### Taste and Teach September - Tomatoes



### Five **Fun Facts** About Tomatoes!

- Processed tomatoes (used to make sauces, soups and more!) have thicker skins than fresh market tomatoes. For best flavor, fresh tomatoes should be eaten at room temperature.
- 96% of all processed tomato products eaten in the US come from California.
- Scientifically, tomatoes are considered a fruit. However, the Supreme Court declared them a vegetable because of the way in which people commonly eat them.
- There are more than 2,750 varieties of fresh market and processing tomatoes.
- The first tomatoes were the size of cherries!

### Four Fun Teaching Ideas!

- Watch this video on tomatoes from the Tomato Wellness Council: https://youtu.be/koZ1QCh8aRY
- Brainstorm common meals that have tomatoes in them. Who can name the most?
- Have students complete a tomato-themed page from the *What's Growin' On?* student newspaper.
- Draw a tomato! Tomatoes come in many shapes,colors and sizes. Have students research and draw a tomato variety. Then, students can discuss and compare their drawings with a partner.

Explore all the great tomato resources in this section!

# Commodity Fact Sheet Processing Tomatoes

Information compiled by the California Tomato Growers Association, Inc.

**How Produced** – Tomato plants are planted in the field as seeds or as young plants, called seedlings. If sowing seeds directly into the ground, the producer sows seeds in late

January or early February. If planting by seedling, plants are grown in greenhouses until they are hardy enough to be planted outside in the spring.

Tomatoes are ready for harvest between early July and mid-October. Mechanical harvesters move through the fields picking the entire tomato plant and shaking the tomatoes off the vine. Specially designed electronic sensors on the harvesters sort the ripe, red tomatoes from the vine and transfer them into a gondola pulled by a tractor following alongside. The tomatoes are immediately transported from the fields by trucks, which can hold approximately 50,000 pounds of tomatoes. Trucks haul the crop to a nearby state-controlled

grading station to be graded, then on to a tomato processing plant where they are peeled, sliced, diced, or sauced into the familiar canned tomato products seen on store shelves.

**History** – The first tomatoes can be traced to the South American Andes Mountains where they grew wild as cherrysized berries. Padres following the Spanish conquistadors most likely sent the first seeds to Spain in the early 1500s. The fruit gained little attention in Spain, but soon traveled to Italy—a country that embraced tomatoes with great passion and developed numerous recipes which are still popular today. By the mid-sixteenth century, tomatoes made their return to America via English colonists. They did not become an important part of the American diet, however, until after World War I. Today, tomatoes are grown in every state except Alaska.

**Varieties** – There are more than 2,750 genetic varieties of fresh market and processing tomatoes at the Tomato Genetics Stock Center at the University of California, Davis. These varieties have been developed to suit the various growing conditions around the state, taking into account soil type, climate, and disease. Processing tomatoes have been selectively bred for more than 60 years to differ from fresh market tomatoes. The varieties designated for processing have a thicker skin and firmer consistency than fresh market tomatoes. These qualities enable the mechanical harvester to pick the fruit when it is ripe without damaging the fruit and



ensure tomatoes can survive transportation. The processors prefer the "meatier" character of the processing tomatoes because it provides consumers with more of the tomatoes' essence.

> **Commodity Value** – California is the nation's leading producer of processing tomatoes. In 2019, California's processing tomato growers grew approximately 11.2 million tons on 235,000 acres throughout the state. The state's crop value reached \$840 million in 2019.

> **Top Producing Counties** – As of 2019, Fresno County leads production followed by Yolo, San Joaquin, Kings, and Merced counties. However, nearly the entire state is involved in producing processing tomatoes, with some being grown as far south as Kern County and as far north as Colusa County.

**Nutritional Value** – Processing tomatoes are are a nutrient dense food. One, four-ounce tomato supplies about one-third of the recommended daily allowance for vitamin C, plus contains beta-carotene, potassium, folic acid, and other B vitamins, iron, and fiber. Tomatoes are a naturally low-calorie food.

Studies show processing tomatoes are the leading source of lycopene in the American diet. Lycopene, the ingredient that makes tomatoes red, is an antioxidant that blocks cellular damage and is highly effective in preventing cancers. Tomatoes do not lose their health benefits as they are processed and cooked. In fact, lycopene in cooked and processed tomatoes (sauce, paste, salsa, canned tomatoes) is more easily absorbed than fresh tomatoes. This fact, along with their popularity, makes tomatoes a leading nutritional source in the American diet.

#### For additional information:

California Tomato Growers Association, Inc. (916) 925-0225 www.ctga.org



## Processing Tomato Activity Sheet



- Label and color the top seven counties in California for processing tomato production.
- Make a collage from labels of various processed tomato products.
- Make a Venn diagram which compares processing tomatoes ٠ to fresh market tomatoes.
- Find out why a tomato is scientifically a fruit but is also known ٠ as a vegetable.
- Create a class cookbook which includes favorite student recipes using a tomato product.
- Research the Spanish exploration movement of the 1500s. What other "treasures" came from the New World?
- Locate your nearest tomato processor. Where do the tomatoes they process come from?

#### Fantastic Facts

- 1. California leads the nation in processing tomato production.
- 2. Processing tomatoes are harvested by machines.
- 3. Processing tomatoes have thicker skins than fresh market tomatoes so they can be mechanically harvested and successfully transported.
- 4. There are 2,750 different varieties of tomatoes.
- 5. Tomatoes were once thought to be poisonous.
- 6. Processing tomatoes are rich in vitamin A, vitamin C, potassium, folic acid, beta-carotene, iron, B vitamins, and fiber.
- 7. The first tomatoes originated in the South American Andes and were berries the size of cherries.

#### Lesson Plan: pH Perfection

Introduction: When food is preserved, the microorganisms causing food spoilage are destroyed or slowed down. This is done by using extreme temperatures, changing the moisture level, or altering the acidity of the foods. The temperature of canning is extremely important for safety reasons. Foods with a pH higher than 4.6 must be canned at 240°F or greater. Foods that are more acidic, having pH measurements less than 4.6, may be preserved at 212°F. This difference in temperature can affect food taste and cost.

Objective: Students will conduct an experiment to determine the ideal temperature for canning tomatoes.

California Standards: NGSS: 5-PS1-3, MS-PS1-4

Materials: Lemon, pear, carrot and tomato juice, litmus paper which shows varying pHs, six paper cups or test tubes, forceps.

#### Procedure:

1. Discuss reasons and ways people preserve food. Talk about the importance of acidity and heat in canning.

- 2. Explain what pH is and how scientists determine the pH of a substance. Talk about the indicator litmus and how it will be used.
- 3. Pour an equal amount of each substance to be tested into a cup or test tube.
- 4. Using the forceps, have the students dip one piece of litmus into one substance and record its pH. Repeat this procedure for each juice.
- 5. Discuss which foods could be preserved at the lower temperature and which need to be canned at the higher temperature. Where do tomatoes fall in this test?
- 6. What could be done to the foods to change their pHs? When do you think scientists should check the pH of the item to be canned?



| Certeer: Truck Driver  | Chris Eck, Core-Mark, West Sacramento, CA<br>What is the training for truck driving?<br>Training requires classes through the<br>Department of Transportation or a private<br>company to get your Class A license.<br>What do you haul? I haul many products.<br>Some examples are tomatoes, milk, candy,<br>and lemons.<br>What are some facts about truck driving?<br>My truck gets between 4-6 miles per gallon<br>depending on the weight of the freight.<br>I can drive 11 hours per day but need 10<br>hours of downtime between shifts, J can | drive 60 hours per week. If you see a truck<br>pulled off the freeway, they may be taking a | required preak.<br>What is a tip you have for us about truck             | <b>drivers?</b> Always give truck drivers time, we can't always see you and don't stop fast! | Contract for best flavor, tomatoes                                       |
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| metoes He<br>metoes Ev | n the US<br>processed<br>products<br>m California.<br>a also leads the<br>the production<br>sing tomatoes!<br>The tomato is the world's<br>most popular fruit. Why<br>most popular fruit. Why<br>most popular fruit. Why<br>is a tomato a fruit? To a<br>tist, tomatoes are fruits<br>e seeds in them. So cucumbers, pu<br>idered fruits. Vegetables are any p<br>tir roots (carrots, beets), stems (aspa<br>a chef, a tomato would be considered<br>used in cooking.  | <b>essed</b> tomatoes have to get from Ca<br>but in Sacramento, California, and h           | table, calculate the following:<br>any miles is it round trip to deliver | ad? Please fill in the table.<br>ng will it take you to get to each                          | ng the route if you are traveling at 2 Round to the nearest hour fill in |

2,833 1,138 845 926 799 New Orleans-**Kansas** City-New Orleans Sacramento **Kansas** City Brooklyn-Chicago Brooklyn Chicago-Sedona-Totals 60 mph? Round to the nearest hour, fill in If your truck gets 5 mpg in diesel, how Total all of your columns: mileage, hours many gallons of diesel will you use? Round to the nearest tenths place, fill in the table. • Using an average diesel cost of \$3.25 per gallon, how much will you spend on your driven, gallons used, and \$ spent on diesel

the table.

should be eaten at room

temperature.

you to go round trip (return to Sacramento)? You can only drive 11 hours per day and only 60 hours per week.

• CHALLENGE: How many days will it take

trip in diesel? Fill in the table.

Answers: 1.7,974 miles; 2.9 hrs., 15 hrs., 14 hrs., 14 hrs., 14 hrs., 13 hrs., 47 hrs. 3.1,594.8 gallons; 4. \$5,183.10, 5. Mileage: 7974 miles; Hours: 132 hours; 15 hrs., 13 hrs., 13 hrs., 15 hrs., 13 hrs., 47 hrs. 3.1,594.8 gallons; 4. \$5,183.10, 5. Mileage: 7974 miles; Hours: 132 hours; 1394.8 gallons; 15 hrs., 14 hrs., 15 hrs., 15 hrs., 14 hrs., 14

CA Standards: ELA CCSS: RI.3-5.1, 7, W.3-5.2, RI.6-8.1, RI.6.7, W.6-8.2, W.6-8.9, RH.6-8.7; Math CCSS; 5.NBT.5, 6.NS.3, 7.NS.2 Sources: http://learnaboutag.org/resources/fact/tomatoes.pdf; www.transportation.gov ©2016 California Foundation for Agriculture in the Classroom. All Rights Reserved.

tomatoes explaining why you think they are so popular. Use evidence from this page and

moting tomatoes that includes reasons why people should buy them. Use information Extension: Why do you think tomatoes from this page.

**Tomatoes Everywhere** 

Create a newspaper advertisement pro-

do some of your own research.

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tomato harvester was developed in California in the

1950s.

Sources: California Tomato Growers Association (www.ctga.org)

**Standards**: Science - Grade 3: 5b; Grade 7: 5f; ELA - Grade 3; Reading Informational Text (RTI) 2; Writing 1b, Speaking and Listening (SL)1; Grade 4: RTC2, Writing 1b, SL 1; Grade 5: RTC2, Writing 1b, SL 1; Grade 5: NL 2; Streade 5: NL 2; Stre

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**The Ketchup Dream** 

By Sofia Magni 2022 Imagine this... Story Writing Contest Winner 5th Grade, Sacred Heart School Serra Trovao, Teacher Stanislaus County Illustrated by Inderkum High School

I've been told the same story about my family's history since the day I was born. I listen to the story, but my family doesn't listen to me. Grandpa always says the same things. He tells me all about where my relatives came from, where they've been, and how we got where we are now. I don't care about those places. The place I want to be is on a big, juicy hamburger.

This is how Grandpa tells his story.

"Listen up, Melody. You need to be proud of your tomato heritage. You know, the first tomatoes can be traced to the South American Andes Mountains where they grew wild as cherry-sized berries."

"I know, Grandpa. You've told me before," I say, rolling my eyes.

"Just keep listening, Melody. This is important. We know that padres following the Spanish conquistadors most likely sent the first tomato seeds to Spain in the early 1500s. We gained little attention in Spain, but soon traveled to Italy–a country that embraced our tomato ancestors and developed numerous recipes which are still popular today."

Melody interrupts, "Now that's interesting. I like the part about food. Do you know anything else about our family history as food?" I ask with a great smile.

"I know that by the mid-sixteenth century, tomatoes made their return to America via English colonists but did not become an important part of the American diet until after World War I." "I want to be part of someone's diet today, Grandpa. I want to be the ketchup inside someone's hamburger. Can you help me with that?"

"I want to do what makes you happy, my dear, so I will try to help," Grandpa says.

"I can't believe it, Grandpa. Will you actually help?"

"Of course! I will do anything for you," Grandpa says.

I feel as if I am on cloud nine. My grandpa is actually listening to the words that are coming out of my mouth.

"Okay, my dear. I have a plan. We need to get you harvested, onto a truck, and delivered to a processing plant," Grandpa says.

"Okay, I'm ready," I say, cheerfully.

"I am ready too. I will do this with you, Melody," Grandpa says.

"Just imagine Grandpa, how amazing it will be if we get in the same bottle. We could be on the same hamburger together!"

Grandpa replies, "There is no better time. Tomorrow is harvest day."

Melody asks, "What happens on harvest day, Grandpa?"

"Mechanical harvesters will move through the fields picking our entire tomato plant family and shaking us off the vine. Specially designed electronic sensors on the harvesters will sort the ripe, red tomatoes, that's us, from the vine and transfer them into a gondola pulled by a tractor following alongside. We will immediately be transported from the fields by trucks. The trucks will haul us to a nearby state-controlled grading station to be graded, then on to a tomato processing plant where we will be sorted, washed, and chopped," Grandpa explains.

"Wow, that's so cool. I can't wait!"

The next day everything happens just as Grandpa told me. Even though I have been cut into pieces, I'm excited because my dream is coming true. The entire process of ketchup manufacturing generally takes two to three hours, so Grandpa and I are going to be on a hamburger sooner than I thought!

Soon the next steps in the ketchup process begin. We are precooked in stainless steel vats. This preserves us and destroys bacteria. Next, we are pumped into pulping machines, which separate seeds, skins, and stems from the pulp. The pulp and juice are filtered through screens and processed further into ketchup.

The pulp is pumped into cooking tanks and heated to boiling. Precise amounts of sweeteners, vinegar, salt, spices, and flavorings are added to the tomato pulp. We are cooked for 30-45 minutes and circulated by rotating blades installed in the cookers. Once the cooking is complete, the ketchup mixture passes through a finishing machine, removing excess fiber and particles through screens, creating a smoother consistency.

After a few final steps, we are filled into ketchup bottles that have labels that remind people that ketchup is a good source of vitamins C and B. That's because of us tomatoes.

That's it. It happened. Grandpa and I are in the same ketchup bottle. A week later we are at a little girl's birthday party getting poured onto a big, juicy, hamburger. All my dreams have come true.

### Learn more about the "Imagine this.. Story Writing Contest" by visiting LearnAboutAg.org/imaginethis !