farm TO SCHOOL

DECEMBER 2023

NEWSLETTER

THIS MONTH WE'RE HARVESTING

Citrus!

In This Issue

Farmer Spotlight

JERRY ANDRADE - SWEET TREE FARMS, LLC
REEDLEY, CA

Twelve years ago, fourth generation farmer Jerry Andrade made a big change on his farm—he pulled out the grapevines his great-grandparents planted and replaced them with citrus trees. "The price of grapes would fluctuate so much, sometimes we couldn't even break even. After four generations, we decided it was time," said Andrade. Today, he and his family grow three different varieties of mandarin oranges—Satsumas, Tangos, and Murcotts—on their 40-acre farm.

For Andrade, growing citrus fruit is a year-round job. In March, the earliest varieties begin to bloom. "If the trees are cross-pollinated, the citrus develops seeds inside," said Andrade. Avoiding cross-pollination is so important, Andrade covers the rows of Murcott trees, an uncommon variety particularly susceptible to seed development, with netting designed to keep pollinators out.

Soon, tiny fruits replace the blossoms. As the fruit grows, truckloads of compost are spread evenly throughout the orchard. "The compost is a natural fertilizer that provides important nutrients to the trees," explained Andrade. Technology also plays an important role during the growing season—solar-powered pumps and a carefully monitored drip irrigation system helps Andrade save time, money, and water.

Harvest begins in the fall. Satsumas are harvested in October, followed by Murcotts, and finally Tangos in February. As temperatures plummet, large orchard fans keep the fruit from freezing. During harvest, crews use tall ladders to pick each fruit from the tree. Each tree can be harvested up to four times as fruit gradually ripens.

While most large-scale citrus growers send their produce to a packinghouse for nationwide distribution, Andrade packs his produce on-site. Twice a week Andrade delivers his mandarins to farmers markets and independent grocery stores in the San Francisco Bay Area. Soon after the last fruit is sold, the first trees are coming into bloom again. Andrade observes, "We don't get much down time. It's hard, but we're also proud of the citrus we produce."

FOOD for FUEL

All citrus fruits are rich in vitamin C–in fact, one medium orange or grapefruit provides 100% of your daily vitamin C needs.

HERE ARE SOME OF THE HEALTH BENEFITS OF INCLUDING CITRUS FRUITS IN YOUR DIET:

Strong BONES

Vitamin C, potassium, and magnesium (all found in citrus fruits) play an important role in bone structure, density, and strength.

Radiant SKIN

The vitamin C found in citrus helps protect our body's cells from sun damage, while improving skin elasticity and tone.

Immune System SUPPORT

The vitamin C, flavonoids, and carotenoids found in citrus fruits and juices support healthy immune systems by fighting inflammation and helping produce white blood cells, which are necessary to fight infections.

HUNGRY CATERPILLAR

Some caterpillars enjoy munching on citrus tree leaves, which can cause serious damage in the case of orchard infestation. Without leaves, trees can't make food through photosynthesis. This ultimately affects plant growth and development. Thankfully, in this citrus-themed snack, the caterpillar is completely harmless and totally delicious!

Ingredients:

- *One citrus fruit of your choice*
- *Two blueberries*
- *One snack-size box of raisins*

Adapted from stemilt.com

Directions:

1. *Wash your produce under running water.*
2. *Peel your citrus fruit and thinly slice it.*
3. *Arrange the caterpillar's body by overlaying the sliced fruit in a horizontal s-shape.*
4. *Place raisins along the bottom of the body for feet.*
5. *Use blueberries to create the eyes.*
6. *Cut slivers from the citrus peel to create antennae. Place on the caterpillar's head.*

CLASSROOM Connection

Citrus Sink or Float Challenge

Have you ever wondered why some objects float on water while others sink? The secret is buoyancy, or the ability of objects to float. Whether or not an object has buoyancy depends mostly on two factors: the amount of water an object displaces and the density of an object. Did you know there are more than 1000 different varieties of citrus grown in the nation? Let's use a few of these varieties to help us better understand the idea of buoyancy.

Objectives:
Students will compare the buoyancy of two different citrus varieties. They will use mass, volume, and density to justify why the varieties sink or float. Advanced students will consider the molecular structure of a substance and whether that physical structure affects density.

Standards:
NGSS: 2-PS1-1, 5-PS1-3, MS-PS1-1

Materials: Two different varieties of citrus fruits such as pomelos, mandarins, lemons, oranges, grapefruits, or limes; two cylinders or beakers with mL measurement (and can fit the largest fruit inside); balance; student worksheet (page 3).

Note: Educators will determine if this is an investigation for the class, small groups, or individuals and scale the materials appropriately.

Procedure:

1. Show students two different varieties of citrus fruits. Ask them to predict if the fruits will sink or float. Have students explain their reasoning and identify any physical characteristics that reveal the fruit's likelihood to sink or float.
2. Distribute worksheets and materials to the class. Have students place their citrus fruits in water and record their findings on the worksheet.
3. Demonstrate how to accurately find mass and measure displaced volume.
4. Have students complete the student worksheet.
5. Invite students to report their densities, organized by variety, on the board or flip chart. Identify varieties with a greater density than water, and those less dense than water. Ask students, "How can you predict buoyancy given the mass and volume of an object?"

7th/8th Grade Challenge: Research illustrations of the atoms and molecules that make up citrus fruits (and their peels) to help understand differences in density. How does physical structure explain why each variety sinks or floats in water?

Name: _____

Citrus Sink or Float Challenge

Choose two different citrus fruits. Drop them in identical containers of water. Do they sink or float?

Draw a picture of your fruits in water

Float ☐ Sink ☐

Variety _____

Float ☐ Sink ☐

Variety _____

But WHY??

Density plays a part in why some things float and others sink. Objects that are more dense than water sink and those less dense float. Let's test this principle and determine if it's true.

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Mass

Place one variety of fruit on the balance. Add weights until the balance is level. Determine the mass. Repeat for the second variety of fruit.

Variety:	**Mass:** _____ **grams**
Variety:	**Mass:** _____ **grams**

Displaced Volume

Start with enough water in the measuring container so it will be able to cover the entire fruit. Record the volume. Carefully place one fruit into the water. If the fruit floats, use a pencil to gently push the top of the sample just under the surface of the water. Record the volume. Find the displaced volume by subtracting the starting level of the water from the final level.

Variety:	**Starting volume** _____ **- Ending volume** _____ **= Displaced volume** _____ **cm3**
Variety:	**Starting volume** _____ **- Ending volume** _____ **= Displaced volume** _____ **cm3**

Density

Calculate the density using the formula d = M/V.

Variety:	**Density:** _____ **g/cm3**
Variety:	**Density:** _____ **g/cm3**

Water has a density of 1 g/cm3. Objects will float in water if their density is less than 1 g/cm3. Objects will sink in water if their density is greater than 1 g/cm3. **Do your findings support this principle? Why or why not?**

virtual FIELD TRIP

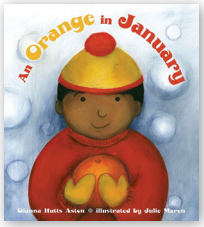
When it comes to navel oranges, there's a good chance the oranges in your kitchen came from the Bailey Brothers' grove—their orchards produce more than 40 million pounds of fruit each year. Produced by America's Heartland, this video introduces viewers to four generations that harvest citrus fruit on this Central California farm.

SCAN ME

DIG DEEPER

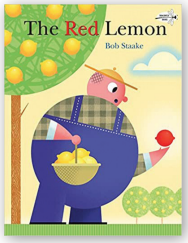
These books, websites, and other resources will help you and your students learn more about citrus fruits.

BOOKS



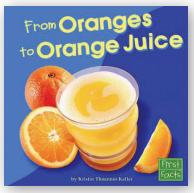
An Orange In January
written by Dianna Hutts Aston and illustrated by Julie Maren

Readers follow an orange from blossom to ripe fruit, from tree to truck to market, and into the hands of a boy who shares this treat with his friends on the playground—so that everyone could taste the sweetness of an orange in January.



The Red Lemon
written and illustrated by Bob Staake

In this brightly illustrated book, Farmer McPhee is horrified to discover an anomaly in his orchard, and immediately discards it. Through rhyming text, readers discover that even unusual things can be appreciated with the right perspective.



From Oranges to Orange Juice
written by Kristin Thoennes Keller

In this nonfiction text, readers discover how oranges from an orange grove are taken to a factory and made into orange juice. Introduces basic concepts of food production.

WEBSITES

learnaboutag.org
The California Foundation for Agriculture in the Classroom provides free resources to teachers. The resources highlight many of California's 400 agricultural commodities, including citrus fruits.

sunkist.com
For more than 125 years, Sunkist has supported citrus growers as an agricultural cooperative. Their website provides a wealth of information including "family stories" videos featuring Sunkist growers, recipes incorporating citrus, ideas for using citrus to promote health, and much more.

RESOURCES

Lesson Plan: Sour Subject *(Grades 5-6)*
By California Foundation for Agriculture in the Classroom
In this science investigation, students reinforce their skills of observation, mathematical computation, and written expression by comparing and contrasting grapefruits and lemons.

Lesson Plan: Focus on Fruits *(Grades K-3)*
By Iowa Department of Public Health
In this lesson, students will learn basic characteristics of kiwis, tangerines, and grapefruit, and how they are grown. Includes kid-friendly instructions for preparing as a snack.

Lesson Plan: Lemon Battery *(Grades 4-8)*
By North Dakota State University
Build a fully functional lemon battery and use it to learn about electricity as you power a light bulb in this science experiment for kids.

ELK GROVE Unified School District EGUSD

Learn About Ag® California Foundation for Agriculture in the Classroom

CA FARM TO SCHOOL INCUBATOR GRANT 2021