

12th edition

# What's Growin' On?

## ...Under the California Sun



**Extra!  
Extra! Classroom Extensions**



California Foundation for  
Agriculture in the Classroom

# Extra! Extra! 12<sup>th</sup> Edition

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# Introduction

Welcome! Thank you for your interest in California Foundation for Agriculture in the Classroom's (CFAITC) student activity newspaper, What's Growin' On? ...Under the California Sun.

Developed by educators like you, What's Growin' On? offers fun and engaging ways for students to learn the importance of our food and fiber system while practicing core academic skills.

Extra! Extra! is a teacher supplement that contains ideas to build upon the content presented in the student activity newspaper. Lesson ideas are varied to meet the needs of different learning styles and include inquiry based labs, hands-on activities, visual displays, and opportunities for group work.

The agricultural-themed examples and activities found in What's Growin' On? are designed to motivate and inspire your students, connecting classroom lessons to real-life experiences so students can better relate to food they eat, clothes they wear, homes they live in, and the open spaces they enjoy. Additionally, using the **newspaper** as an instructional tool allows students to discover the relevance of their classroom studies by reading news stories, acquiring knowledge, forming opinions, and broadening their understanding of the world they live in.

**California Foundation for Agriculture in the Classroom** is dedicated to increasing the awareness and understanding of agriculture among California's educators and students. CFAITC provides educators with resources and programs that enhance agricultural literacy. To request a free teacher resource packet or a classroom set of the current edition of What's Growin' On? student newspapers contact CFAITC via e-mail ([info@LearnAboutAg.org](mailto:info@LearnAboutAg.org)) or phone (800-700-2482).

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## We Are Number One!

### Extension Ideas

1. **Ag Activity a Day.** Do an agricultural related activity with your students every day. This booklet from Illinois Agriculture in the Classroom provides hands-on, science, health, English language arts, history-social science, and visual art activities. Booklet found at: [www.goo.gl/zNEfkJ](http://www.goo.gl/zNEfkJ)
2. **Top 10 Agricultural Products.** Use the list of California's top ten agricultural products on page three in WGO and list these on the board in your classroom. Next, go to [www.CFBF.com](http://www.CFBF.com) and click on "County Farm Bureaus." Select your county and write down the top 5 agricultural products on the board. Have students work in pairs and assign one agricultural product from the list to each pair. Instruct students to research the history of their assigned product, how it is grown or produced, its economic value, and two fun facts. CFAITC's Agricultural Fact and Activity Sheets are a good resource and may be found at: [www.LearnAboutAg.org/factsheets](http://www.LearnAboutAg.org/factsheets)  
Students should design a poster to display information about their agricultural product in an eye catching and interesting format.
3. **Bounty of Produce.** Take advantage of the fresh fruits and vegetables that are available in our grocery stores and farmers markets throughout the year. With more than 400 different crops grown in California, we have plenty to choose from. Select one California grown product each week and conduct a taste test in your classroom. The "Tasty Testing" lesson provides basic guidelines and can be found at: [www.LearnAboutAg.org/agbites](http://www.LearnAboutAg.org/agbites)

### Guest Speaker Idea

Choose a few of the top agricultural commodities in your county and find a farmer or rancher to speak about their product to your class. Your county Farm Bureau is a good source for contacts and may be found by going to [www.CFBF.com](http://www.CFBF.com) and clicking on "County Farm Bureaus." Ask your speaker to bring photos of their commodity and different tools of the trade to share during the presentation. The speakers should be prepared to talk about the different stages of production and harvest as well as the sale of their commodity.

## **Inquiry Opportunity**

Do your family and friends know that California is such a special agricultural state? Have students design a survey based on California agriculture facts found on page three. The survey can be conducted with pencil and paper or through social media. Students should survey at least 15 people and should present their results to the class using pie or bar graphs.

# Sprouting the Bounty

## Extension Ideas

1. **Seed Anatomy.** Soften large bean seeds such as kidney or lima beans by soaking them in water overnight. The next day, remove them from the water and place them in a dish on a sunny windowsill. Cover the beans with wet paper towels and keep moist for a couple of days until they begin to sprout.

Have students work in pairs to dissect and label the different parts of the seed. Students can use straightened paper clips to separate the two halves of the bean. Help students identify the seed embryo, endosperm, and seed coat.

- Embryo: immature plant that will sprout when the seed is planted
- Endosperm: food for the seed
- Seed Coat: outer coating that protects seed

2. **Seed Comparison.** Seeds come in many shapes and sizes. Wash and save seeds from various fruits and vegetables. Examples include cherries, avocados, blackberries, apples, peaches, tomatoes, squash, green beans, apricots, citrus, watermelon, and more. Ask students to guess the fruit or vegetable origin of each seed then have them compare seed size, shape, and texture. Have students turn to a neighbor and jot down ideas on how seed characteristics help with seed dispersal and seedling survival. Share these ideas as a class.



### 3. Saving Seeds From a Bell Pepper.

- a. Remove seeds from the pepper.
- b. Spread clean seeds on a paper plate and allow them to dry in the sun or near a warm window. Make sure seeds are completely dry by pressing on one seed with your fingernail. If the seed breaks, it is dry.
- c. After allowing the seeds to dry, store them in your kitchen freezer until you are ready to plant them.
- d. Before planting the dried seeds, do a quality test to determine which seeds to plant and which to throw away.

**Floater Test:** place your pepper seeds in a bowl or cup with water. Throw away any seeds that float. These seeds are less dense because they probably don't have a seed embryo. Save the seeds that sink to the bottom and dry them if you plan to store them. Otherwise go ahead and plant your seeds.

### Gate Adaptation

Hybrid seeds are created by cross breeding two different varieties of the same plant species. In a class discussion, ask students for ideas on the advantages of hybrid plants. Ask students which plants they would cross in order to achieve a certain characteristic. For example, crossing one variety of strawberry that has a very sweet taste with another variety of strawberry that isn't as sweet but has a longer shelf life.

### Technology Opportunity

The Great Seed Search game from My American Farm will take students on an interactive adventure around the world, as they learn about geography, unique cultures, and agricultural commodities. [www.myamericanfarm.org/games/great\\_seed\\_search](http://www.myamericanfarm.org/games/great_seed_search)

An accompanying lesson, Science of Seeds from My American Farm can be downloaded for free at: [www.myamericanfarm.org/lessons/Science\\_of\\_Seeds.pdf](http://www.myamericanfarm.org/lessons/Science_of_Seeds.pdf)

### Inquiry Opportunity

Do different seeds require different conditions for germination? Organize students into groups of two and instruct groups to choose two different types of seeds for an experiment. Explain that students should design their own experiments to find out if both types of seeds germinate under the same conditions. Give some examples of germination conditions for exploration such as soaking seeds before planting or placing planted seeds in a dark or light place.

## Recipe

### Roasted Pumpkin Seeds

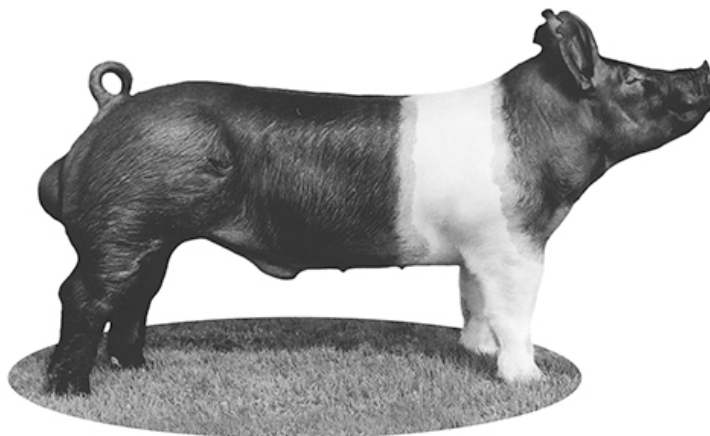
1. Wash your hands.
2. Scoop the seeds out of a pumpkin. You should get about 1 ½ cups of seeds.
3. Wash and dry the seeds.
4. Preheat oven to 300 degrees Fahrenheit.
5. Melt 2 teaspoons of butter and combine with the washed and dried pumpkin seeds in a bowl.
6. Add a pinch of salt and stir.
7. Spread seeds evenly in a single layer on a baking sheet.
8. Bake for 45 minutes or until golden brown.
9. Enjoy!



# Super Swine

## Extension Ideas

1. **Newspapers in Education.** For homework, have students collect grocery store advertisements from newspapers to compare the prices of three different cuts of pork from at least two different grocery stores. Students should use fractions and percentages to make price comparisons.



2. **Swine Health and Husbandry.** 4-H offers free, downloadable lessons on swine at: [www.4-h.org/resource-library/curriculum/swine2](http://www.4-h.org/resource-library/curriculum/swine2). Lesson topics range from bio-security risk assessment to swine health assessments, and crossbreeding systems.
3. **Tasty and Safe.** Project the [www.foodsafety.gov](http://www.foodsafety.gov) website on the classroom screen. Navigate to the section that describes safe handling and cooking procedures for pork. Instruct students to take notes that will allow them to write detailed, step-by-step instructions for preparing a recipe that includes pork as one of the main ingredients. Students should complete the recipe by writing a concluding paragraph that explains how the food safety procedures prevent the spread of foodborne illness.

## Technology Opportunity

Study Stack [www.studystack.com/flashcard-312862](http://www.studystack.com/flashcard-312862) is an online tool used to create virtual flashcards for studying any subject. With this resource, students can create their own flashcards. After flashcards have been created, organize your class into pairs to sharpen their agricultural knowledge, or connect to a classroom projector and use the flashcards to quiz the whole class.

## **Field Trip Opportunity**

Take your students on a virtual field trip to a modern hog farm by showing the 5 minute video “The Amazing Pig!” from the Kansas Pork Board in your classroom. The video may be found on YouTube by typing in the title. As students watch the movie, have them take notes that they will use to make fact cards after the video. Students can use the cards to quiz each other on swine facts. Another option is for your students to write a fact-based, fictional story about the day in the life of a hog farmer using their notes from the video.

## **GATE Adaptation**

Instruct students to research and produce a short video or slideshow that features swine’s contribution to human medicine. Students should appropriately cite all information sources.

# One Potato, Two Potato, Three Potato...

## Inquiry Opportunities

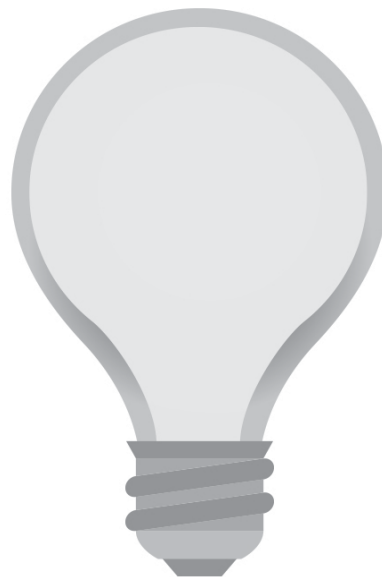
1. **Potato Float.** Teach students about density, buoyancy, solutes, and solvents in this hands-on lesson developed by NASA.  
*[www.aquarius.nasa.gov/pdfs/potato\\_float.pdf](http://www.aquarius.nasa.gov/pdfs/potato_float.pdf)*
2. **Digging for Treasure.** Digging up potatoes is an exciting adventure that most students have probably not experienced. Find a video online that shows the process of harvesting potatoes by hand. Do some class research and find out how to determine when potatoes are ready to be harvested. A local master gardener chapter is a great source of information and helpful volunteers and can be contacted by calling your nearest California University Cooperative Extension office. Learn more at *<http://ucanr.edu>*
3. **Potato Stamps.** In this art activity, students will use potatoes to make stamps. Cut potatoes in half and distribute one half to each student. Instruct students to draw a simple design on the cut end of their potato. Have students use age appropriate tools or help them cut around their design, leaving about ¼ inch raised for the stamp. Students can then dip their stamps into different colored paint to make patterns. Reinforce concepts of color and positive and negative space with this activity. For more information, visit *[www.msfb.com/Programs/AITC/potato.pdf](http://www.msfb.com/Programs/AITC/potato.pdf)*

## Field Trip Idea

There are many Community Supported Agriculture (CSA) programs in California that grow a variety of fruits and vegetables. Find a CSA near you *[www.localharvest.org/csa](http://www.localharvest.org/csa)* that is growing potatoes as one of their crops and schedule a visit to their farm. Students will learn how certain crops are grown and harvested by local farms.

## GATE Opportunity

1. **Potato Power.** Potatoes are an exciting way to teach students about energy. Use this lesson developed by TEACH Engineering to engage students in exploring electrical energy and the concepts of voltage, current, and resistance using potatoes. [goo.gl/r4mZ2o](http://goo.gl/r4mZ2o)
2. **Profiling a Potato Killer.** In this lesson developed by the University of North Carolina, students will conduct an Internet search and use the scientific method to uncover the factors that led to the potato blight that resulted in one of the most destructive famines in history.  
[www.learnnc.org/lp/editions/csi-dublin/6866](http://www.learnnc.org/lp/editions/csi-dublin/6866)



# Careers With Critters

## Extension Ideas

1. **Career Preparation.** Have your students research which classes should be taken in high school and college to prepare for vet school. Students should make a list of these classes along with ideas for job shadowing or gaining related job experience.

After graduating from college, veterinary students must attend four years at a veterinary college and pass an exam to become a licensed veterinarian. Have students research and list the top ten veterinary schools in the nation and highlight the ones that are located in California.



2. **Caring for Our Pets.** The American Veterinary Medical Association (AVMA) has developed twelve lessons and activity sheets that can be downloaded and used in elementary school classrooms to teach students about pet care, wild and domestic animals, veterinary careers, and more. [www.petweek.org/lessons.html](http://www.petweek.org/lessons.html) AVMA educational resources for older students may be found at: [www.avma.org/kb/k12/pages/avma-educational-resources.aspx](http://www.avma.org/kb/k12/pages/avma-educational-resources.aspx)

Purdue University College of Veterinary Medicine has developed extensive third, sixth, and ninth grade curriculum units as well as additional teacher and student resources that may be found at: [www.purdue.edu/vet/engagement/p12](http://www.purdue.edu/vet/engagement/p12)

**3. A Vet's Truck is a Hospital on Wheels!** Here are some things you might find in a large animal vet's truck. Share this list with your students and have them compare items that people should have in their first aid kit with those that a mobile vet would keep in his or her truck. Ask students to research the purpose of each item.

- Medication for vaccinations
- Emergency drugs for colic
- Antibiotics
- Bandages
- X-ray equipment
- Surgical instruments
- Instrument for horse dental care
- Ultrasound equipment
- Digital thermometer
- Scale
- Blood pressure monitor

### **Guest Speaker Idea**

Find a large animal veterinarian in your area who is willing to visit your class. Arrange for the vet to drive his or her truck to the school. Begin the presentation in the classroom by asking the vet to give an overview of their background and the training they completed to become a veterinarian. Ask the vet to talk about the work they do on a daily basis and pictures they could share if available. Conclude the presentation by allowing students to go outside to see the mobile vet clinic on wheels.

# Solar Powered Fruit

## Extension Ideas

1. **Map Activity.** California grows 100 percent of the raisins in the U.S. and more than one third of the raisins in the world. The majority of raisins are grown in the San Joaquin Valley due to its fertile soil and long, hot summers. California raisins are shipped all over the world. The top ten export markets for California raisins are:

- Japan
- United Kingdom
- Germany
- China
- Sweden
- South Korea
- Taiwan
- Malaysia
- Norway



Print out a map of the world from Eduplace [www.eduplace.com/ss/maps](http://www.eduplace.com/ss/maps). Instruct students to find and label each of the listed countries on the map.

2. **Raisins Rock.** This is collection of several math and science lessons from the California Raisin Marketing Board. An overview and instructions are provided by teachers. This resource may be downloaded for free from [www.calraisins.org/professionals/nutrition-educator-teachers/super-kids-raisin-school-curriculum](http://www.calraisins.org/professionals/nutrition-educator-teachers/super-kids-raisin-school-curriculum)
3. **Rappin' Raisin Song.** Instruct students to make an outline of facts about raisin nutrition and how raisins are grown. From this outline, students should compose a song or poem about raisins.

## Inquiry Opportunity

Dancing Raisins is a lesson that can be used to teach students about density and buoyancy. This lesson is just one adaptation of many variations that can be found on the Web.

As a class demonstration, put a large beaker half full of water in a place where students can easily see it. Tell students that the beaker contains tap water. Ask them what they think will happen when you drop a handful of approximately ten raisins into the beaker. Observe the raisins for one or two minutes after they have been dropped into the water. Ask students why the raisins sank to the bottom (because they have a higher density than the water).

Next, ask your students what they think will happen if you put raisins into a glass of soda water (clear tonic water or other clear soda pop). Discuss possible answers and have each student write down their prediction. Divide the class in groups of two or three to discover the answer.

Materials for each group:

- 1 clear cup or beaker approximately  $\frac{3}{4}$  full of clear soda water or soda pop
- 3 to 5 raisins

Procedure:

1. Instruct students to drop the raisins into the cup or beaker with soda.
2. Have students carefully observe the raisins for several minutes and write down their observations.
3. Ask students what happened when they first dropped the raisins into the soda. They sunk because they were more dense than the soda.
4. Ask students what happened to the raisins as they sat on the bottom of the container. They accumulated air bubbles on their surface.
5. Ask what happened next. The raisins rose to the top, then sunk.
6. Ask students why they think the raisins floated until they got to the top and then sank. The bubbles that accumulated on the raisin surface made them buoyant and they rose to the top of the glass as they became less dense than the soda. When they got to the top and broke the surface of the liquid, they lost some of the bubbles along with their buoyancy and sank back down because they were more dense than the soda.
7. Ask students what the soda has that the tap water didn't have. Carbonation or carbon dioxide in water.
8. Instruct students to write a concluding paragraph that describes their observations and explains why the raisins floated and sank repeatedly. Students should include the vocabulary words density, buoyancy, and carbonation.



## **CFAITC Resource**

Check out CFAITC's Agricultural Fact and Activity Sheet on table grapes. This publication features information on history, economic value, and how grapes are grown along with lesson ideas for teachers. Fact Sheets can be downloaded at no charge from *[www.LearnAboutAg.org/factsheets](http://www.LearnAboutAg.org/factsheets)*

# Movin' in the Garden

## Extension Ideas

1. **Lunchtime Nutrition.** Teach your students how to make healthy lunch choices that provide energy to fuel activities and learning. Use this example of a turkey roll-up to show students how to pay attention to ingredients and calories. Make photocopies of nutrition information from packages and distribute to groups of students. Groups should inspect the calorie content of the ingredients and write them down. Students can then use the recipe to make the turkey roll-up at home.

### Turkey Roll-up Recipe

#### Ingredients:

1 seven-inch whole wheat tortilla \_\_\_\_\_ calories  
2 tablespoons of low fat cream cheese \_\_\_\_\_ calories  
 $\frac{1}{2}$  cup of chopped lettuce \_\_\_\_\_ calories  
 $\frac{1}{4}$  cup of sliced tomatoes \_\_\_\_\_ calories  
 $\frac{1}{4}$  cup of sliced bell peppers \_\_\_\_\_ calories  
3 slices of deli turkey \_\_\_\_\_ calories

#### Directions:

Spread the cream cheese on the tortilla and layer with each of the toppings. Roll up the tortilla and eat!

Total calories in turkey roll-up = \_\_\_\_\_.

Use the daily calorie intake chart from the Movin' in the Garden page in WGO to have students look at the percentage of daily calories provided by this recipe for their activity level and age group.

2. **Family Fitness.** Choosing a physical activity that you enjoy makes it easier to incorporate it into your day. Ask the class to come up with a few physical activities they think are fun and list these on the board. Next, have students think about activities that different members of their family would enjoy and make a list of these on the board.

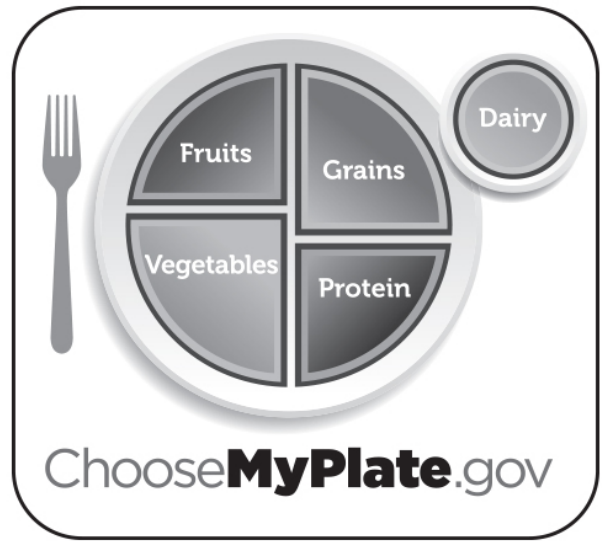
Instruct students to write a daily plan to help their families get healthier by participating in a physical activity each day. If possible, the plans should involve some type of activity that the whole family can enjoy together. Students should take this home and have family members pledge to try the plan for a week. The following website offers some helpful ideas.

[www.webmd.com/parenting/fun-and-fit-family-11/calorie-burners](http://www.webmd.com/parenting/fun-and-fit-family-11/calorie-burners)

3. **Food Groups.** Teach students about the five food groups that are part of a healthy diet by projecting the food group page from

[www.choosemyplate.gov/food-groups](http://www.choosemyplate.gov/food-groups) in the classroom. Explore each of the food groups as a class (fruits, vegetables, grains, protein, and dairy). As you click on each food group, have students select at least three examples that they like from each one. Look at the MyPlate graphic and ask students what it means. Next, have students create a poster of their daily meal plan that follows the MyPlate guidelines and includes a variety of healthy foods.

Students may use their own drawings or pictures of food from magazines to illustrate their daily meal plan poster.



### ELL Adaptations

1. Make a class word wall by having students cut out pictures of healthy food and exercise from magazines. Arrange labels next to each corresponding picture on a classroom bulletin board.
2. Smoothies have become a popular way to consume fruit. Split the class into five groups, and instruct each group to create their own version of a berry smoothie using the same five ingredients (berries, milk, yogurt, juice, and ice). Pour small sample cups and distribute to the class. After each group has tasted a smoothie, practice sentence building to promote vocabulary and use of adjectives. Each member of the group adds on to the description of a simple sentence that was started by the first person to describe their smoothie. For example, person #1 says, "The smoothie was **cold**." Person #2 says, "The **tart** smoothie was **sweet** and cold." Person #3 says, "I **enjoyed** the tart smoothie that was sweet and cold **like ice cream**." Person #4 says "I enjoyed the tart, **refreshing**, smoothie that was sweet, **fresh**, and cold like ice cream." Capture each group's sentence on the board and compare the adjectives used to describe the smoothie.

## Delicious Dairy Delights

### Extension Ideas

1. **Dairy Dates.** Each student should use the list below to create a timeline of the important dates in dairy history. Next, organize the class into pairs and assign one date to each pair. Instruct pairs to make a one-minute infomercial on the significance of their assigned date to present in front of the class.

- 1611 – Cows arrive in the Jamestown colony
- 1878 – Centrifugal cream separator invented
- 1993 – “Got Milk?” advertising campaign launched
- 1948 – Ultra high temperature pasteurization introduced
- 1964 – Plastic milk containers begin to be used commercially
- 1866 – Automatic bottle filler and capper invented for filling glass milk jugs
- 1861 - Louis Pasteur develops Pasteurization
- 1974 – Nutrition labeling begins on milk containers
- 1884 – First glass bottle patented by Dr. Henry Thatcher
- 1624 – Cows arrive in the Plymouth Colony
- 1932 – Plastic coated, paper milk cartons are introduced commercially



2. **Dairy Design.** In small groups or individually, have students choose a dairy product and design a commercial or poster that advertises that product. Advertisements should promote the product's taste, nutrition, appearance, and various uses. Advertisements can be presented to the class.
3. **Digits with Dairy.** Using a compass and ruler, show students how to draw an O and a V to form an ice cream cone. Instruct students to use the following formulas to find the area and volume of the ice cream cone.

Area of triangle = base x height / 2

Area for circle =  $\pi \times \text{radius}^2$

Volume of a cone =  $(1/3) \times \pi \times \text{radius}^2 \times \text{height}$

Volume of a sphere =  $(4/3) \times \pi \times \text{radius}^3$

### Technology Opportunity

Take a virtual field trip to learn how milk gets from the cow to your grocery store. Before beginning "The Story of Milk" tour, have students take out several pieces of paper. Instruct them to take notes on their virtual field trip. Pause the video as necessary to allow students to record information. Then, watch it one more time without any pauses. Students should use their notes to design a concept map that can be used to teach others how milk is produced on dairy farms and how it gets to our home refrigerators. [www.moomilk.com/virtual-tour/](http://www.moomilk.com/virtual-tour/)

### CFAITC Resources

- Check out CFAITC's Agricultural Fact and Activity Sheet about dairy. This publication features facts on the dairy industry including information on history, production, top producing regions, products, and economic value along with lesson ideas for teachers. Fact sheets can be downloaded at no charge. [www.LearnAboutAg.org/factsheets](http://www.LearnAboutAg.org/factsheets)
- Want to share a tasty treat with your class? Use the "Ice Cream in a Bag" Ag-Bite activity to make this delicious dairy treat. Have an alternative activity or recipe ready for students who are lactose intolerant. [www.LearnAboutAg.org/agbites](http://www.LearnAboutAg.org/agbites)
- For an in-depth look at dairy, teach lessons from CFAITC's "Milk Matters: Discovering Dairy" unit for grades 4-6. This unit teaches students about the many

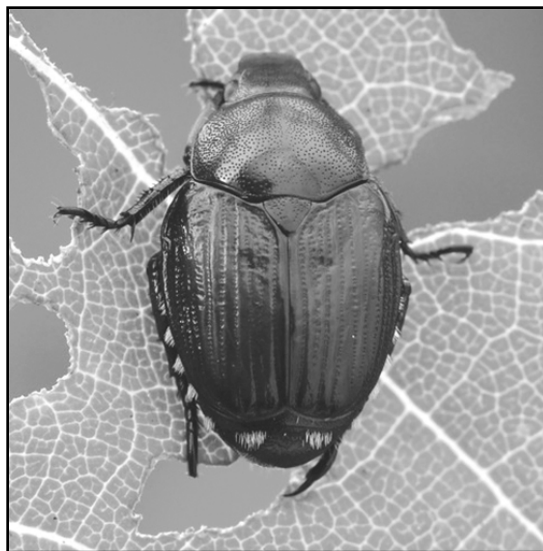
different aspects of life on a dairy farm. From investigating the historical significance of dairy breeds to conquering mathematical business challenges, students will understand why milk matters. This five-lesson unit plan meets the California State Content Standards in each subject area. Aligned to the Content Standards for California Public Schools. [www.LearnAboutAg.org/lessonplans](http://www.LearnAboutAg.org/lessonplans)

- Say Cheese! This fun lesson can be used in the classroom or at home to learn about the history of cheese, nutrition information, and how cheese is made. Follow a simple recipe to make your own mozzarella cheese. [www.LearnAboutAg.org/agbites](http://www.LearnAboutAg.org/agbites)

## The Invaders

### Extension Ideas

1. **Public Service Announcement.** Ask students to create a public service announcement that can be used to educate other students, family, neighbors, or community members about an invasive species in your area. Students may choose an invasive species listed in What's Growin' On? 12<sup>th</sup> edition or they may research their own. Public service announcements can be in the form of brochures, videos, or flyers and should be designed with the target audience in mind.



*HungryPests.com* is an excellent reference website developed by the USDA. The site includes sample public service announcements, U.S. Pest Tracker, an explanation of the top eight ways that invasive species spread, and a guide on what you can do to stop the spread of invasive species.

2. **Food Web Connections.** Choose two or three invasive species with which your students are familiar. Have students work in pairs to sketch the food web that is impacted by the presence of one of these invasive species. Students should draw arrows and captions that explain the different feeding relationships.
3. **Invasive Species Lessons.** Allow your class to choose a couple of these lessons about invasive species from Florida Agriculture in the Classroom. While some of the lessons discuss invasive species that are of concern to Florida, many of the lessons are appropriate for use in any part of the country.

*faitc.org/invasive-species*

### Technology Opportunity

1. While some insects are harmful, most aren't, and many are helpful. The following resources will help you and your students learn about beneficial garden insects. Ask students to search around their homes and the school and take digital photos of any beneficial insects they find over the course of one week. Students

should keep notes about the areas where they found the insects. At the end of the week students can compile photos into a class slideshow. Students should be prepared to tell the class where they found the beneficial insects in their photo collection, and why each insect is beneficial.

- [www.reneesgarden.com/articles/Beneficial%20Insects%20Guide.pdf](http://www.reneesgarden.com/articles/Beneficial%20Insects%20Guide.pdf)
- [www.ucanr.edu/sites/scmg/Beneficial\\_Insects/](http://www.ucanr.edu/sites/scmg/Beneficial_Insects/)

2. Show the *HungryPests.com* website to students and explore the different resources available. For homework or classwork have students go to the “See How They Spread” page and choose one method of spread to develop their own unique infographic poster. Students should not simply copy the photos from the website. Their infographics should use illustrations and/or photos along with a simple message that teaches others to be aware of how invasive species can spread through that specific activity. Posters can be displayed around the classroom or another appropriate school location.

### **GATE Opportunity**

Instruct students to research pheromone traps. Students should then write up their own plans for a new pheromone trap that will target one of California’s invasive species. Students should prepare a presentation to inform their classmates about their new product. The presentation should include visuals of how the pheromone trap attracts the insect of interest and how it will help control the insect population.

### **CFAITC Resource**

Check out CFAITC’s Agricultural Fact and Activity Sheet on invasive species. This publication features facts about invasive species along with lesson ideas for teachers. Try the Invasive Weed Seed Walk activity with your students. Fact Sheets can be downloaded at: [www.LearnAboutAg.org/factsheets](http://www.LearnAboutAg.org/factsheets)



## Where Would We Be Without Honey Bees?

### Extension Ideas

1. **Story Time.** Learn more about bees and their role in agriculture, by reading Honeybee Worker Day to your students, found at:  
[www.LearnAboutAg.org/imaginethis/2011](http://www.LearnAboutAg.org/imaginethis/2011)

After reading the story, provide guidelines for your students to research and write a fact-based story about a day in the life of a worker honey bee.

The Honey Files: A Bee's Life is a good resource for background information for students as they research facts for their story. These lessons may be downloaded for free at:

[www.honey.com/images/uploads/general/HoneyFilesWeb.pdf](http://www.honey.com/images/uploads/general/HoneyFilesWeb.pdf)



2. **Concept Mapping.** Draw and label the pollination cycle of a plant such as an apple or cherry tree involving honey bees.  
The Honey Files: A Bee's Life is a good resource for background information for students. These lessons may be downloaded for free at:  
[www.honey.com/images/uploads/general/HoneyFilesWeb.pdf](http://www.honey.com/images/uploads/general/HoneyFilesWeb.pdf)
3. **Create a Crossword.** Have your students find the answers to the following clues, then have them develop a crossword puzzle the uses both the answers and the clues.

#### ACROSS Clues

- Only worker honey bees have a \_\_\_\_\_ for protecting the hive.
- Worker honey bees collect \_\_\_\_\_ from flowers.
- Many food crops require \_\_\_\_\_ to produce fruit.
- Honey bees were brought to North America from \_\_\_\_\_.

*Across Answers (stinger, nectar, pollination, Europe)*

#### DOWN Clues

- A \_\_\_\_\_ raises honey bees for honey or pollinating crops.
- Honey bee workers produce \_\_\_\_\_ to make honeycomb walls.

*Down Answers (beekeeper, wax)*

4. **Bee Dance.** Use this lesson from Science NetLinks for a fun way to teach students about honey bee communication and navigation.

[www.sciencenetlinks.com/afterschool-resources/dances-bees/](http://www.sciencenetlinks.com/afterschool-resources/dances-bees/)

Next, show the “Dances With Bees” video from NOVA so students can see live honey bees doing different dances to communicate the distance and direction to the nearest flower nectar. [www.pbs.org/wgbh/nova/bees/dances.html](http://www.pbs.org/wgbh/nova/bees/dances.html)

### **Guest Speaker Idea**

Contact the California State Beekeepers Association to find a beekeeper in your area to invite to your class as a guest speaker. Visit [www.californiastatebeekeepers.com](http://www.californiastatebeekeepers.com) or call (209) 545-5359. Ask your guest to bring photos and the tools of their trade to share with students.

### **Field Trip Idea**

Take students on a virtual field trip to an apiary through an online video. Choose one or all of these videos from “America’s Heartland” [www.americasheartland.org/pollinators](http://www.americasheartland.org/pollinators).

## The Vegetable With a Heart

### Extension Ideas

1. **Artichoke Taste Test.** How do you cook an artichoke? One way to prepare an artichoke is to steam it. Here's a recipe that you and your students can follow in class as a taste test activity.
  - a) Wash the artichoke under cold water.
  - b) Slice the stem off of the artichoke and pull off any small petals at the base.
  - c) Slice about one inch off the tip of the artichoke.
  - d) Fill a large pot with a few inches of water and a slice of lemon to preserve the bright green color of the artichoke while cooking. Place a steaming basket in the pot and place the artichoke in the basket and put a lid on the pot.
  - e) Bring water to a boil then reduce heat to simmer for 30-45 minutes depending on the size of the artichoke. The artichoke is cooked when outer petals easily pull off.
  - f) Use tongs to remove the artichoke from the pot and place on a dish to cool for several minutes.
  - g) Wash hands. Once cooled, pull off individual petals and place them on plates for students to enjoy. As a demonstration for how to eat an artichoke, place a petal in your mouth with the cup side down, and pull through your teeth to remove the delicious flesh of the petal. Discard the remaining part of the petal.

How many students in your class liked the artichoke? \_\_\_\_\_

How many students didn't like the artichoke? \_\_\_\_\_

Instruct students to make a bar graph of the taste test results.

What percentage of students liked the artichoke? \_\_\_\_\_

2. **Vegetable Verses.** Write a poem or song about artichokes, the official California vegetable.

- 3. Leaf Investigation.** Project the following Web page on your board so students can sketch and write down names of different leaf shapes.  
[goo.gl/nK7Sg0](http://goo.gl/nK7Sg0)

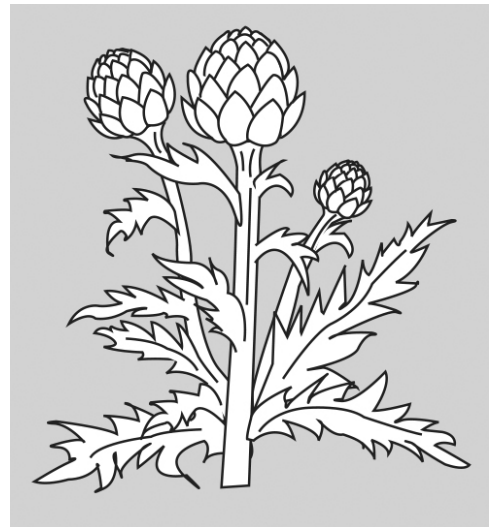
How would students describe the leaf shape of an artichoke plant? How would students describe the leaf shape of an artichoke bud? Go on a hike and have students find different types of leaves and label and sketch them in a notebook. If a hike is not possible, instruct students to bring in leaves that were collected from home. Spread leaves around the classroom for students to categorize, sketch, and label.

### **GATE Adaptation**

Have students investigate the regions of California that have suitable climates for growing artichokes. Students should identify at least three different areas and explain why those areas are suitable for artichoke farming. Students must include information on average precipitation and temperature and can draw and label these artichoke growing areas on a map of California. Students can expand their research by finding other countries that are suitable for growing artichokes. Students can search geography, climate, and agriculture statistics by country at: [www.nationmaster.com](http://www.nationmaster.com)

### **CFAITC Resource**

Check out CFAITC's Agricultural Fact and Activity Sheet about artichokes. This publication features facts on artichokes including information on history, production, top producing regions, products, and economic value along with lesson ideas for teachers. Fact Sheets can be downloaded at: [www.LearnAboutAg.org/factsheets](http://www.LearnAboutAg.org/factsheets)



## Additional Resources

The California Foundation for Agriculture in the Classroom has an extensive website, designed to connect teachers with a wealth of resources that bring agriculture education to life by teaching students where their food and fiber comes from.

Visit [www.LearnAboutAg.org](http://www.LearnAboutAg.org) for the following resources:

- **Lesson Plans** and comprehensive units aligned to California State Content Standards. Our newest units are aligned to Common Core and Next Generation Science Standards. These resources are available for grades K-12 as free downloads from the website.
- **Searchable Database** providing a listing of recommended books, websites, educational materials, and organizations that relate to agricultural topics of interest.
- **Agricultural Fact and Activity Sheets** specific to California topics from agricultural water to invasive species and beyond. One side of the fact sheet includes information about various commodities, production, history, nutrition information, and economic value. The other side provides specific lesson and activity ideas for the classroom.
- **Teacher Resource Guide** provides an overview of CFAITC programs and materials, agricultural facts and information, field trip ideas, agriculture-related books and websites, and recommended educational resources. Request a free copy while supplies last, or visit the website's searchable database.
- **Information** about events and resources via e-newsletter and blog posts, and links to your county Farm Bureau.

## What's Growin' On? Activities Answer Key

### Page 3: We Are Number One!

#### Map Activity:

- Characteristics of coastal regions: mild summer and winter temperatures, fog.
- Characteristics of the Central Valley: long, hot, dry summers and mild winters.
- Characteristics of mountains: Four distinct seasons. Winters are cold with freezing temperatures at times and summers are warm.
- Characteristics of deserts: Long, hot summers. Very little precipitation throughout the year.



Describe the microclimate in your area and one crop that is grown there. Answers will vary. Example: *The microclimate where I live is hot and dry during the summer, with mostly mild winters with some freezing days. Annual precipitation is 39 inches per year. Common commodities produced in the region where I live include beef cattle, winegrapes, and mandarins.*

# #1 Commodities by County










Ranking based on dollar value of commodity;  
 2011 statistics information obtained from County Agricultural Commissioner reports.

## 99% Club Activity:



California produces 99% or more of many crops grown in the United States. Some of them are listed below. Complete the chart.

	Name	How it grows (trees, vines, plants, etc.)
	Almond	Tree
	Artichoke	Plant
	Raisin	Vine
	Olive	Tree
	Peach	Tree
	Kiwifruit	Vine
	Walnut	Tree

## Page 4: Sprouting the Bounty

### Handy Garden Activity:

Students should use a journal to record observations of their Handy Garden and should record observation dates for different growth processes and measurements.

## Page 5: Super Swine

### Pig Idiom Activity:

- Going hog wild: Used to describe someone who is very excited about participating in something. For example: *Billy went hog wild when we took him to ride the roller coaster at the fair.*



- Bringing home the bacon: Used to describe bringing home something of value such as a paycheck. For example: *Luis got a new job and will be bringing home the bacon.*
- When pigs fly – Used to describe something that has very little chance of happening. For example: *When Kristina asked her mom if it would snow on their summer vacation he mom said, "It will snow when pigs fly."*
- Pig out – Used to describe someone who is eating with a voracious appetite. For example: *Patches pigged out on her dog food after she came home from chasing squirrels all day.*

### Math Activity:

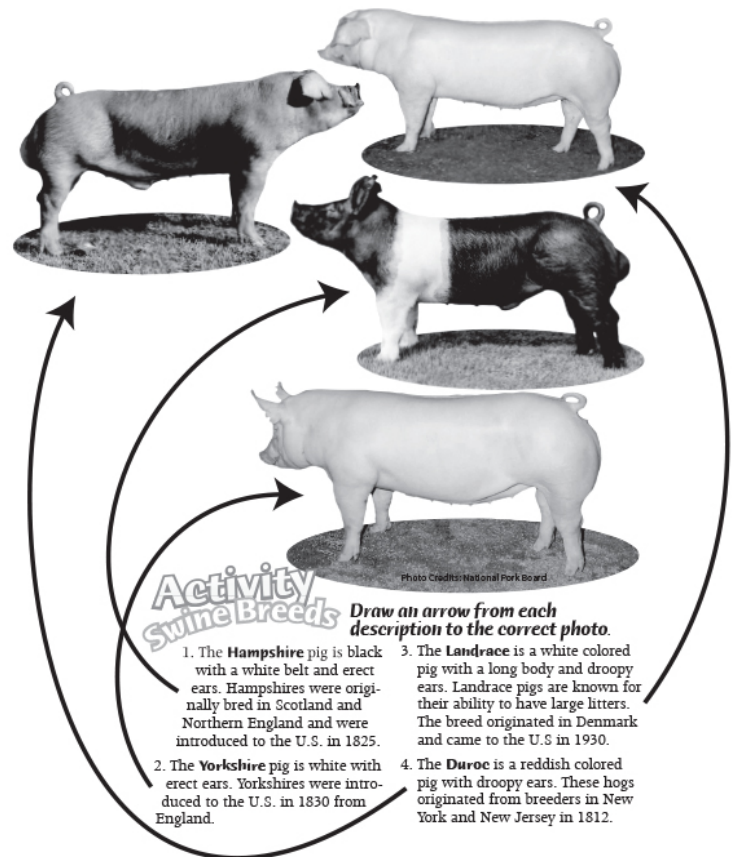
- 108 lbs
- 154 lbs
- 163 lbs

### Swine Breed Activity:

- Duroc – top left photo
- Landrace – top right photo
- Hampshire – middle photo
- Yorkshire – bottom right photo

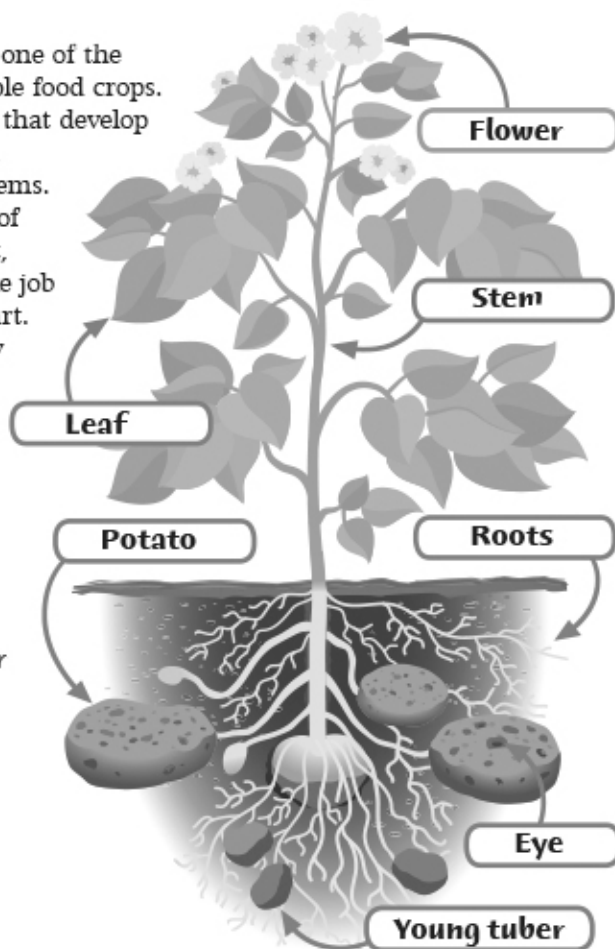
### Timeline Activity: (Answers will vary)

- **1812 Duroc breed introduced:** Another interesting fact from this time in U.S. history is that the United States declared war on the British Empire, starting the War of 1812.
- **1825 Hampshire breed introduced:** Other interesting facts from this time in U.S. history include that John Quincy Adams became the sixth U.S. president and tin cans were patented for food storage.
- **1830 Yorkshire breed introduced:** Also during 1830, the first U.S. railroad station opened in Baltimore.
- **1930 Landrace breed introduced:** This time in U.S. history also marked the beginning of the Great Depression.



**P**otatoes are one of the world's staple food crops. They are tubers that develop from thickened, underground stems. Label the parts of the potato plant, then, discuss the job of each plant part. Use the glossary for assistance.

- Flower
- Leaf
- Stem
- Roots
- Potato
- Eye
- Young tuber or potato



### Potato Math Activity:

One serving of a potato provides 620 mg of potassium which is 18% of your recommended daily intake. How many total mg of potassium should you have each day?

18% of what is 620 mg?

$$0.18 (x) = 620$$

$620/0.18 = 3,444$  mg is the recommended mg of potassium a person should have each day. (Value may vary depending upon each person's individual needs)

Potatoes are also a good source of vitamin C.

### **Super Soaker Activity:**

What happened? The potato half that was soaked in salt water should have become limp and flexible due to osmosis. Water moves from an area of high concentration to lower concentration until equilibrium is reached. The water concentration inside the potato cells was higher than the water concentration in the salt water solution, therefore, water diffused out of the potato cells and into the surrounding saltwater solution.

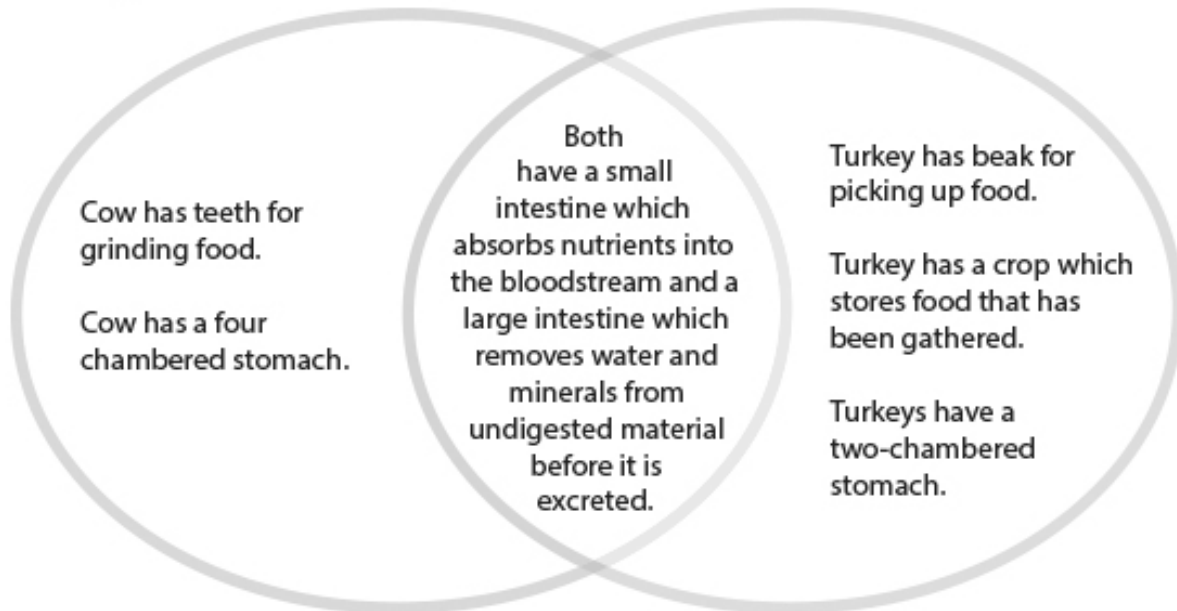
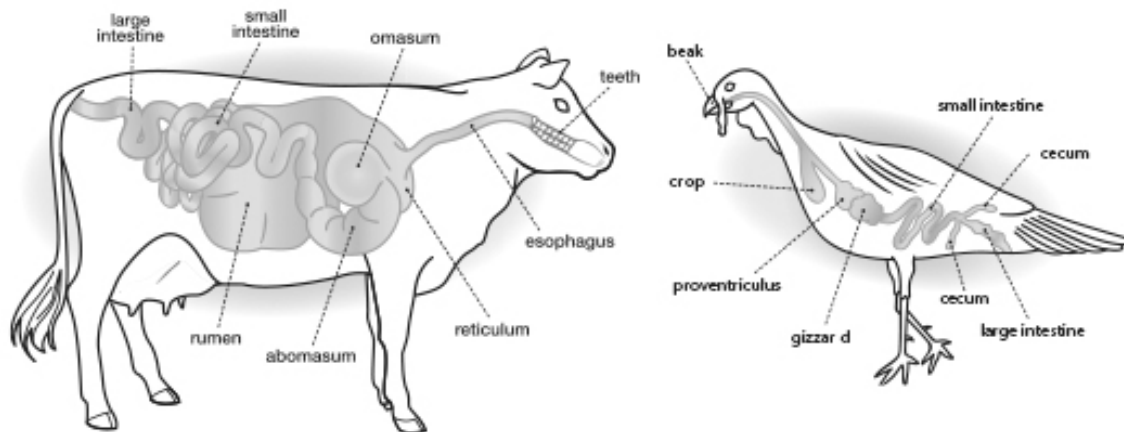
The opposite happened to the potato half soaked in the water. Water diffused into the potato cells because the concentration of water in the bowl was greater than the concentration of water inside the potato cells. This potato half became hard and crispy.

### **Page 7: A Career With Critters**

#### **Vet's Schedule Activity:** (answers will vary)

Example:

- 6:30 a.m. Wake up and shower
- 7:00 a.m. Eat breakfast with my brother and sister
- 7:30 a.m. Catch the bus
- 8:00 a.m. Get to school and visit with friends
- 8:15 a.m. Start school
- 12:00 p.m. Open my brown bag lunch to eat my turkey sandwich, apple, and crackers
- 12:30 p.m. Go to P.E. class
- 3:00 p.m. School is out, go to soccer practice
- 4:15 p.m. Picked up from practice
- 4:30 p.m. Eat a snack with my brother and sister, then help unload the dishwasher before doing homework
- 6:30 p.m. Eat dinner with family
- 7:15 p.m. Pack my lunch, then read my favorite book
- 8:45 p.m. Go to bed



## Similarities

Both turkey and cow have a small intestine which absorbs nutrients into the bloodstream and a large intestine which removes water and minerals from undigested material before it is excreted.

## Differences

Cow has teeth for grinding food.

Cow has a four chambered stomach.

- Rumen, the first chamber of the stomach which has beneficial bacteria to help with digestion.
- Reticulum, separates food particles and brings the undigested feed back up the esophagus in the form of cud to be re-chewed.
- Omasum, the third chamber of the stomach which regulates the passage of partially digested food into the abomasum.
- Abomasum, the fourth chamber of the stomach which contains digestive enzymes and acids to prepare food nutrients for absorption into the small intestine.

Turkey has beak for picking up food.

Turkey has a crop which stores food that has been gathered.

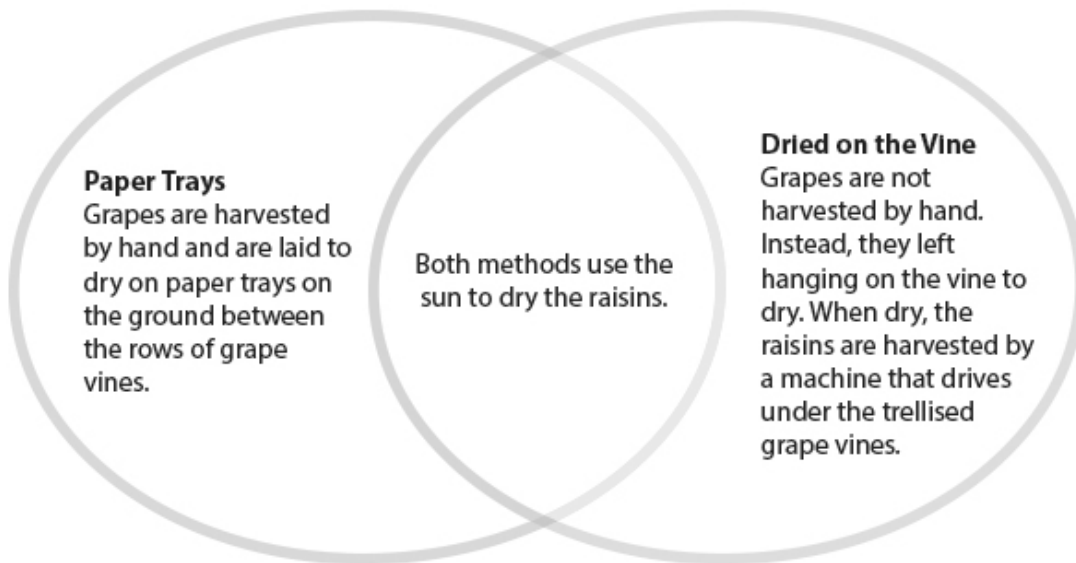
Turkeys have a two-chambered stomach.

- Proventriculus, secretes acid for digesting food.
- Gizzard, has very tough muscles for grinding and digesting food
- Cecum, helps with absorption of water and proteins, and the decomposition of fiber.

These two animals have different digestive systems because each is adapted to eating different foods. Cows are herbivores. Their diets consist of grass and other plant material. Their digestive systems are specially adapted to breaking down cellulose material of plant cell walls and absorbing the nutritious portion of the plant material.

Birds like turkeys are omnivores, which means that they eat both plant and animal material. Their digestive systems are specially adapted to breaking down food that is very tough such as grain, nuts, insects, whole rodents, and fish.

**Drying Comparison Activity:**



**Similarity**

Both methods use the sun to dry the raisins.

**Differences**

Paper Trays – Grapes are harvested by hand and are laid to dry on paper trays on the ground between the rows of grape vines.

Dried on the Vine – Grapes are not harvested by hand. Instead, they left hanging on the vine to dry. When dry, the raisins are harvested by a machine that drives under the trellised grape vines.

**Do-It-Yourself Raisin Activity:**

Example (answers will vary)

- I predict my grapes will shrivel up when placed in the sun.
- Each day that I tasted my grapes, they seemed a little sweeter.
- I think the grapes tasted sweeter as time went by because water evaporated from them and concentrated the natural sugar in the raisin.

### Measurement Conversion Activity:

Ingredient	Grams	Ounces
Raisin juice concentrate	5000	<b>175 ounces</b>
Cinnamon	15	<b>0.53 ounces</b>
Raisin paste	1200	<b>42 ounces</b>
Cream cheese	400	<b>14 ounces</b>
Vanilla extract	70	<b>2.45 ounces</b>

### Raisin Bread Science Activity:

Ingredient	What is it?	What does it do?
Active Dry Yeast	Single-celled fungi	<b>Releases carbon dioxide bubbles in the bread mixture which help the dough rise</b>
Warm Water	H <sub>2</sub> O	Activates the yeast
Flour	<b>Grain</b>	<b>Provides wheat gluten, which makes the dough stretchy</b>
Sugar	<b>Natural sweetener made from sugar beets or sugar cane</b>	Provides food for the yeast
Salt	<b>Mineral</b>	<b>Gives the bread flavor</b>
Vegetable Oil	<b>Oil made from plants</b>	Makes the bread soft
Raisins	Fruit	<b>Makes the bread sweet</b>

### From Shriveled Up to Plumped Up! Activity:

Observations will vary.

Semipermeable membrane in this experiment is the raisin skin. After soaking in water overnight the raisins should plump up. This happened because of osmosis. Water diffused from an area of high concentration (the water in the glass) to an area of lower concentration (inside the raisin).

**Math Activity:**

To make 50 pounds of raisins you would need 225 pounds of grapes.

**Page 10: Movin' In the Garden**

**Math Activity:**

You burned 650 calories shoveling snow and playing basketball.

Daily Calories Activity

(answers will vary)

Example: An 11-year-old boy who is somewhat active should eat 1,800 – 2,200 calories per day.

In order to get enough exercise each day, I can go for a 30 minute walk in the morning and do yard work and play with my dog for an hour when I get home in the evening.

**Page 11: Delicious Dairy Delights**

**Breakfast Activity:**

(answers will vary)

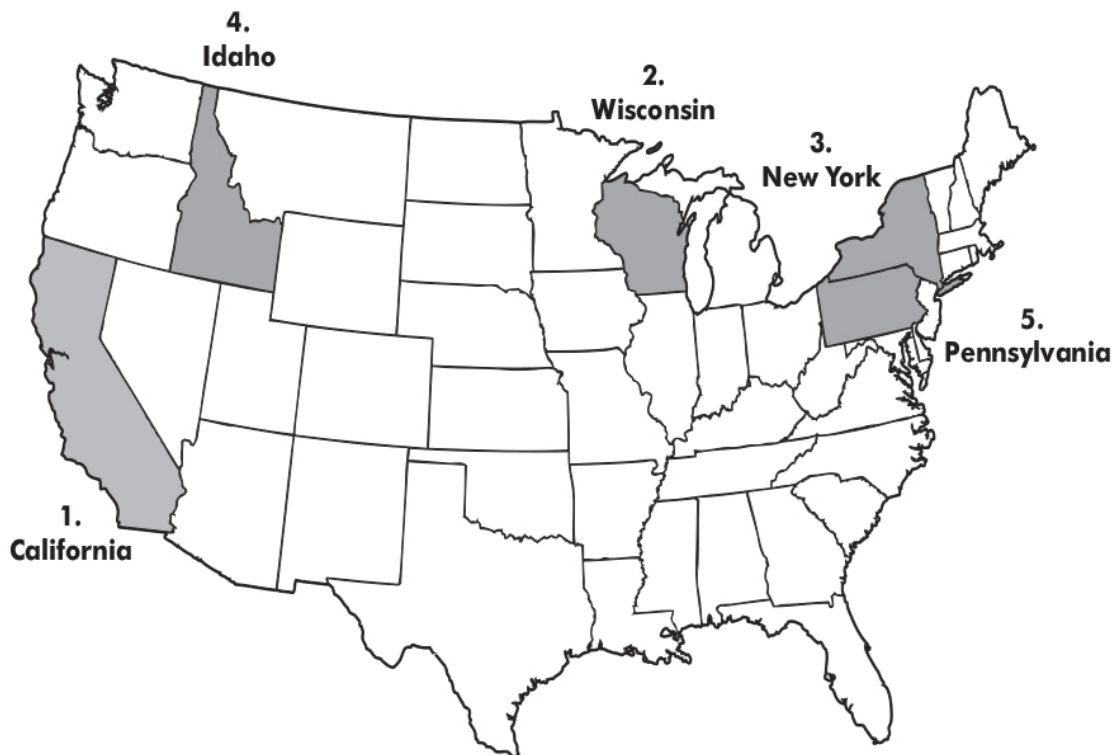
Example:

Food Item	Amount	Food Group
Eggs	2	Protein
Orange	1	Fruit
Milk	1 cup	Dairy
Toast	1 slice	Grain



I would explain to my family that dairy provides nine important nutrients including calcium for strong bones and teeth and nutrition to provide us with energy for work, learning, and play.

**Map Activity:**



**Food Safety Activity:**

The heating process of pasteurization removes 99.9% of the bacteria in the milk, which gives the milk an approximate shelf life of 16 - 21 days from the date it was packaged.

## Page 12: The Invaders

### Research Activity:

(answers will vary)

### Orange Farm Activity:

If 550 cartons of oranges were harvested per acre and sold for \$15 each, the total would be \$8,250 per acre.

$$\text{\$8,250} \times 100 \text{ acres} = \text{\$825,000}$$

Now, we must subtract the amount of money invested in growing oranges.

$$\text{\$6,000 per acre} \times 100 \text{ acres} = \text{\$600,000}$$

$$\text{\$825,000} - \text{\$600,000} = \text{\$225,000}$$

The profit would have been \$225,000 if the orchard was not infected by the Asian citrus psyllid.

Now that Fiona has to remove 50% of the trees in her orchard to prevent the spread of huanglongbing disease, this will essentially take all of the profit for tree removal and disposal, purchasing, and replanting new trees. Fiona's farm will have to operate off of the profits of 50% of the orchard for the next five or six years because it will take this long before those trees will be able to produce fruit.

## Page 13: Where Would We Be Without Honey Bees?

### Drawing Activity:

Answers will vary, however student illustrations should carefully follow each direction.

### Honey Math Activity:

$$(1.1 \text{ pounds}) \times (\text{number of people in your house}) \times (55,000 \text{ miles}) = \text{answer will vary}$$

There would be approximately 534 drones in a colony of 53,402 honey bees.

### Strawberry Ice Cream and Bees Activity:

Students should write a paragraph that explains that honey bees pollinate strawberry plants and pollinated strawberry plants produce strawberries to eat.

## Page 14: The Vegetable With A Heart

### Height Activity:

The artichoke in the picture is 42 inches tall, which equals 3.5 feet, which equals 106.68 cm tall.

Height comparison example: If a student is 48 inches tall the comparison to the artichoke's height would be:

$$\frac{48 \text{ inch tall student}}{42 \text{ inch tall artichoke}} = \frac{24}{21}$$

= 114%

