GRADES 4-5

From GOLD to GREEN

The Rise of California Agriculture

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California Foundation for Agriculture in the Classroom

From GOLD *to* GREEN:
The Rise of California Agriculture

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Vision: An appreciation of agriculture by all.
Mission: To increase the awareness and understanding of agriculture among California's educators and students.
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For Teachers

California Foundation for Agriculture in the Classroom offers a variety of resources designed to help students explore the many ways agriculture influences their everyday lives. The activities included in this guide align with both the Common Core and Next Generation Science Standards. For additional materials and information, please visit *www.learnaboutag.org.*

This unit is designed to complement our newest web-based tool, which uses geolocation services to help students explore local and statewide specialty crops. Discover more at *www.knowinwhatsgrowin.com*.

Acknowledgements

California Foundation for Agriculture in the Classroom is committed to enhancing public understanding of the agriculture industry. We collaborate with K-12 educators and community leaders to integrate agricultural examples into classroom curricula, empowering students to make informed decisions. Through these efforts, we aim to foster a deeper appreciation for agriculture and its vital role in our world.

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Unit Overview

This three-lesson unit, designed for fourth and fifth grade students, focuses on the period of time following the California gold rush, and how the events during this time greatly impacted the agriculture economy we enjoy in California today.

The lessons feature immersive learning experiences that help deepen student understanding, while also increasing student engagement. These lessons can be used separately or together and may be taught in any order.

Lesson 1: Forty-Niner to Farmer (1849-1875)

Students uncover how the California Gold Rush sparked a shift from mining to farming among the forty-niners. They'll explore how miners adapted to agriculture for a new way of life, linking their experiences to modern-day parallels with the San Francisco 49ers football team. Engaging in hands-on activities, students step into the shoes of 1850s California agriculture workers, identifying key crops and job skills through a gallery walk activity.

Lesson 2: Connecting A Growing California (1860-1900)

Students take a closer look at how regional railroads supported California's agricultural growth by connecting farms to markets within the state. Students will investigate key railway hubs, research the impact of refrigerated rail cars, and create dioramas showcasing regional agricultural products. Through group work, they will analyze how railroads influenced farming communities and economic expansion. The lesson includes historical research, hands-on model building, and presentations.

Lesson 3: Pioneers of the Golden State: Agricultural Changemakers (1900-1950)

Students will explore the contributions of key agricultural changemakers—scientists, labor leaders, and entrepreneurs—who introduced innovations in plant breeding, irrigation, and farm labor rights. Through an engaging mystery bag activity, students will uncover the identities of these historical figures and connect their ideas to advancements in agriculture. By conducting research and presenting their findings, students will gain a deeper understanding of the challenges and progress that shaped California's agricultural success.

Knowin' What's Growin' Website Extension Activities

As a unit recap, teachers will select preferred activities to engage students using the *Knowin' What's Growin'* website. From sketching botanical drawings to creating historical timelines and categorizing commodities, students deepen their understanding of California's agricultural heritage while exploring art, history, and biology in an interactive and fun manner.

California Standards

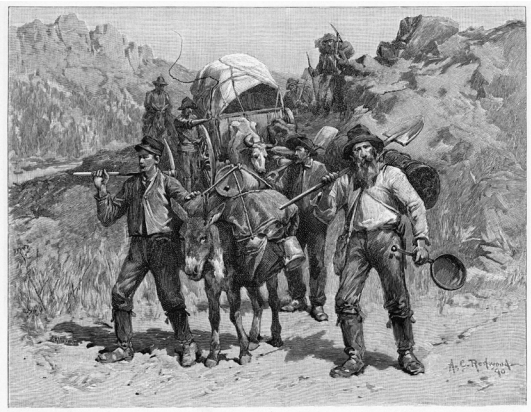
A concerted effort to improve student achievement in all areas has impacted education throughout California. California Foundation for Agriculture in the Classroom provides educators with numerous resource materials and lessons that can be used to teach and reinforce the current education standards for California Public Schools including Common Core and Next Generation Science Standards.

The lessons in this unit encourage students to think for themselves, ask questions, and acquire problem-solving skills while learning the specific content needed to better understand the world in which they live. This unit includes lessons that can be used to teach and reinforce several educational standards covered in fourth and fifth grades, with a special emphasis on history-social studies and English language arts.

Lesson 1:

FORTY-NINER to FARMER (1849-1875)

Total Lesson Time: 90 minutes
Teaching Time: 60 minutes
Assessment: 30 minutes



Background

The Gold Rush had a profound impact on California's agricultural landscape. Before 1848, the state's economic structure relied on self-sufficient missions and raising cattle on ranchos. However, with the diminishing allure of gold, many prospectors transitioned from mining to agriculture.

California's population surged from 26,000 in early 1849 to 380,000 in 1860, mirroring the influx of settlers seeking new opportunities. Initially disrupted by "gold fever," agricultural activities experienced a revival as exhausted miners sought stability, and out-of-state farmers returned to the land in order to feed a growing population.

Between 1848 and 1872, fruit cultivation, notably viticulture, witnessed substantial progress. While orchard fruit expansion was evident, progress was gradual due to the financial constraints and time required for orchards to bear fruit. By 1870, California boasted two million apple trees, along with significant numbers of peach, pear, almond, walnut, and olive trees.

As the realization dawned that gold alone could not sustain a robust economy, agriculture emerged as a vital pillar, shaping California's prosperity. The resilience of farmers and the cultivation of previously fallow land laid the foundation for California's diverse and thriving agricultural landscape.

OBJECTIVES

Students will...

1. Describe who the forty-niners were and explain how their skills and traits helped them transition into farming by comparing the characteristics of miners and athletes.
2. Investigate the specific crops and agricultural jobs that became prominent in California after the Gold Rush by completing the *Forty-Niner to Farmer Job Search* activity.
3. Apply their understanding of Gold Rush-era agricultural changes by writing a persuasive letter to a historical employer, using evidence from job descriptions to support their argument.

Standards

History-Social Science

- HSS 4.4: Students explain how California became an agricultural and industrial power, tracing the transformation of the California economy and its political and cultural development since the 1850s.
- HSS Analysis Skills H1.K-5.3: Students identify and interpret the multiple causes and effects of historical events.

Common Core ELA

- CCSS.ELA-LITERACY.W.4.1: Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
- CCSS.ELA-LITERACY.RI.4.1: Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.
- CCSS.ELA-LITERACY.W.5.1: Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

FORTY-NINER to FARMER Materials

- Scissors and glue (one per group, optional)
- Clipboards (one per student, optional)
- Commodity samples: carrots, olive oil, grapes, oranges (optional)
- Display: *Forty-Niner to Farmer Job Descriptions* (one for the class, pages 10-12)
- Handout: *Athlete or Miner? Activity Graphic Organizer* (one per group, pages 6-7)
- Handout: *Forty-Niner to Farmer Job Search* (one per student, pages 8-9)

Anticipatory Set: Athlete or Miner?

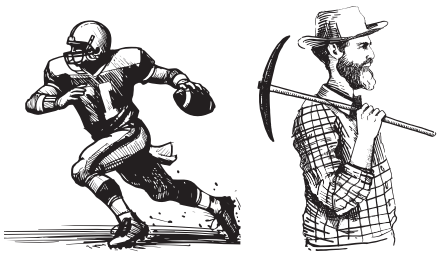
1. Introduce the activity by saying, "Have you heard of the football team called the San Francisco 49ers? The football team is named after a group of people called the 'forty-niners' who rushed to Northern California in 1849 to find gold during the Gold Rush. The team's mascot, Sourdough Sam, is a character inspired by those adventurous gold prospectors. Today, we're diving into an exciting activity that connects the past and present—exploring the traits of the miners of the California Gold Rush and the San Francisco 49ers football team."

2. Divide the class into small groups. Distribute or display the list of traits that could be related to miners, athletes, or both. Review and define any unfamiliar terminology.

3. Explain the activity: In your groups, read through the list of traits and discuss whether you think each trait applies to the miners, the athletes, or both. Share your thoughts and reasoning with your group. Optional: Cut out each trait and glue the trait onto the *Athlete or Miner? Activity Graphic Organizer*. Discuss the results of this activity as a class.

4. Transition into the lesson by saying, "Today we are going to learn more about the forty-niners of the Gold Rush era, and how they used their skills in other ways when gold became almost impossible to find."

Note to teachers: the purpose of this activity is to provide a review of the people behind the California Gold Rush. It is more important for students to choose and defend their choices than to identify characteristics as "right" or "wrong" answers.



ATHLETE or MINER? Traits

Fostered camaraderie
Showed perseverance
Relied on sports equipment
Used natural resources
Achieved financial success
Worked independently
Multilingual
Relied on basic tools
Formed a team
Brought unique skills
Faced discrimination
Sought success for themselves
Sought success for their team
Must be physically fit
Adventurous
Ambitious
Driven by wealth
Driven by fame
Adapted to new challenges
Engaged in trade and local economy
Wore hats for protection
Wore helmets for protection
Yelled "Eureka!"
Yelled "Touchdown!"

Activity: Forty-Niner to Farmer Job Search

1. Distribute the *Forty-Niner to Farmer Job Search* handout and explain that students will be exploring various commodities that gained prominence after the Gold Rush. Read the activity description together, and then allow students to move around the classroom, gathering information about different commodities and related jobs.

2. Around the room, place a copy of each *Forty-Niner to Farmer Job Description*. If possible, include a physical example of the agricultural product related to the job, for example: carrots, olive oil, grapes, and oranges. Allow students time to complete the handout and choose one role that interests them the most.

Assessment

1. Instruct students to write a persuasive letter to the employer of their chosen job, outlining their imagined skills, experiences, and qualities that make them suitable candidates. Encourage students to use evidence from the job descriptions to tailor their letters to the specific job and industry.

2. Review the standards for writing a persuasive text:

    - Clearly state their opinion (e.g., "I would be an excellent candidate for the position of _____.").
    - Provide evidence from the job description, using facts and details.
    - Use linking words and phrases (e.g., for instance, in order to, in addition).
    - End with a strong closing statement that reinforces their qualifications.

3. Review student letters and confirm students have understood the objectives of the lesson.

Cross-Curricular Connections

Nutrition

- Explore the Gold Rush miners' diets and the crops that thrived in post-Gold Rush California. Challenge students to enhance a typical miner's meal by incorporating post-Gold Rush crops. Students will creatively reimagine and illustrate their improved meal on a plate template, integrating historical research with current nutrition recommendations. (CA Health Education: Grade 4 7.3.N)

Math

- Extend learning by examining historical economics through a math-focused activity. Students will analyze grocery store prices during the Gold Rush era and compare them to wages offered in the provided job descriptions. This analysis allows students to explore the impact of scarcity on prices and reflect on how inflated costs affected farm workers' ability to afford basic necessities. (CC Math: 4.MD.A.2)

ATHLETE or MINER? Activity

Graphic Organizer

Directions: In your groups, cut out each trait and discuss whether it applies to miners, athletes, or both. Share your thoughts and reasoning with your group. Once you reach an agreement, glue the trait onto the provided graphic organizer.

ATHLETE TRAITS

MINER TRAITS

BOTH

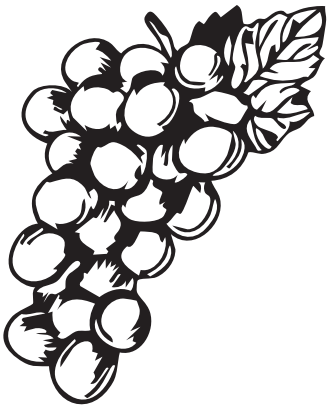
ATHLETE or MINER? Traits

Fostered camaraderie	Showed perseverance	Relied on sports equipment
Used natural resources	Achieved financial success	Worked independently
Multilingual	Relied on basic tools	Formed a team
Brought unique skills	Faced discrimination	Sought success for themselves
Sought success for their team	Must be physically fit	Adventurous
Ambitious	Driven by wealth	Driven by fame
Adapted to new challenges	Engaged in trade and local economy	Wore hats for protection
Wore helmets for protection	Yelled "Eureka!"	Yelled "Touchdown!"

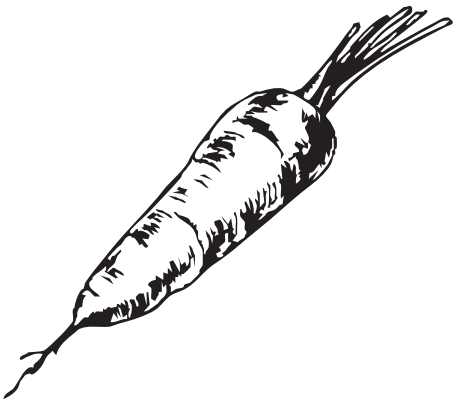
FORTY-NINER to FARMER Job Search

Before the Gold Rush, most of California's economy came from missions and cattle ranches. Then, in 1848, gold was discovered, and people rushed from all over the world to become miners. But gold soon became hard to find. Many miners needed a new way to make a living, so they turned to farming. Agriculture soon became a major part of California's growth and success.

Directions: Explore job postings for different crops and record notes about them below. Choose one that intrigues you, and craft a compelling letter to the manager, persuading them to hire you for the advertised position.

Crop	Notes
	**Job Title:**_____ **Skills required:**_____ _____ _____ _____ **Wage:**_____ **Location:**_____

Crop	Notes
	**Job Title:**_____ **Skills required:**_____ _____ _____ _____ **Wage:**_____ **Location:**_____

Crop	Notes
	**Job Title:** _____ **Skills required:** _____ _____ _____ _____ **Wage:** _____ **Location:** _____

Crop	Notes
	**Job Title:** _____ **Skills required:** _____ _____ _____ _____ **Wage:** _____ **Location:** _____

FORTY-NINER to FARMER
Job Descriptions

GRAPE HARVEST MANAGER NEEDED NEAR SAN FRANCISCO

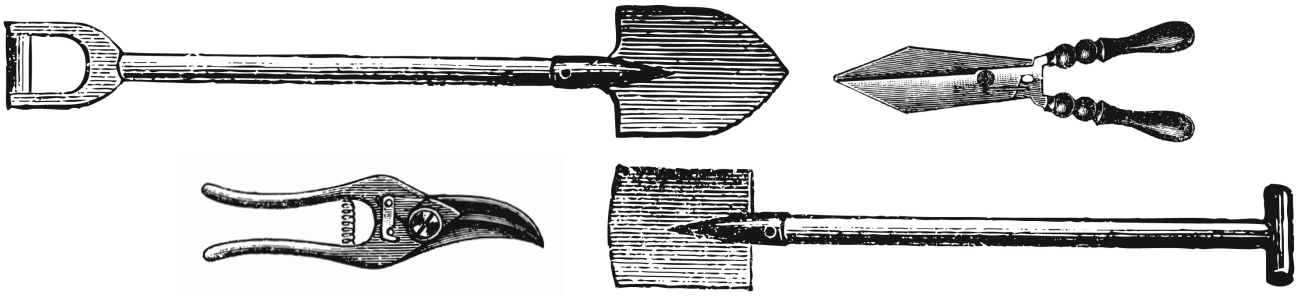
ATTENTION: Ambitious individuals with leadership skills needed to oversee the grape harvest in vineyards near San Francisco. Preference shall be given to those fluent in Chinese or with prior experience in managing Chinese workers in mining or construction sites.

Required Skills:

- Ability to supervise and coordinate all aspects of the grape harvest, including vineyard preparation, fruit picking, and transportation
- A strong manager of people, able to give directions to Chinese-speaking workers in their tasks
- Skilled in communication and maintaining a peaceful work environment among diverse labor teams
- Cares about doing a good job and makes sure others are doing their work correctly too
- Committed to upholding the reputation of our vineyard's produce

Compensation:

- Competitive wages offered, beginning at $3.00 per day, in addition to provided room and board.



ORANGE HARVESTERS NEEDED IN SOUTHERN CALIFORNIA

SEEKING: Hard-working people with quick hands and strong focus to help pick ripe oranges in the sunny orchards of Southern California. Join us in the quest to pluck, gather, and deliver the golden bounty of oranges upon markets far and wide.

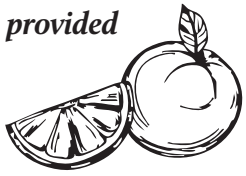
Required Skills:

- A gentle touch and keen eye for selecting ripe, juicy oranges
- Nimble hands to quickly pluck fruit from loaded branches
- Strength to labor under the warm Southern California sun
- Willingness to work in harmony within a team and follow orchard safety rules

Compensation:

- Wages offered by the bushel, ensuring that the fruits of your labor directly reflect your efforts. Rates starting at 25 cents per bushel, with the potential to earn more based on productivity.

No prior harvesting experience is necessary, as guidance will be provided to those who demonstrate diligence and dedication.



OLIVE OIL PROCESSING PLANT LABORER NEEDED IN NORTHERN CALIFORNIA

ATTENTION: Hardworking individuals with a passion for craftsmanship and a willingness to work among the olive groves of Northern California. Join us in the noble pursuit of producing the finest olive oil in the land.

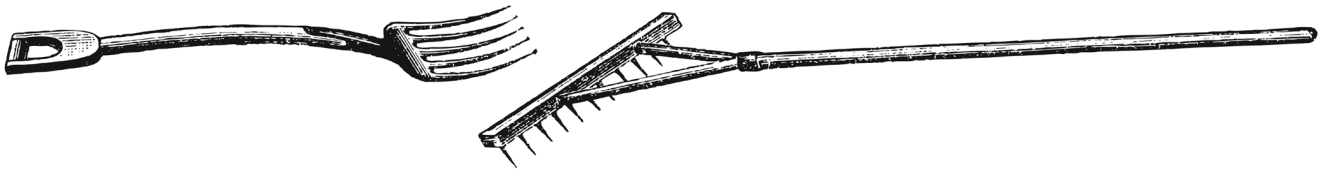
Required Skills:

- Skilled in harvesting and sorting olives with care and precision
- Ability to operate and maintain machinery and equipment
- Commitment to cleanliness and sanitation standards throughout the plant
- Collaboration with fellow workers to meet production goals and ensure product quality

Compensation:

- $0.50 to $1.00 per day based on experience and performance.

Experience in agricultural or food processing work is beneficial but not required. Training will be provided for job seekers eager to learn the art of olive oil production.



CARROT PACKING WAREHOUSE IN CALIFORNIA

WANTED: Enterprising individuals with a tough spirit and steady hand to join the ranks of the Golden Harvest Carrot Packing Warehouse in the sun-kissed lands of California. Seeking those with a keen eye for detail and a strong back to aid in the sorting, packing, and swift delivery of our prized carrots to markets both local and distant.

Required Skills:

- A sturdy constitution, accustomed to the rigors of labor
- Sharp eyes and skillful hands for the careful selection and packing of carrots
- Endurance to lift and move crates with ease and grace
- Willingness to follow instructions and maintain cleanliness in our busy warehouse

Compensation:

- Competitive wages offered, beginning at $1.50 per day, in addition to provided room and board.

While prior experience in agricultural or warehouse work is preferred, it is not an absolute requirement. Those with a hunger for honest work and a willingness to learn will find themselves welcome.

Lesson 2:

CONNECTING a GROWING CALIFORNIA (1860-1900)

Total Lesson Time: 2 hours and 45 minutes
Teaching Time: 30 minutes
Group Project: Three 45 minute sessions (one session for research, two for building the diorama)

Background

Regional railroads in California worked alongside the Transcontinental Railroad to help grow the state's agricultural economy. Extending from the Central Valley to the coast and beyond, these local rail networks connected fertile farmland to towns, ports, and the main rail lines, moving crops, goods, and people.

While the Transcontinental Railroad opened access to distant markets across the country, the regional railroads made it possible to collect and distribute agricultural products within California itself. They linked productive regions like the Central Valley to coastal cities and ports, enabling farmers to reach consumers statewide.

The introduction of refrigerated railcars in the late 19th century greatly increased the value of this entire rail network. With cold storage on wheels, perishable goods could now travel long distances without spoiling. Refrigerated railcars enabled farmers to focus on high-value crops, knowing their perishable produce could travel long distances and reach markets nationwide in good condition.

OBJECTIVES

Students will...

1. Explain the role of regional railroads in expanding California's agriculture industry by analyzing a historical timeline and map of California's railway development.
2. Investigate one of California's early rail systems by conducting group research using provided resources to learn about its development, routes, and role in agriculture.
3. Demonstrate their understanding of the relationship between railroads and agriculture by constructing a diorama of a regional railroad that includes major depots, crops grown, and the area's historical significance.

Standards

History-Social Science

- HSS 4.4: Students explain how California became an agricultural and industrial power, tracing the transformation of the California economy and its political and cultural development since the 1850s.
- HSS Analysis Skills CST.K-5.1: Students place key events and people of the historical era they are studying in a chronological sequence and within a spatial context; they interpret timelines.
- HSS Analysis Skills CST.K-5.5: Students judge the significance of the relative location of a place and analyze how relative advantages or disadvantages can change over time.

Common Core ELA

- CCSS.ELA-LITERACY.W.4.7: Conduct short research projects that build knowledge through investigation of different aspects of a topic
- CCSS.ELA-LITERACY.W.5.7: Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.

CONNECTING a GROWING CALIFORNIA *Materials*

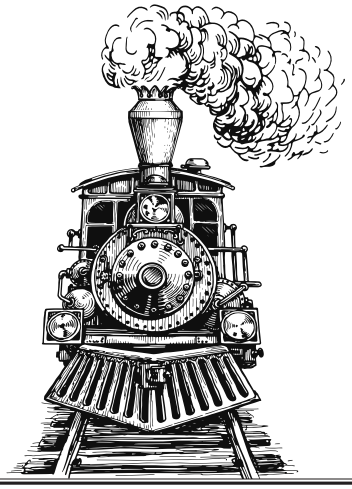
- Laptop or tablet for research
- A medium-sized box, one per group
- A variety of crafting materials, such as cardstock, string, tape, colored pencils, glue, paint, markers, chenille stems, fabric, clay, tissue paper, and content specific magazines
- A variety of natural materials, such as rocks, sticks, grass, leaves, etc.
- Small figures, animals, and toy train cars (optional)
- Display: *All Aboard! Railroad Expressions* (one for the class, page 15)
- Handout: *Timeline of California Railway Development* (one per student, page 18)
- Handout: *Railway Research* (one per student, pages 19-20)

Anticipatory Set: All Aboard!

Railroads had a significant impact on California's agricultural economy, impacts that we still experience today. In fact, many expressions we use today were inspired by the innovation of railroads.

1. Review *All Aboard! Railroad Expressions*. Display one expression at a time using a document projector. Have students guess each expression's meaning based on intuition or prior knowledge, either by raising hands or calling out answers. After a brief guessing period, reveal the correct meaning with an example sentence. Continue with additional expressions until engagement wanes.

2. Transition into the lesson by saying, "Now that we've explored these expressions, think about how they might reflect the challenges and successes of California's early railroad development. Let's dive deeper into those early years, when California's regional rail lines were established. Just as these expressions capture the highs and lows, the twists and turns of railroad journeys, so too did California's railroad system experience its own ups and downs, paving a path that shaped the state's agricultural economy."



All Aboard! Railroad Expressions

Off the rails	**On the right track**
Get on board	**Runaway train**
Train of thought	**Train wreck**
Derail someone	**Stay on track**
Tunnel vision	**Just the ticket**
Letting off steam	

Activity: Exploring California's Regional Railways

For this activity, students will be divided into small groups. Each group will research a regional railroad in California and create a diorama to represent it.

1. Distribute the *Timeline of California Railroad Development* handout to students. Review together, projecting a map of California to identify major cities and routes.

2. Teachers may assign or allow student groups to choose a railroad to research further. The *Railroad Research* template will guide their investigation. Encourage students to explore the websites provided to investigate the railroad influences in their assigned region and how they are still important today.

3. Explain to students that they will use their new knowledge to create a diorama illustrating their regional railroad. Students must include information about major depots and depict the agricultural bounty of their region.

4. Provide students with crafting materials such as cardboard boxes, cardstock, string, tape, colored pencils, glue, and content-specific magazines for their dioramas.

5. Each group will present their diorama to the class, explaining the key features of their assigned region or county, including the crops grown, the historical significance of the area, and the importance of railroads in its development.

Assessment

Assess groups based on their ability to effectively research their assigned region, accurately depict its agricultural history and railroad influences in the diorama, communicate their findings clearly during the presentation, and work collaboratively with their group members.

Cross-Curricular Connections

Science

- Students analyze a topographic map of California, identifying physical features like valleys, mountains, and coastlines. They discuss how these features impact agriculture, noting advantages like fertile valleys and access to water, as well as challenges such as mountainous terrain and desert valleys. (Science 4-ESS2-2)

Math

- Students explore distances between stops along California's regional railroads. They use maps or online resources to identify major railroad stations and calculate the distances between them. Using average train speeds from the 19th century, they create an arrivals and departures timetable for at least four locations along the railroad route. (CC Math: 4.MD.A.1)

English-Language Arts

- Make connections across subjects by encouraging students to read books about the agricultural products found in the communities they're researching. These books will help them understand the crops grown in those regions, their significance, and how they've shaped local economies and cultures. (CC ELA: RL.4.1)

All Aboard!
Railroad Expressions

Off the rails	**On the right track**
Get on board	**Runaway train**
Train of thought	**Train wreck**
Derail someone	**Stay on track**
Tunnel vision	**Just the ticket**

Letting off steam

Off the rails: This expression means to go out of control or become disorganized.
Example: "After the manager left, the whole team went off the rails."

On the right track: This expression means doing something correctly or making progress.
Example: "His grades have been improving; he's definitely on the right track."

Get on board: This expression means to join or support something.
Example: "We need everyone to get on board with the new class rules."

Runaway train: This term describes a situation or project that's gotten out of control or is moving too fast to manage.
Example: "Laughter spread through the classroom like a runaway train."

Train wreck: This expression describes a disastrous or chaotic situation.
Example: "The birthday party was a complete train wreck; the house will never be the same."

Train of thought: This refers to the sequence of connected ideas or thoughts.
Example: "I lost my train of thought when the door bell rang."

Derail someone: This means to cause someone to fail or deviate from their plans or goals.
Example: "The constant distractions derailed her from finishing the homework on time."

Stay on track: This means to remain focused and continue making progress towards a goal.
Example: "If we want to finish this project on time, we need to stay on track."

Tunnel vision: This expression refers to a narrow focus or concentration on a single thing, often to the exclusion of everything else.
Example: "He had tunnel vision when it came to basketball, ignoring his school work."

Just the ticket: This expression means exactly what is needed or desired for a particular situation. *Example: "A warm cup of tea was just the ticket to soothe her sore throat."*

Letting off steam: This expression refers to releasing pent-up emotions or frustrations in a constructive or therapeutic manner.
Example: "After a stressful day at school, he enjoyed letting off steam by going for a run."

TIMELINE OF CALIFORNIA RAILROAD DEVELOPMENT AND MAJOR CITIES ESTABLISHED ALONG THE ROUTE

The development of railroads in California played a crucial role in the establishment and growth of major cities along their routes, facilitating economic development, trade, and population migration throughout the state.

1856: SACRAMENTO VALLEY RAILROAD (Sacramento County) – The Sacramento Valley Railroad, the first railroad in California, is completed, connecting Sacramento to Folsom. The first run hauled ore, food, goods and passengers along 22.9 miles of track.

1862: THE SACRAMENTO, PLACER, AND NEVADA RAILROAD (Nevada and Placer Counties) – Built to connect the communities of Nevada City, Auburn, and Folsom. About 20 miles of track were completed before funds ran out. The railroad was abandoned in May 1864 because it couldn't compete with the Central Pacific Railroad.

1864: CENTRAL PACIFIC RAILROAD (Sacramento and Placer Counties) – After President Lincoln signed the Pacific Railroad Act on July 1, 1862, the Central Pacific Railroad was given authority to build tracks east from Sacramento. The first trains started running in 1864, and the track later became part of the transcontinental railroad.

1865: NAPA VALLEY RAILROAD (Napa County) – The Napa Valley Railroad is constructed, linking Napa to Vallejo and providing transportation for the expanding wine industry in the region.

1865: SOUTHERN PACIFIC RAILROAD (Many counties, including San Francisco, Fresno, Tulare, Kern, Orange, Los Angeles, Imperial, and Riverside) – The Southern Pacific Railroad was founded in December 1865 to build a transcontinental line from San Francisco to the Colorado River. Los Angeles leaders knew a railroad link was crucial for the city's growth and survival.

1869: WESTERN PACIFIC RAILROAD (Sacramento, San Joaquin, Alameda, and Santa Clara Counties) – The Western Pacific Railroad Company was formed in 1862 to connect San Jose with Sacramento, and construction began in San Jose in 1865. The 123-mile line was finished in September 1869.

1870: CALIFORNIA PACIFIC RAILROAD (Sacramento, Yolo, Solano, Contra Costa, and Alameda Counties) – Finished in 1870, the railroad created a shorter 90-mile route from Sacramento to San Francisco Bay than the Western Pacific line. A train ferry—the largest in the world—helped the train cross the Carquinez Strait several times each day.

1875: LOS ANGELES AND INDEPENDENCE RAILROAD (Los Angeles County) – The Los Angeles & Independence Railroad was created in January 1875 to connect Los Angeles to Santa Monica, with plans to extend to San Bernardino and the Owens Valley. Built mostly by Chinese laborers, the 16.7-mile track opened on October 17, 1875. Due to financial troubles, it never expanded beyond Los Angeles and Santa Monica.

Name: _____

★ Railroad Research ★

Name of Railroad: _____

Date Established: _____

Length: _____

Counties Traveled: _____

End Stations: _____ **AND** _____

Research Questions

What was the purpose of the railroad?

What crops likely grew in that region during the late 19th century?

What crops grow there today?

What historical landmarks are in the area?

What geographic features (e.g., rivers, mountains, valleys) did the railroad have to navigate through?

Does the railroad continue to serve its region, or has it been replaced by highways or other forms of transportation?

Recommended Websites for Railroad and Regional Agriculture Research

American Rails
american-rails.com

Britannica
britannica.com

California Historical Society
californiahistoricalsociety.org

Knowin' What's Growin'
knowinwhatsgrowin.com

Los Angeles Railroad Heritage Foundation
larhf.org

California State Railroad Museum
californiarailroad.museum/education/digital-exhibits

Rails West
railswest.com

Southern Pacific Historical and Technical Society
sphts.org

Tracking the History of California Agriculture
ca.stateaghistory.org

Diorama Creation Tips

A diorama is a 3D representation of a scene that you create using craft materials. It's a way to visually show a specific topic or event, helping others understand it better. Your diorama should tell the story of your assigned railroad.

- **Key Elements to Include:** Train tracks, depots, farms or industries, trains, rivers, mountains, key landmarks (e.g., famous towns, agriculture centers).
- **Materials for Diorama:** Use cardboard boxes for structure, colored paper for crops or buildings, string for rail tracks, and paint or colored pencils for terrain and details. Magazines can help with images of the region or specific industries.
- **Be Creative:** Show how the railroad helped the area grow in size and economy. Include things you would see along the train's route, like farms, stations, and landmarks.

Lesson 3:

PIONEERS of the GOLDEN STATE:

Agricultural Changemakers (1900-1950)

Total Lesson Time: 75+ minutes
Teaching Time: 30 minutes
Research: 45 minutes
Assessment: Time varies, depending on assessment method

Background

Between 1900 and 1950, California agriculture went through a massive transformation, shifting from small family farms to a booming industry that fed the nation. This change didn't happen on its own—it was driven by people with big ideas and the boldness to turn ideas into action. Scientists developed new plant varieties, farmers pioneered irrigation techniques, and labor leaders fought for fair working conditions. These changemakers came from all walks of life—Japanese and Mexican immigrants, Dust Bowl migrants, and entrepreneurs—each leaving a mark on California's agricultural landscape.

But progress wasn't always easy. Discrimination, economic hardships, and labor disputes shaped the lives of the workers who kept the fields running. Despite these challenges, people like Luther Burbank, Luisa Moreno, and George Shima helped revolutionize farming, from developing hardier crops to organizing farm workers for better conditions. Their impact is still felt today, as California remains one of the most productive agricultural regions in the world.

OBJECTIVES

Students will...

1. Identify key individuals who made significant contributions to California agriculture between 1900 and 1950 by participating in the *Mystery Bag Reveal* activity.
2. Research a selected agricultural changemaker by using reliable sources and recording important facts.
3. Demonstrate their understanding of their changemaker's impact on California agriculture by creating and presenting an oral, written, or visual report.

Standards

History-Social Science

- HSS 4.4: Students explain how California became an agricultural and industrial power, tracing the transformation of the California economy and its political and cultural development since the 1850s.
- HSS Analysis Skills CST.K-5.3: Students explain how the present is connected to the past, identifying both similarities and differences between the two, and how some things change over time and some things stay the same.
- HSS Analysis Skills H1.K-5.3: Students identify and interpret the multiple causes and effects of historical events.

Common Core ELA

- CCSS.ELA-Literacy.W.4.2: Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- CCSS.ELA-Literacy.W.4.7: Conduct short research projects that build knowledge through investigation of different aspects of a topic.
- CCSS.ELA-Literacy.SL.4.4: Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.
- CCSS.ELA-LITERACY.W.5.2: Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- CCSS.ELA-LITERACY.W.5.7: Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.
- CCSS.ELA-LITERACY.SL.5.4: Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

Anticipatory Set: Agriculture Innovations True or False

1. Introduce the activity by saying, "California agriculture has faced many challenges over the decades. But for every problem, there were innovators who found bold solutions, shaping the industry in ways that still matter today. Let's see how much you know about the challenges and innovations in California's agricultural past."

2. Present each *Agriculture Innovations True or False* statement one at a time. Have students respond by:
   - Holding up whiteboards with their answers;
   - Giving a thumbs-up for true and a thumbs-down for false; or
   - Using this prepared *Kahoot!* game for an interactive experience.

3. Transition into the lesson by saying, "Now, let's take a closer look at the people behind these incredible innovations—individuals who saw challenges in agriculture and responded with bold, creative solutions that helped shape California's farming history."

Kahoot! Game

AGRICULTURE INNOVATIONS TRUE OR FALSE

True or False: New machines helped farmers pick tomatoes so fast that it completely eliminated the need to pick them by hand.	**Answer: False!** Even though machines can pick some tomatoes quickly, they can be too rough for other varieties of tomatoes.
True or False: In the early 1900s, many California farmers didn't have ways to bring water to their fields, making it hard to grow crops in dry areas.	**Answer: True!** Without good irrigation systems, farming in dry places was difficult. Later, new ways to water fields helped farmers grow more crops.
True or False: The invention of the cotton gin in California helped farmers process cotton more quickly.	**Answer: True!** While the cotton gin was invented in the South, its use spread to California, where it helped farmers efficiently separate cotton fibers from seeds, increasing productivity.
True or False: In the early 1900s, most farms in California only used manual labor and simple tools like rakes and shovels.	**Answer: False!** By the early 1900s, tractors and other farming equipment had already started to revolutionize California agriculture, allowing farmers to work much faster and more efficiently.
True or False: Before the 1930s, olives were mostly sold in glass jars, which made them hard to store and transport.	**Answer: True!** Back then, olives were kept in glass jars. Today, many California grown olives are stored in cans.
True or False: California's potato farming boom happened after the invention of refrigerated train cars.	**Answer: False!** The California potato industry grew before refrigerated trains were common, thanks to new farming methods and transportation.
True or False: Before the 1920s, most fruit in California was moved by horse-drawn carts because there were no cars or trains.	**Answer: False!** By the 1920s, cars and trains were already used to transport fruit, making it easier to get produce to markets quickly.
True or False: By the early 1900s, cotton was an important crop in California, but it had to be picked by hand, which was hard work.	**Answer: True!** Cotton was important, but harvesting it was very labor-intensive. The invention of the cotton gin and mechanical harvesters helped solve this problem.
True or False: When tractors were first invented, they made farming slower because they weren't strong enough to pull heavy plows like horses did.	**Answer: False!** Even though early tractors took some time for farmers to learn, they soon proved to be stronger and more efficient than horses, helping farmers work faster and with less effort.

PIONEERS of the GOLDEN STATE: Materials

- Laptop or tablet for research
- Tote bag or other opaque bag
- Various items for mystery bag reveal, see below
- Small whiteboards (one per group, optional)
- Handout: *Agricultural Changemakers* (one per student, pages 24-25)
- Handout: *Agricultural Changemaker Research Notes* (one per student, pages 26-27)

Activity: Mystery Bag Reveal

1. Before the lesson, place an item to represent each agricultural changemaker in an opaque bag. Here are some suggestions:
    - **Luther Burbank:** Plum or small plant
    - **Francis C. Carr:** Small bottled water
    - **Wofford Benjamin Camp:** Cotton ball or piece of cotton fabric
    - **Luisa Moreno:** Mini protest sign or canned item
    - **Manuel T. Azevedo:** Plastic cow or dairy product
    - **Benjamin Holt:** Toy tractor or construction vehicle
    - **Freda Ehmann:** Canned black olives
    - **Agnes Fay Morgan:** Nutrition facts label
    - **George Shima:** Toy train or potato
2. Distribute the *Agricultural Changemakers* handout to the students and explain that student volunteers will take turns pulling an item from the mystery bag. The class will then work together to match the item to one of the featured changemakers. After identifying the person, students will draw a picture of the item in the appropriate place on their handout.
3. Once all the changemakers have been introduced, assign each student or student team an agricultural changemaker to research. Instruct them to use their electronic devices to explore credible online sources, gathering information about the individual's contributions, innovations, and lasting impact on agriculture. Students should record key details on the *Agricultural Changemaker Research Notes*.

4. To assess student learning, provide options for students to demonstrate their understanding: they can deliver a presentation, create a written report, or develop a visual project (such as an infographic or digital timeline) that showcases their changemaker's influence on the agricultural industry.
5. Extension Idea: After all students have shared their projects, create a collaborative class timeline that highlights each changemaker and their major contributions. This visual display can help students see the progression of agricultural innovation over time.

Cross-Curricular Connections

Science

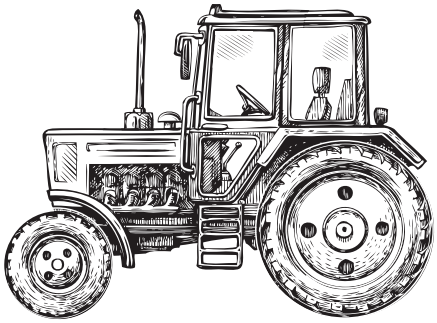
- Students plant heirloom and hybrid varieties of the same crop (e.g., tomatoes, corn, or beans) and compare their growth rates, resilience, and yield over time. Students collect data on plant height, growth rate, and yield, then create bar graphs or calculate averages to compare hybrid and heirloom performance. (NGSS: 4-LS1-1; CC Math: 4.MD.A.2, 5.MD.B.2)

Math

- Students research historical costs of farming equipment, such as early tractors or cotton gins. They compare these prices to modern-day equivalents, adjusting for inflation. Students can check out an online equipment auction for real life application of these concepts. (CC Math: 4.OA.A.2, 5.NBT.B.7)

Innovations in Agriculture

- Students compare historical agricultural advancements, such as the invention of mechanized farm equipment, to modern precision farming techniques. Using the 22nd edition of *What's Growin' On?*, they examine how today's technology, like GPS-guided tractors and automated irrigation systems, continues to shape California agriculture. (CC ELA: RI.4.7, RI.5.7)



AGRICULTURAL CHANGEMAKERS

1

LUTHER BURBANK (1849–1926)

Luther Burbank developed new fruits, vegetables, and flowers by crossbreeding plants. He introduced over 800 new plant varieties, including the Santa Rosa plum and the Russet Burbank potato. *Source: lutherburbank.org*

2

FRANCIS C. CARR (1875–1944)

Francis C. Carr was a lawyer who helped bring water to California's fields. He worked to get support for big water projects, like Shasta Dam, to make sure there was enough water for agriculture in California. *Source: watereducation.org*

3

WOFFORD BENJAMIN CAMP (1894–1986)

Wofford B. Camp helped bring cotton farming to California during World War I. He worked with the USDA to grow a special kind of cotton called Pima cotton, which was used to make fabric for airplane wings during the war. *Source: knowitall.org*

4

LUISA MORENO (1906–1992)

Luisa Moreno organized migrant workers in agriculture and other industries to push for better pay and working conditions. She focused on improving labor rights for workers in processing plants, including canneries and clothing factories. *Source: smithsonianmag.org*

5

MANUEL T. AZEVEDO (1870–1943)

Manuel T. Azevedo helped grow California's dairy industry. Moving from Portugal, he started the American Dairy Company in San José in 1916. His dairy provided milk to the community, and he helped workers start their own dairies. *Source: portuguesemuseum.org*

6

BENJAMIN HOLT (1849–1920)

Benjamin Holt was an inventor who made farming easier. In 1904, he built a tractor with tracks instead of wheels, so it wouldn't get stuck in soft soil. His tractors helped farmers work more efficiently and grow more crops. *Source: invent.org*

7

FREDA EHMANN (1839–1932)

Freda Ehmann developed a successful method for curing ripe olives, helping create California's commercial olive industry. Her business became one of the first large-scale producers of black olives in the U.S. *Source: buttecountyhistory.org*

8

AGNES FAY MORGAN (1884–1968)

Agnes Fay Morgan was a scientist who helped people understand how food is good for our health. She worked at the University of California, where she studied vitamins and how food changes when it is cooked or stored. *Source: chemistry.berkeley.edu*

9

GEORGE SHIMA (1864–1926)

George Shima developed large-scale potato farming techniques and became California's top potato producer, despite facing discrimination. Thanks to the intercontinental railroad, his farms supplied potatoes across the country. *Source: nps.gov*

Name: _____

AGRICULTURAL CHANGEMAKER RESEARCH NOTES

Use the sources provided to get started, and explore other trustworthy websites too, like .edu or .gov sites. If a site is hard to read, try using an AI tool to simplify the text.

Name of Changemaker: _____

Date of Birth: _____

Place of Birth: _____

Job or Role in Agriculture: _____

Why do you think this person is important?

_____

_____

_____

What problems did they solve?

_____

_____

_____

Do we still benefit from their ideas or inventions today? Explain.

_____

_____

_____

Name: _____

AGRICULTURAL CHANGEMAKER RESEARCH NOTES

What is the most interesting thing about their story?

_____

_____

_____

If you could ask them one question, what would it be?

_____

_____

_____

BONUS ACTIVITY: Draw a picture of your agricultural changemaker or one of their inventions!

knowin' what's growin'

Website Extension Activities

This unit complements California Foundation for Agriculture in the Classroom's newest web-based tool, which uses geolocation services to help students explore local and statewide specialty crops. The extension activities below provide engaging ways to use the website, fostering meaningful connections between students and the crops growing around them.

1. Botanical Drawings & Scientific Classification

Art & Science

Students create detailed botanical drawings of different California grown crops, labeling their parts, and including their botanical (scientific) names. Invite collaboration within the class to discover and classify plants based on genus, species, and family. Encourage students to compare similarities and differences among crops, discussing traits such as leaf shape, flower structure, and root systems. Consider displaying the completed drawings in a classroom gallery or compiling them into a field guide of California crops.

2. Crop Mapping

Geography & Science

In this activity, students will explore the connection between geography and agriculture by mapping where different crops are grown across California. Using the website's data on top crops, students will locate where a selected crop is grown on a county map of California. Then, they'll dig into the reasons why—considering climate, soil type, and seasonal availability. Using what they have learned, students will create color-coded maps to show which crops thrive in different regions and the key factors that make those areas ideal for farming.

3. Historical Timelines of Agriculture

History & Social Studies

Using the "Roots Uncovered" section of each crop page, students can research key historical events related to California's agricultural commodities, such as the introduction of irrigation systems, the impact of the Gold Rush on farming, or the development of refrigerated transport. Students will use the information that they discover to create a digital timeline depicting key events in California's agricultural heritage.

4. Nutritional Benefits & Meal Planning

Health & Science

Students can use the "Nutrition Mission" section of each crop page to explore the nutritional profiles of different commodities. They'll research the benefits of key nutrients, determine how much of each nutrient is in a single serving, and calculate how many servings are needed to meet the recommended daily intake. Using this information, students can create well-balanced meal plans featuring California grown ingredients.

5. Recipe Scaling
Math & Culinary Arts

Using recipes from the website, students can practice scaling ingredient amounts for different serving sizes and converting between measurement units. Challenge them to adjust a recipe to serve the entire class, reinforcing real-world math skills. As a final project, students could collaborate on a class-designed cookbook or even prepare one of the recipes together in the classroom.

6. Seasonal Life Cycle Exploration
Science

Students will select a specific California grown commodity and research its life cycle using the website's seasonal photos and growing information. They will document how the crop changes throughout the year, from planting and growth to harvest and dormancy. Using their findings, students will create a life cycle wheel or an illustrated timeline to visually represent each stage.

7. Growing Structure Classification
Science

Categorizing California grown commodities by their growing structures, such as vines, trees, bushes, or underground crops, will help students understand plant classification and more easily identify crops in the field. Using the website's growing information and images, they will create a visual chart that groups crops based on how they grow.

8. Food Storage & Ripening Guide
Food Science & Design

Students will explore proper storage and ripening techniques for various California fruits, nuts, and vegetables by using the detailed information found at the bottom of each "About the Crop" page. After gathering their research, they will create an eye-catching and easy-to-read storage and ripening tip sheet, summarizing key points for quick reference. The tip sheet will then be attached to a magnet, making it a practical and convenient tool for kitchens at home.

9. Spoilage Science
Inquiry-Based Science and Food Safety

Encourage students to explore recommended storage and ripening techniques by designing their own experiments to test food preservation methods. They will develop a hypothesis, follow the scientific process, and make detailed observations on how different factors impact freshness. Students can also analyze the chemistry behind food spoilage, experimenting with variables like temperature, humidity, and packaging to determine the most effective ways to extend shelf life.

10. Agriculture Vocabulary Flipbook
English Language Arts

Students will create a flipbook to explore key vocabulary words from the website. Challenge them to choose at least five content-specific words they want to learn more about. Each page of the flipbook will feature a word, its definition, an original sentence using the word in a new context, and an illustration that represents its meaning. This hands-on activity reinforces vocabulary comprehension and helps students connect agricultural terminology to real-world applications.

11. Produce Promotion and Marketing
Art and English Language Arts

Students will choose a commodity from the website and research its key characteristics, nutritional benefits, and growing process. Using this information, they will develop a marketing plan that includes messaging strategies to promote the commodity and encourage consumption. The plan may feature slogans, advertisements, social media campaigns, or packaging designs. In group presentations, students will showcase their creativity by presenting their marketing plans and unique strategies for promoting the chosen commodity.

12. Website Scavenger Hunt

In this easily accessible activity, teachers can print and distribute the Knowin' What's Growin' scavenger hunt, which provides students with a clear list of tasks to complete as they explore the website. Designed to take approximately 30–40 minutes, the activity includes step-by-step instructions to guide students through the site while they learn about California specialty crops. A reproducible handout is included on the following page.

Learn About Ag®
California Foundation for Agriculture in the Classroom

Name: _____

knowin' what's growin'

This virtual scavenger hunt will help you explore and learn about specialty crops grown right here in California!

1. Sign Up and Create a Profile:

- Visit *knowinwhatsgrowin.com*, select "Sign In" and then "Sign Up" to create a profile following the prompts.
- After saving your profile, select "View Profile" and write your profile name here:

_____

2. Search for Your County:

- Return to the home screen and use the search bar to find your county.
- Write your county name here: _____

3. Crop Exploration:

- Select one of the top specialty crops grown in your county and write it here:

_____

- Learn about the crop by selecting "Learn More." Then go to "About the Crop" and select "Start." Read carefully to complete the details below.
  - *About the Crop: How is the crop harvested?*

    _____
  - *Nutrition Mission: What is a health benefit of this crop?*

    _____
  - *Roots Uncovered: What does the historical picture reveal?*

    _____
  - *Products: List one product made from this crop.*

    _____

MORE ON THE OTHER SIDE

4. Complete Each Crop:

- Learn about all three top crops in your county. Once completed, follow the prompts to start the quiz and earn a badge! Write your county name here:

_____

5. Search for a California Crop:

- Now the you've earned your first badge, return to the home screen and use the search bar to find a California crop.
- Write the crop here: _____

6. Crop Exploration:

- Learn about the crop. Go to "About the Crop" and select "Start." Read carefully to complete the details below.
  - *About the Crop: How is the crop harvested?*

    _____
  - *Nutrition Mission: What is a health benefit of this crop?*

    _____
  - *Roots Uncovered: What does the historical picture reveal?*

    _____
  - *Products: List one product made from this crop.*

    _____

Congratulations! You have completed the scavenger hunt!

As a special bonus, you can take part in a fun four-question survey to help us make our next adventure even better. If you're interested, you can find it at *knowinwhatsgrowin.com/survey*. Thank you for being awesome!

ADDITIONAL RESOURCES

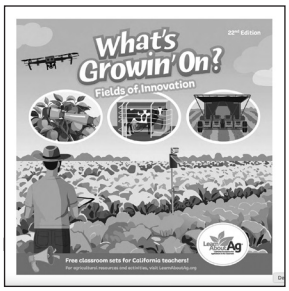
California Foundation for Agriculture in the Classroom offers a robust library of educational resources and curriculum that have been developed over the span of four decades. You can find all of our resources on *learnaboutag.org/resources*. The resources featured on this page may serve as excellent companion resources for this unit.

Tracking the History of California Agriculture Website

Transport your students through time at ***ca.stateaghistory.org***, an interactive website that brings the story of California agriculture to life. Aligned with social science and literacy standards, this engaging resource guides students through an interactive timeline featuring key events, primary source documents, and the stories of people who shaped agriculture across the Golden State. From early land use and the Gold Rush to Dust Bowl migration and post–World War II economic growth, students will explore key turning points in California history through the lens of agriculture.

What's Growin' On? Student Newspaper

Bring agriculture to life in your classroom with *What's Growin' On?* This 16-page educational newspaper is packed with current, accurate information about California's vibrant and diverse agricultural industry. Designed for grades 3–8, each edition features engaging readings, eye-catching graphics, fun trivia, and hands-on activities that appeal to a variety of learning styles.

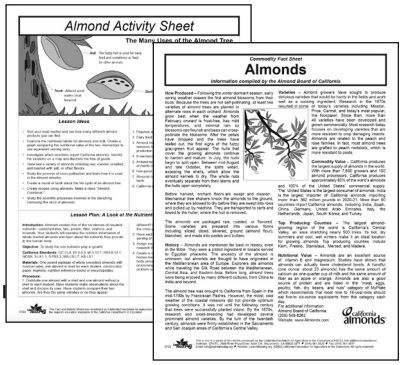


Journey 2050 Program

Take your students on a global adventure with Journey 2050. This free, ready-to-use program includes complete lesson plans and enrichment activities. The interactive simulation invites students to explore the future of agriculture and world food sustainability through engaging video challenges and real-world scenarios. As they make inquiry-based decisions, students see the ripple effects of their choices on society, the environment, and the economy.

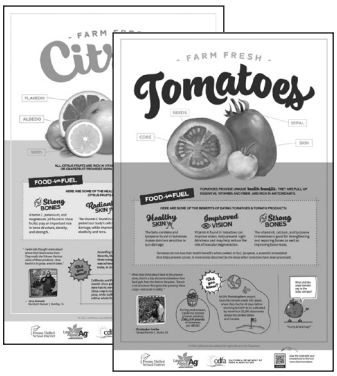
Agricultural Fact and Activity Sheets

California produces more than 400 different agricultural commodities, offering an incredible variety of fruits, vegetables, nuts, milk, nursery plants, flowers, fiber, and livestock. This growing set of 44 (and counting) commodity fact sheets helps readers understand how each commodity is produced, its history, economic value, and more. Each sheet also includes ideas for incorporating the information into lessons or activities, making them a great resource for teachers at any grade level looking to bring agriculture into the classroom.



Farm to School Resources

Ag in the Classroom has partnered with school districts across California to develop a suite of educational resources highlighting different California-grown fruits and vegetables. These farm-to-school materials are designed to bridge the gap between the classroom and the farm, inspiring curiosity, engaging young minds, and fostering a meaningful connection to where our food comes from.



Learn About Ag®
California Foundation for Agriculture in the Classroom

learnaboutag.org