they are eating.
    - ▷ Determine the nutrient analysis of specific fruits and vegetables.
    - ▷ Teach students the Spanish names of fruits and vegetables.



## Materials

- Tops and Bottoms by Janet Stevens
- Grocery bag or basket
- Assortment of fruits and vegetables
- Photos of fruits and vegetables: Fresh Fruit and Vegetable Photo Cards, CDE.ca.gov (optional)

## Tip

Use fruits and vegetables that are growing in the school garden, from students' home gardens, or from a local farmers market.

## California Standards

### Kindergarten

ELA CC: SL.K.1, 2; RI.K.1, 4, 10  
Physical Education Content: 1.1, 1.4, 1.8, 3.1 5.2, 5.4

### Grade 1

ELA CC: RI.1.1, 4, 10; SL.1.1, 2  
Physical Education Content: 2.2, 3.1, 5.1, 5.2, 5.6

### Grade 2

ELA CC: RI.2.1, 4, 10; SL.2.1, 2  
Physical Education Content: 1.2, 5.1, 5.2

### Grade 3

ELA CC: RI.3.1, 4, 10; SL.3.1, 2



# Tasty Testing

Investigate what influences your decision about what you buy to eat.

Grades 9-12

## Preparing Taste Test

1. Explain that consumers make decisions that are influenced by a variety of criteria including appearance, taste, advertising, and cost.
2. Brainstorm a list of criteria that would make a good pear (size, color, variety, taste, texture). Have students vote for which criteria they think is most important.
3. Prepare the pears for the taste test by cutting enough for each student to taste each variety. Serve immediately or treat with lemon juice to prevent browning.
5. Place each pear variety (3-5) on a separate numbered plate.
6. Have students taste each pear and rank them based upon the criteria they determined was the most important.
7. Discuss the results from the taste test.

## Materials

- Three to five different kinds of pears
- Small cups for sampling
- Chart paper to collect brainstormed criteria
- Sticky dots or markers for voting

## Tip

Try taste tests using other products.

## Classroom Activities

### English Language Arts

- Write a new advertising jingle for the winning product highlighting the criteria. Create a 30-second commercial highlighting the product and present it to the class.
- Conduct a market test and write an article with artwork for a consumer report that explains the results. Create a marketing plan, including packaging and target audience.
- Research the career of a marketer. How do these professionals help producers and consumers? Interview someone who has a marketing job.
- If students have a hard time determining what is the most important criteria for the taste tests, have a classroom debate to decide which is the most important.



## California Standards

Grades 9-12

ELA CC: SL.9-12.1; W.9-12.2

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





# A Journey Through the Rice Mill

Grades 9-12

Learn how rice is processed to become edible, and how its by-products are used.

## Activity

In order for harvested rice to be edible, the hulls must be removed. Brown rice is hulled rice and white rice is obtained by milling further to remove the rice bran. This leaves the rice with a soft texture that reduces cooking time.

### Rough rice to brown rice

1. Have students place a mouse pad on their desk. Place several pieces of rough rice on a mouse pad or rubber piece and lay the second mouse pad on top.
2. Rub the two pieces back and forth until all of the hulls are removed from the rice kernels. Rice hulls, the by-product, are often burned in biomass factories to produce energy or incorporated into animal feed. Brown rice is packaged and sold for human consumption.

### Brown rice to milled white rice

1. Place one piece of sandpaper flat on the desk. Place several kernels of brown rice on the sandpaper and lay a second piece of sandpaper on top.
2. Rub the two sheets of sandpaper together for 3-5 minutes. When finished, the students will be able to observe two distinct rice products—milled white rice and rice bran. Rice bran, the by-product, is used as an additive in several different food products. White rice is packaged and sold.

## Materials

### Per Student

- Two pieces of 70-100 grit sand paper
- Rough rice (paddy rice)
- Two mouse pads or flat rubber pieces

## Tip

Ask a local farmer for rough rice and to be a guest speaker.



## Classroom Activities

### Science

- Design an experiment to measure the thermal energy created during the milling process.

### English Language Arts

- Research how the by-products of rice are used and write a research paper about the process from planting to the product. Remember to cite references and resources. Examples include rice hulls and rice bran.
- Research the history of rice in California and the major methods in which it is grown. Present your findings in an oral presentation.
- Discuss the nutritional differences between white rice and brown rice. Create a balanced meal using *The 2015-2020 Dietary Guidelines* as a reference.
- Research the geographic region in California where rice is grown. Locate the areas on a map and present the results to the class.

## California Standards

### Grades 9-12

NGSS: HS-PS3-4

### Grades 11-12

ELA CC: W.11-12.4, 7, 9; SL.11-12.4

### Grades 9-10

ELA CC: W.9-10.4, 7, 9; SL.9-10.4

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

*Adapted from CFAITC's Rice Fact and Activity Sheet*





# Asparagus

Encourage students to explore asparagus production in California.

Grades 4-6

## Activity

Asparagus is one of the few perennial vegetables grown in California. As a perennial, asparagus plants will produce spears year after year. Asparagus has a short 90-day growing season and is primarily grown in California's Central Valley, Salinas Valley, and the Delta. California asparagus can be purchased at grocery stores, farmers markets, and produce stands in different sizes based on diameter: very small (less than  $\frac{5}{16}$  in.), small ( $\frac{5}{16}$  to  $\frac{8}{16}$  in.), medium ( $\frac{8}{16}$  to  $\frac{11}{16}$  in.), large ( $\frac{11}{16}$  to  $\frac{14}{16}$  in.), and very large ( $\frac{14}{16}$  in. and larger). The asparagus plant produces all sizes all season long. Contrary to popular belief, the thicker spears are more tender. Tenderness also relates to color—the more green, the more tender. The following activity will introduce students to the size scale used to sort asparagus prior to shipping it in the grocery store.

## Measuring Asparagus

1. Have students research the origin of asparagus and identify its growing region on a map of California.
2. When harvested, asparagus is measured one inch above the bottom of the stem. Collect various sizes of fresh asparagus, or download and print copies of the measuring worksheet.
3. Measure the asparagus both in standard and metric systems. Practice converting between larger and smaller units.
4. Determine the diameter, circumference, radius and estimate the volume of each asparagus spear. Identify if the size is very small, small, medium, large, or very large.
5. Have students create an infographic to represent their findings.

## Classroom Activities

### Science

- Compare and contrast the appearance, growing methods, and market for white and green asparagus. Display the information in a graphic organizer.

### English Language Arts

- Learn about the history of asparagus production, investigating where it was first cultivated and how it arrived in California. Use online tools to create a digital timeline. Share your timeline in an oral presentation.
- Identify and learn more about the costs and benefits of asparagus production. Write a market report that include predictions for future production and value. Cite evidence to support your predictions.

## California Standards

### Grade 4

ELA CC: RI.4.3; SL.4.4, 5

Math CC: 4.MD.1, 4

### Grade 5

ELA CC: RI.5.3; SL.5.4, 5

Math CC: 5.MD.1, 2, 5

### Grade 6

ELA CC: RI.6.1; SL.6.4, 5

Math CC: 6.G.1, 2

## Materials

- California-grown asparagus in various sizes or measuring worksheet from [LearnAboutAg.org/resources/bites](http://LearnAboutAg.org/resources/bites)
- California map
- Ruler

## Tip

Ask a local produce specialist to be a guest speaker and talk to the students about asparagus.

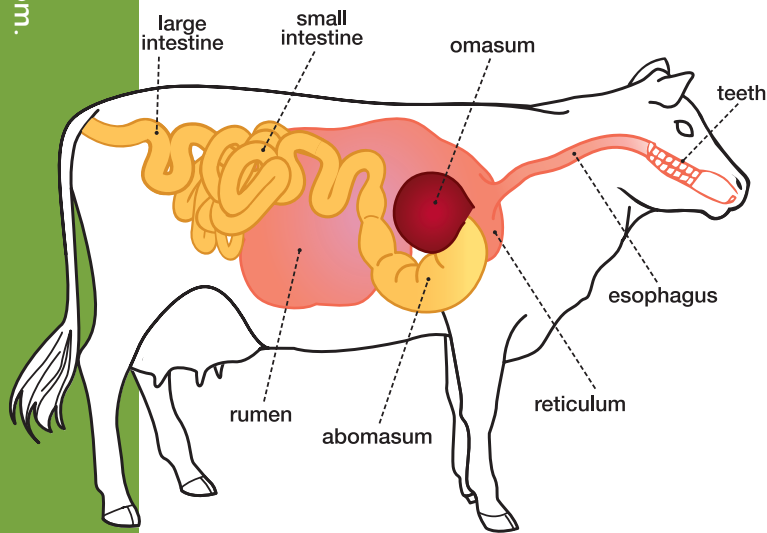




## Activity

There are two basic digestive systems: monogastric and ruminant. Although both systems break down food into smaller components, they have significant differences. A monogastric organism, such as a human, has a simple, single-chambered stomach. Ruminants, such as cattle and deer, have four different chambers in their stomach (rumen, reticulum, omasum, and abomasum), and these chambers have specific functions. Students will explore the ruminant digestive system in this activity.

1. Prior to the lesson, download and print copies of *Animal Appetites*, *Got Guts?* labels, and *Cow Digestive Tract* handouts.
2. Read the story *Animal Appetites* as a class. Solicit student responses to the included questions.
3. Introduce the term “digestive tract” by reviewing the human digestive system. Allow students to identify parts and their related functions.
4. Tell students that they will use modeling materials to construct models of a ruminant digestive system. Give each group the *Cow Digestive Tract* handout. Distribute the listed materials.



5. Instruct students to create a model of the cow's digestive tract on the foam board using the labels and materials provided.

6. Have students share their models and identify all parts and functions of the ruminant digestive system.

## Materials

- *Animal Appetites*, *Got Guts?* labels, and *Cow Digestive Tract* handouts from [LearnAboutAg.org/resources/bites](http://LearnAboutAg.org/resources/bites)
- Foam board
- Modeling materials: balloons, tubes, hoses, straws, string, rope, empty soft drink bottles, chenille stems, milk jugs, and food containers
- Scissors
- Tape or glue

## Tip

Review the human digestive system by viewing a slide show of how the digestive system works at [MayoClinic.com](http://MayoClinic.com).

## California Standards

### Grade 3

ELA CC: RI.3.1, 7; W.3.7;  
SL.3.4; L.3.6  
NGSS: 3-LS1-1

### Grade 4

ELA CC: RI.4.1, 3, 7; W.4.2, 7;  
SL.4.4; L.4.6  
NGSS: 4-LS1-1, 7, 4-ETS1.A

### Grade 5

ELA CC: RI.5.3, 7; W.5.2, 7; SL.5.4;  
L.5.6  
NGSS: 5-LS1.C, 5-PS3.D, 5-LS2-1

## Classroom Activities

### English Language Arts

- Have students write a paragraph explaining how ruminant digestive systems allow them to survive on a diet of plant materials.

### Nutrition

- Have groups of students design a healthy meal plan for themselves for one day. Refer to the daily food plan section on the USDA's MyPlate website [ChooseMyPlate.gov](http://ChooseMyPlate.gov). Instruct students to research the dietary requirements of a ruminant animal. Each group should make a chart to compare the meal plan they made for themselves with the meal plan for the ruminant animal.

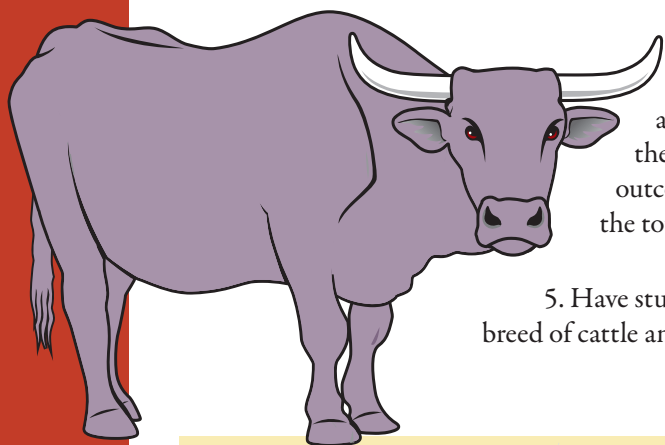
*Adapted from CFAITC's "Steer" Toward STEM: Careers in Animal Agriculture unit. [LearnAboutAg.org/resources/lessons](http://LearnAboutAg.org/resources/lessons)*



## Activity

By understanding how genes are passed on to offspring, scientists can help improve a wide range of economically important livestock traits. They can also decrease the likelihood of an animal receiving an undesirable trait which may affect the health and well-being of the animal. A trait is a physical characteristic or feature, which is inherited from one or more parent. Traits may be dominant or recessive. A dominant trait is expressed in offspring if *one* or *both* parents carry the dominant trait. A recessive trait is displayed in offspring if *both* parents carry the recessive trait. Dominant traits are represented with a capital letter and recessive traits are represented with a lowercase letter. If dominant and recessive traits are combined, the dominant trait will mask the recessive trait. Students will determine the probability of possible traits and create a drawing of the offspring they create.

1. Replicate the *Roll of the Genes* handout for each student.
2. Brainstorm physical features, such as eye and hair color, which makes each student look different. Explain that these characteristics are called traits.
3. Introduce the *Roll of the Genes* handout and explain the Punnett square process to the class. Explain that the traits used as examples are not necessarily real cattle traits, but these will help students understand the main concepts of heredity.
4. Have students use the Punnett square to create their own breed of cattle. Remind students that probability is the likelihood that a particular event, or outcome, will occur. It is expressed as a fraction with the numerator being the total number of one particular outcome and the denominator being the total number of possible outcomes.
5. Have students sketch a drawing of their own breed of cattle and share their artwork with the class.



## Classroom Activities

## Science

- Have students research and summarize the pea plant experiments by Gregor Mendel.

## English Language Arts/ History-Social Science

- Organize students into groups and instruct each group to select a breed of cattle to research. Groups should create a visual aid that illustrates the genetic history of the breed, including the country of origin, breed characteristics, and genetic selection over time.
- Ask student groups to develop a rhyme or song about the inheritance of traits in animals, plants or imaginary characters.

## Materials

## Per Student

- Handout from [LearnAboutAg.org/resources/bites](http://LearnAboutAg.org/resources/bites)
- Colored pencils
- White paper
- Ten, four-sided dice

## Tip

Introduce genetics through an educational video on heredity. Select "Heredity" video on Brain POP at [BrainPop.com](http://BrainPop.com).

## California Standards

## Grade 3

ELA CC: RI.3.4, 7; W.3.2, 7

Math CC: 3.NF.1

NGSS: 3-LS3

## Grade 4

ELA CC: RI.4.4, 7; W.4.2, 7

Math CC: 4.NF.3b

NGSS: 4-LS1

## Grade 5

ELA CC: RI.5.3, 4

NGSS: 5-ETS1



# Say Cheese

Investigating the cheese-making process.

Grades 9-12

## Mozzarella Recipe

California is a leading producer of Mozzarella cheese. Mozzarella is a fresh cheese that originated in Italy and is commonly used on pizzas and in pastas. The recipe makes approximately 12-14 ounces of fresh mozzarella cheese and takes 30-60 minutes.

1. Pour milk into stainless steel pot, add citric acid and stir gently to blend. Heat milk over medium-low heat to 88-90°F.
2. Remove from heat, add rennet and stir for 30-60 seconds to blend. Cover and let sit for five minutes. Continue to heat to 105°F as curd and whey separate.
3. Line colander with cheesecloth. Gently pour curds (solids) and whey (liquid) into colander to strain. Place curds in microwave-safe bowl. Whey can be retained for other baking projects like bread.
4. Microwave curds for 30-60 seconds on high. Remove from microwave and gently press curds with hands (draining off additional whey). Repeat process two to three more times, microwaving in 20-30 second intervals. Press curds together while cheese is warm (almost too warm to handle) and knead cheese like bread dough until it is smooth and pliable (like pulling taffy). If needed, microwave cheese in 10 seconds intervals to keep cheese warm and pliable. Then, knead in salt.
5. Cheese is done when it is smooth. Form cheese into a ball and place in cold water to cool. When cheese is cold, remove from water and place in plastic wrap and refrigerate. Eat within one week.



*Adapted from "30 Minute Fresh Mozzarella" by Utah Education Network.*

## Materials

- ¼ teaspoon liquid or ¼ tablet rennet (dilute in ¼ cup water)
- 6-8 quart stainless steel pot (not aluminum)
- 1 gallon of whole milk
- 1 ½ teaspoons citric acid (dilute in 1 cup water)
- Dairy thermometer
- Colander
- Cheesecloth
- Microwave-safe bowl
- 1-2 teaspoons salt
- Food-grade rubber gloves

## Tip

Take a virtual tour of California dairies and meet dairy farmers at [RealCaliforniaMilk.com](http://RealCaliforniaMilk.com)

## Classroom Activities

### Science

- Have students record observations throughout the cheese-making process including descriptions of how the ingredient properties changed and the temperatures at which they observed phase changes. Have students identify the catalyst and describe the role it played in cheese making.
- Instruct students to categorize mozzarella cheese into a food group, list the number of recommended servings of that food group per day and the nutritional facts of mozzarella cheese.

### English Language Arts

- Have students work in groups to create their own mozzarella cheese brand name, slogan, logo, and informational advertisement that persuades shoppers to purchase their product. Students can present this material to their classmates using a poster, PowerPoint, or video.

## California Standards

### Grades 9-12

ELA CC: W.9-12.1, 4, 6;

SL.9-12.1, 2, 4, 5; WHST.9-12.1, 7

NGSS: HS-PS1-1, 2, 4, 5



This is one in a series of Ag-Bites developed by CFAITC. Ag-Bites meet the standards of the California Department of Education.  
2600 River Plaza Drive, Suite 220, Sacramento, CA 95833-3377 • [info@LearnAboutAg.org](mailto:info@LearnAboutAg.org) • [LearnAboutAg.org](http://LearnAboutAg.org)  
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**Look for the Seal**

California Milk Advisory Board

Welcome to Drive Through Nutrition! Can we take your order? Come along on our road trip while learning fun facts about nutrition and the foods you order. Get ready to get active as we drive along!

### Game

1. Gather materials to play the game. You can play with the whole class or make copies and play in small groups.
2. Roll the die, move that number of spaces, read the fact and do the activity.
3. Keep track, on the menu, of what food groups you've eaten. Make a copy of this page or use another sheet of paper to record.
4. You're finished when you've landed on or "eaten" from all 5 food groups at least 3 times.



Start Here ►



### Materials

- Ag-Bite game board
- 1 Die
- Space for Physical Activity
- Marker for game board
- Copy this page or have a paper and pencil to keep track of food groups "eaten" from

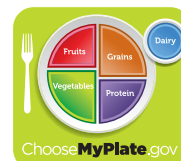
### Tips

Visit [www.ChooseMyPlate.gov](http://www.ChooseMyPlate.gov) for snack and meal ideas.

### Menu

Check Off Each Time You "Eat" A Food Group

▲ Protein	○ ○ ○
★ Grains	○ ○ ○
♥ Vegetables	○ ○ ○
■ Fruits	○ ○ ○
● Dairy	○ ○ ○



### Classroom Activities

#### SCIENCE

- Create a science fair project related to food science (e.g., preserving foods, having taste tests, creating new recipes). Have a family science night to share projects with your class.

#### MATH & VISUAL ARTS

- Plan a meal and calculate how many calories are in the meal. Draw an illustration of your meal.

#### ENGLISH LANGUAGE ARTS & PHYSICAL EDUCATION

- Create your own game. Write instructions and include physical activities.
- Make an individual and class challenge to eat better and be more active. Write out your goals and keep track.

#### California Standards

- ELA CC: SL.3-5.4, W.3-5.4, 7, 10, W.6.4, WHST.6.7, 10
- Math CC: 3.MD.3, 4.MD.4, 5.MD.2
- NGSS: 3-LS1-1, 4-LS1-1, 5-LS1-1
- Physical Education Content: 3.3, 4.3, 5.3, 6.3
- Visual Arts Content: 3-6, 5.0



# Track Your Nutrition

ON YOUR MARKS, GET SET, GO! Join the track meet! To win the race, you must "eat" from all five food groups and complete at least three laps. Learn fun facts about the food groups and how your body uses the foods you eat. Get ready to get active!

## Game

1. Gather materials to play the game. You can play with the whole class or make copies and play in small groups.
2. Roll the dice, move that number of spaces, read the fact and do the activity.
3. Keep track of your laps and what food groups you've eaten. Make a copy of this page or use another sheet of paper to record.
4. You're finished when you've eaten all 5 food groups and have made at least 3 laps.
5. OPTION: Do the **Digestive System Relay** word search activity with your class when you land on the space.



## Classroom Activities

### SCIENCE

- Create a science fair project related to food science (e.g., preserving foods, having taste tests, creating new recipes). Have a family science night to share projects with your class and community.

### ENGLISH LANGUAGE ARTS & PHYSICAL EDUCATION

- Create your own game. Write instructions and include physical activities.
- Make an individual and class challenge to eat better and be more active. Write out your goals and keep track.

### MATH & VISUAL ARTS

- Plan a meal and calculate how many calories are in the meal. Draw an illustration of your meal.
- Create, design and illustrate a restaurant menu with a variety of food choices. Include prices and all food groups.

### California Standards

- ELA CC: W.9-12.4, 7, 10; SL.9-12.4; WHST.9-12.7, 10
- Math CC: HS.N-Q.1; HSS-ID.1
- High School Physical Education Content: 1.2, 1.3, 2.2, 2.11, 3.2
- High School Visual Arts Content: 5.0

## Start Here ▶



## Materials

- Ag-Bite game board
- 1 Die (for each group)
- Space for Physical Activity
- Markers for game board
- Copy this page or have paper and pencil to keep track of laps and food groups.
- Download a copy of the *Digestive System Relay* word search for each group at [LearnAboutAg.org/resources/bites](http://LearnAboutAg.org/resources/bites).

## Tips

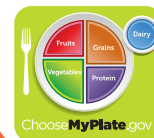
Visit [ChooseMyPlate.gov](http://ChooseMyPlate.gov) for meal and activity ideas.

Visit [LearnAboutAg.org/resources/fact](http://LearnAboutAg.org/resources/fact) for more information about commodities grown in California!

## Food Groups/ Laps

Check Off Each Time You "Eat" A Food Group

▲ Protein	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
★ Grains	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
♥ Vegetables	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
■ Fruits	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
● Dairy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



# Garden in a Glove

Bring seeds to life, and create a 'handy' little garden.

Grades 3-8

## Activity

1. Moisten 5 cotton balls using a spray bottle.
2. Put 3-4 seeds of the same type on each cotton ball.
3. Place a cotton ball inside each of the glove's fingertips. You may need to use a pencil to get the cotton balls all the way to the tips.
4. Tape the glove to a sunny window. Keep the top open to allow air inside.
5. Moisten cotton balls by spraying with water as needed. Seeds germinate in 3-5 days.

## Classroom Activities

### English Language Arts and Science

- Observe seedlings over the next month. Use a notebook to record observations and growth measurements. Report your findings.
- Research and write a report about seeds. Give an oral report to your class. Learn about different types and explore the parts of seeds, their functions, growing seasons and germination process.
- After seeds germinate, cut fingers off glove, remove cotton balls and plant seedlings in a container or in the ground.

### Math and Visual Arts

- Sketch, measure and graph the seedlings as they grow into mature plants. Compare with classmates.
- Draw a scale model of your seeds and label their parts.

## California Standards

CC ELA: W.3-8.2,7; SL.3-5.4; WHST.6-8.7

CC Math: 3-4.MD.4, 6.SP.4, 7.RP.2,7.G.1

NGSS: 3-LS1-1,4-LS1-1, 5-LS1-1

Visual Arts Content 5.0: Grades 3-8

## Materials

- Clear, Polyethylene Glove
- Cotton Balls (5 per glove)
- 5 varieties of seeds
- Water and Spray Bottle
- Tape
- Permanent Marker

## Tips

- Seed suggestions: beans, radishes, sunflowers, squash and tomatoes
- Record which type of seed was placed in each finger.
- Watch a time-lapse video of seeds germinating: [www.vimeo.com/7608720](http://www.vimeo.com/7608720)





Explore how to create a scale model of a shipping container and learn about agricultural commodities that are shipped around the world!



### The Facts

A port is a location where ships, trucks, and trains come to load and unload cargo. Cargo ships carry shipping containers that hold many products, including California agricultural commodities such as almonds, walnuts, grapes, raisins, tomatoes, rice and citrus. The Port of Oakland exports these commodities to China, Japan, South Korea, Hong Kong, Taiwan, and Europe. Check out the *What's in the Box?* video at [LearnAboutAg.org/resources/bites](http://LearnAboutAg.org/resources/bites).

### The Challenge (Part 1)

- Cargo ships can hold as many as 18,000 shipping containers, with the most common size of container measuring 8' x 8' x 40'. Create a scale model shipping container based on an actual 8' x 8' x 40' shipping container's dimensions.
- Discuss the different meanings of scale – for instance the scale used for a map. Show the world map and point out ports in California, the West Coast, Asia, and Europe. Discuss distances and what scale is used.
- Clarify what scale means in math – the ratio of a model in comparison to a life-size object. The first number represents the model, the second is the life-size object.
- Challenge students to create a scale model container that fits on graph paper. Allow students time to create and find solutions that would be proportional.
- As a class, determine the scale to use for the 8' x 8' x 40' container (Let 1 in = 8 ft). Find the scale factor:  $1 \text{ in} / 8 \text{ ft} \times 1 \text{ ft} / 12 \text{ in} = 1/96$ . The size of the scale model is  $1/96$  the size of the actual container or the container is 96 times larger than the scale model! ( $8'/96 = .083 \text{ ft}$ ,  $.083 \text{ ft} \times 12 \text{ in}/\text{ft} = 1 \text{ in}$  and  $40'/96 = .4167 \text{ ft}$ ,  $.4167 \text{ ft} \times 12 \text{ in}/\text{ft} = 5 \text{ in}$ ) It works well to use 1" x 1" x 5" (1 in = 8 ft and 5 in = 40 ft) as the scale model size to draw a net of the container on graph paper. Ask students what shape is this? (A rectangular prism)
- Cut out the net. Fold and tape all sides except one. You can also measure and cut out a net on thicker paper such as construction paper. Decorate your scale model container. Save for part 2.

### The Competition (Part 2)

- Test out your scale model in the **Aluminum Ship Competition**. Build a cargo ship out of aluminum foil that will carry agricultural commodities and stay afloat. Compete with others in your class! Visit [LearnAboutAg.org/resources/bites](http://LearnAboutAg.org/resources/bites) for instructions and extension ideas.

### Classroom Activities

#### Science:

- Exporting fresh fruits and vegetables requires special care. Develop an experiment to measure the best way to preserve fresh produce – consider drying, refrigerating, or canning.

#### Technology:

- Cranes load container boxes onto ships. Using classroom supplies, build a machine that will load a box. Create a video to show how it works. Check out Simple Machines at [LearnAboutAg.org/resources/lessons](http://LearnAboutAg.org/resources/lessons) for lessons about simple machines.

#### Engineering:

- Design a container that will safely transport an egg, pear, or avocado. Test your container by dropping it from different heights.

#### Math:

- Exports and imports travel to and from ports all over the world. Visit [ports.com](http://ports.com) to find the distance from the Port of Oakland to ports in China, Japan, South Korea, Hong Kong, and Taiwan. Calculate round trips and convert to nautical miles.

### California Standards

#### Grade 5

Math CC: 5.NF.5b, 6, 5.MD.1, 3, 5b

NGSS: 5-ETS-1, 2, 3

#### Grade 6-8

Math CC: 6.RP.1, 2, 3, 6.G.1, 3, 4;

7.RP.2, 7.G.1, 6

NGSS: MS-ETS1, 2, 3, 4



This is one in a series of Ag-Bites developed by CFAITC. Ag-Bites meet the standards of the California Department of Education.  
2600 River Plaza Drive, Suite 220, Sacramento, CA 95833-3377 • [info@LearnAboutAg.org](mailto:info@LearnAboutAg.org) • [LearnAboutAg.org](http://LearnAboutAg.org)  
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## Materials

### The Challenge (Part 1)

- World Map to show export countries and to use as an example of scale
- ¼- or ½-inch graph paper; construction paper or heavy paper
- Pencil, Scissors, Tape

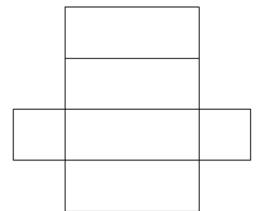
### The Competition (Part 2)

- Aluminum foil (pre-cut sheets are best)
- Dish pan, sink, or kiddie pool
- Various agricultural commodities

## Tips

For more information about ports visit [www.portofoakland.com](http://www.portofoakland.com).

For information about California commodities visit:  
[LearnAboutAg.org/resources/fact](http://LearnAboutAg.org/resources/fact)



## The Facts

Blueberries are one of the most versatile fruits that can be found in more than 4,000 different food products including pet food and cosmetics. A single serving, one cup, of fresh blueberries (approximately 75 to 80 berries) delivers a variety of vitamins and minerals, including 25% of the daily recommendation of Vitamin C. A serving of blueberries also offers the daily recommended amount of manganese, that plays an important role converting proteins, carbohydrates, and fats into energy. **Which blueberry snack fuels you with energy?**

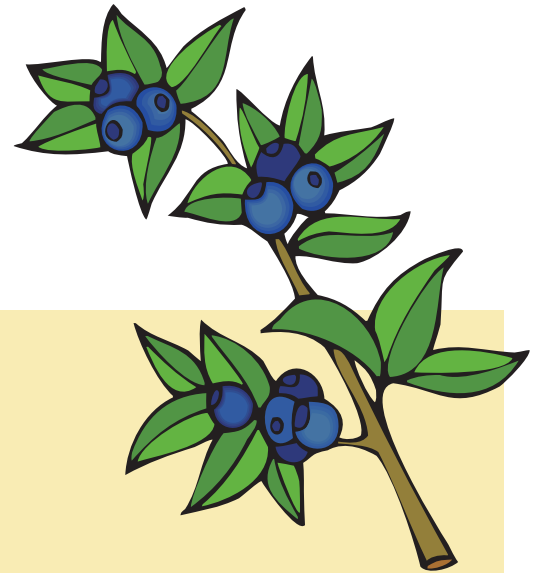
## Nutritious Blueberries Examination

- Examine the 5 provided blueberry nutrition labels or use 5 labels from real blueberry products to analyze which snack option fuels you with energy.
  - Make sure to write down your initial claims in case they change.
- Comparing the 5 blueberry nutrition labels, identify similarities and differences between the nutrition labels. Focus on the protein, fats, and carbohydrates.
- Work with a partner to circle which food label you determine to be the healthiest choice for you and provides the body the most energy.
- Write a Claim Evidence Reasoning (CER)\* about why the selected blueberry food label provides a healthy snack option for a quick burst of energy and is the healthier option when compared to other choices.
- Have students present their snack choice to the class and allow them to respond to feedback from their peers that may have chosen another blueberry food item.

\* Claim Evidence Reasoning (CER): To do a proper CER make a claim, provide evidence that supports your claim. Then provide reasoning to defend your claim.

## Classroom Activities

- Determine which snack would provide the most energy using a conversion rate of carbohydrates, proteins, and fats.
- Research the pH level needed to grow blueberries and how it ties to where they are grown in California.
- Research the origin of blueberries using the Blueberry Fact and Activity Sheet at [LearnAboutAg.org/resources/fact](http://LearnAboutAg.org/resources/fact).
- Compare and contrast the appearance, growing methods, and market for organic and conventionally grown blueberries. Display the information in a graphic organizer.
- Use blueberries as a natural dye to make cloth art.
- Determine what percentage of the class likes each blueberry product provided. Create a graph with the class results.



## Materials

- Download a copy of the **Blueberry Nutrition Labels** for each group at [LearnAboutAg.org/resources/bites](http://LearnAboutAg.org/resources/bites). (Five real blueberry product labels can be used in place of the worksheets.)
- Download a copy of the CER worksheet for each student at [LearnAboutAg.org/resources/bites](http://LearnAboutAg.org/resources/bites).

## Tip

When examining the nutritional label, always note the serving size per package or container.

## California Standards

### Grade 5

Health Education Content:  
1.2.N, 1.6.N, 7.1.N

### Grade 6

NGSS: MS-LS1-6  
ELA CC: RST.6-8.1

### Grades 7-8

Health Education Content:  
1.2.N, 1.6.N, 5.1.N  
ELA CC: RST.6-8.1

Using strawberries to learn about the pH scale.

### The Facts

From the baking soda we add to cookie dough to the slightly acidic soil we grow strawberries in, pH is all around us. The pH scale is how we quantify how acidic or basic something is. Today we will determine where strawberries fall on the pH scale.

### Activity

1. Place the strawberries in a large bowl and mash.
2. Label three cups: puree, puree with lemon, and puree with baking soda. Equally divide the puree into the three cups.
3. Add nothing to the cup labeled puree. Stir one tablespoon of lemon juice into the cup labeled puree with lemon. Stir  $\frac{1}{4}$  teaspoon of baking soda into the cup labeled puree with baking soda.
4. Dip one pH test strip halfway into each cup. Immediately remove the strips and place them onto a piece of copy paper. After a few seconds, record the pH level. Use the pH scale in the sidebar to compare the three strawberry solutions.
5. Taste the strawberry solutions and share observations. Invite students to use the claim, evidence, reasoning (CER) model to analyze each mixture.
6. To learn more about strawberry production, growing challenges, and nutritional benefits, download Ag in the Classroom's Strawberry Fact Sheet from [learnaboutag.org/resources/fact](http://learnaboutag.org/resources/fact).



### Classroom Activities

#### Nutrition

- Use food labels to compare the nutritional value between frozen, fresh, or dried strawberries. Is there a difference?

#### Math

- Research the price of strawberries at different times of year. Create a graph to show the price differences and construct a CER argument as to why the price fluctuates throughout the year.

#### Science

- Identify ways that agriculturists can change the pH of the soil to maximize plant health.
- Research the parts of a strawberry plant. Dissect the fruit and label the different parts using online resources as a guide.
- Prepare and test the pH value of other fruits and vegetables by first creating a puree and then measuring the pH. Illustrate your results with a color-coded spectrum similar to the one in the sidebar.

### California Standards

#### Grade 6-8

NGSS: MS-PS1-2

ELA CC: RST.6-8.1

### Materials

- 1 (16 oz) carton of fresh strawberries or (thawed) frozen strawberries
- 1 tablespoon lemon juice
- $\frac{1}{4}$  teaspoon baking soda
- pH test strips
- Blender or large fork to mash
- Three 8-ounce cups
- Spoons
- Large bowl
- Stir sticks or spoons
- Copy paper

### Tip



Examples:

Stomach Acid (1)

Lemons or Limes (2)

Strawberries (3)

Tomatoes (4)

Artichokes (5)

Milk (6)

Distilled Water (7)

Sea Water (8)

Baking Soda (9)

Milk of Magnesia (10)

Ammonia (11)

Hand soap (12)

Household Bleach (13)

Drain Cleaner (14)

Make a simple microwave applesauce while comparing and contrasting how American traditions have changed from the past to the present.

### Activity

1. Wash your apples under running water. If desired, peel apples.
2. With the help of a grown up, remove the core and slice the apples. If students want to take a more active role, they may be given a cored half and a plastic knife to cut the half into smaller slices.
3. Place the apples in a large, microwave-safe bowl. Add approximately a tablespoon of cinnamon and a teaspoon of nutmeg. Adding sugar is optional, depending on whether your apples are sweet or tart varieties.
4. Place the bowl in the microwave and loosely fit the lid on top. Microwave for six minutes, or until the apples can be easily pierced with a fork.
5. Allow apples to cool until they are safe to handle. Use a potato masher to lightly mash the apples in the bowl until they reach the desired consistency. Serve and enjoy!

### Materials

- Ten medium-sized apples (will serve approximately 20)
- Vegetable peeler
- Knife and cutting board
- Large, microwave-safe bowl with lid
- Microwave
- Cinnamon
- Sugar (optional)
- Nutmeg (optional)
- Potato masher

### Classroom Discussion

- What technology did we use today to make applesauce? How do you think this method compares to how applesauce was made long ago?



- When colonists arrived in North America, they only found wild sour crab apples. How did the apples we enjoy today come to grow in America?
- Prior to refrigeration, applesauce was an inexpensive and convenient way to preserve apples for several months at a time. Often, families would store applesauce in a cellar and open a jar when fresh fruit was not available. How does this compare to how your family enjoys applesauce today? Where does your applesauce come from? When do you eat it?

- What are some other apple snacks you enjoy today? Do you think they had these snacks long ago? Why or why not?



### Classroom Activities

#### Science:

- Observe the changes that occur during the process of making applesauce. Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.
- Bring a variety of apple products into the classroom. Classify the products based on their observable properties. Identify if the items can be categorized as a solid, liquid, or gas.

#### Nutrition:

- Conduct a taste test of applesauce made from different varieties of apples.
- Participate in a shared research project. As a class, work together to create a poster highlighting the reasons why eating “an apple a day” is good advice.

### California Standards

#### Grade 1

CA History-Social  
Science: 1.4, 1.5  
CC ELA: W.1.7

#### Grade 2

CA History-Social  
Science: 2.1  
NGSS: 2-PS1-1, 2-PS1-4  
CC ELA: W.2.7

#### Grade 3

CC ELA: W.3.7





**Welcome to the fun of learning about California Agriculture!  
We hope you will enjoy the resources included in this booklet  
and find the use of Agriculture in the Classroom resources  
helpful and exciting as your students LearnAboutAg!**

### **What is Agriculture in the Classroom?**

Agriculture in the Classroom is designed to help kindergarten through twelfth grade students acquire the knowledge necessary to understand where their food and fiber comes from. Through various programs and resources, educators are encouraged to incorporate agriculture and nutrition into their lessons in all subject areas and to point out the important role agriculture plays in our economy, society, and daily lives. California Foundation for Agriculture in the Classroom is a non-profit organization dedicated to providing educators with free, quality resources, trainings, and information to enhance students' understanding of California agriculture.

### **Why Teach About Agriculture?**

Agriculture is everywhere. It is the food we eat, the clothes we wear, the houses we live in, and the plants we enjoy. A well-rounded education should include hands-on experiences and true-to-life learning at the most fundamental level. By exposing students to agriculture through engaging lessons and activities, we hope students will be inspired to continue to learn about food and fiber and, ultimately, gain an appreciation for all that agriculture provides.

### **When to Teach About Agriculture?**

The time is right now! Ag in the Classroom creates resources that allow teachers to weave agriculture into all subject areas. We have simple activities that can be implemented in minutes, as well as units that can be used for a longer course of study. All our resources are aligned to California Education Standards.

### **How Can You Teach About Agriculture?**

Ag in the Classroom has developed hundreds of FREE resources for you to use in any educational environment. All resources are available online for download and most are available to order free of cost. Visit our website at [LearnAboutAg.org](http://LearnAboutAg.org).



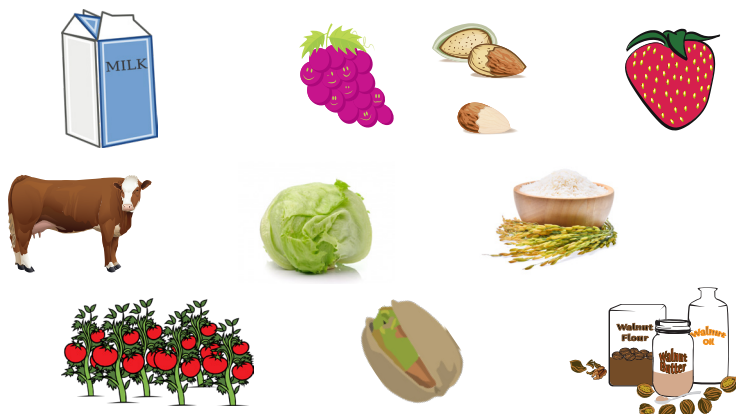
# CA Agriculture Overview

California is the top agriculture producing state in the country. What does that mean? It means we produce more food, fiber, flowers, forest, and fuel than any other state. The Top-Ten commodities all fall into these five categories—The five “F”s of Agriculture.

Look around you, wherever you live, there are ranches and farms that grow these commodities. More than 400 different commodities grow right here in California.

## California’s Top 10 Commodities:

1. Milk
2. Grapes
3. Almonds
4. Cattle and Calves
5. Strawberries
6. Pistachios
7. Lettuce
8. Tomatoes
9. Walnuts
10. Rice



2020-21 statistics information obtained from California Agricultural Statistics Review.

## The Five F’s of Agriculture:

1. **Food:** Farmers and ranchers grow many different types of food, from the strawberries growing in fields, to the hamburger and bacon on your dinner plate.
2. **Fiber:** Cotton from plants and wool from animals are types of textile fiber that we use and wear every day.
3. **Flowers:** Cut flowers, nursery plants, house plants and landscaping plants are all a part of agriculture.
4. **Forests:** Trees from forests are used to make more than 5,000 products we used every day, from paper to pencils to the furniture for your house.
5. **Fuel:** There are many uses of energy on the farm. Cow manure is made into fuel that can heat or cool buildings and ethanol from corn is used to fuel cars, trucks and tractors.

Download our “California Agriculture Farming is Everywhere” Coloring Book for more activities on the Five F’s of Agriculture. [LearnAboutAg.org/resources/grab](https://LearnAboutAg.org/resources/grab).

## Resources in Your Community:

- California Foundation for Agriculture in the Classroom: [LearnAboutAg.org](https://LearnAboutAg.org)
- National Agriculture in the Classroom Organization: [agclassroom.org](https://agclassroom.org)
- California Farm Bureau Federation and County Farm Bureaus: [cbbf.com](https://cbbf.com)
- UC Cooperative Extension: [ucanr.edu/county\\_offices](https://ucanr.edu/county_offices)

# LearnAboutAg.org







2600 River Plaza Drive, Suite 220 • Sacramento, CA 95833 • (916) 561-5625 • [LearnAboutAg.org](http://LearnAboutAg.org) • [info@LearnAboutAg.org](mailto:info@LearnAboutAg.org)

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