

What's Growin' On?

California Agriculture



Teacher's Supplement



California Foundation for
Agriculture in the Classroom
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Introduction

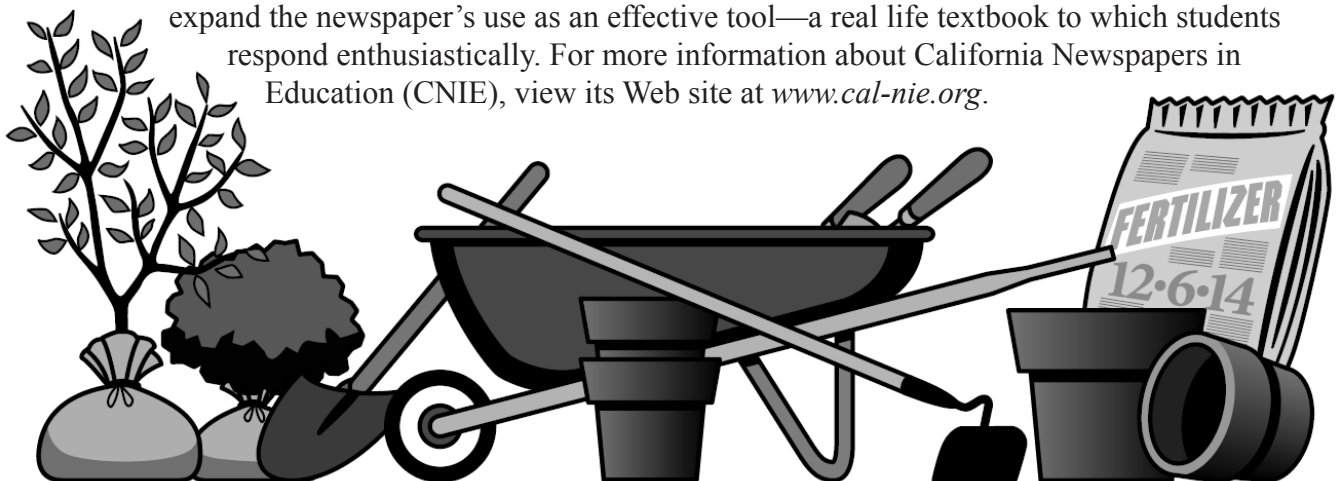
Welcome! Thank you for your interest in California Foundation for Agriculture in the Classroom's student activity newspaper, *What's Growin' On?* Planting Healthy Lives. Now in its 6th edition, *What's Growin' On?* has become recognized by teachers, schools and communities throughout the state for providing standards-based activities utilizing agricultural examples and California newspapers to reinforce academic concepts taught in third through eighth grades.

Developed and reviewed by educators, *What's Growin' On?* offers fun and engaging ways to teach problem-solving and critical thinking skills in the curricular areas of reading, writing, mathematics, science and social studies while familiarizing students with their local newspaper. This Teacher's Supplement contains the specific academic Content Standards for California Public Schools satisfied by activities within *What's Growin' On?* making it teacher-friendly and easy to use. Use the page numbers referenced to identify the corresponding activities within the student newspaper to help you keep your students informed and entertained.

The agriculturally-themed examples and activities are designed to motivate and inspire your students, allowing them to connect classroom lessons to real life experiences and circumstances. This is accomplished by weaving **agriculture** into teaching so that students can better relate to food they eat, clothes they wear, homes they live in, and open spaces they enjoy. Additionally, using the **newspaper** as an instructional tool as well as a continuing source of information in the classroom can help motivate students. They will discover the relevance of their classroom studies through current news stories, learning about events and gathering facts in the pages of the newspaper.

The **California Foundation for Agriculture in the Classroom (CFAITC)** 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 copies of the current edition of *What's Growin' On?* contact CFAITC via e-mail (cfaite@cfbf.com) or phone (800-700-AITC).

Newspapers in Education (NIE) is comprised of approximately 700 newspapers throughout the United States, 50 in California, that promote and aid in newspaper education. Whether creating or offering special curricula or programs, NIE touches the lives of students in countless ways. Local NIE programs reach out to their educational communities by providing teachers with training and resources that expand the newspaper's use as an effective tool—a real life textbook to which students respond enthusiastically. For more information about California Newspapers in Education (CNIE), view its Web site at www.cal-nie.org.



What's the Buzz?

(Page 3)

Name _____



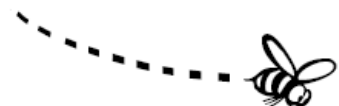
Honey Bee Facts

- Weight of average worker bee: **80 milligrams**
- Amount of nectar one honey sac can hold: **70 milligrams**
- Amount of pollen a worker can carry in the pollen baskets: **20 milligrams**
- Maximum number of eggs laid daily by a queen bee: **3,000 eggs**
- Average number of trips a worker bee makes outside the hive each day: **10 trips**
- Average speed of a worker bee in flight: **15 miles per hour**
- Average distance from hive a worker bee travels in one trip: **1½ miles**
- Average life of a worker bee born in the summer: **45 days**

Math Bee Activity

Use the facts above in the following math problems. Show your work.

1. What is the average total weight a worker bee carries in both nectar and pollen per trip?
Amount of nectar _____ + amount of pollen _____ = Total Weight _____
2. What is the maximum amount of nectar one worker bee could contribute to the colony in one day?
Amount of nectar carried in one trip _____ x number of trips in one day _____ = Total Nectar Weight _____
3. What is the ratio of the total weight of a full load of nectar and pollen carried by the worker bee in one trip as compared to her body weight?
4. If you could carry the same amount of weight in comparison to your body weight as a honey bee, how much weight could you carry?
5. Approximately how many weeks does a worker bee live in the summer?
6. About how long would it take a worker bee to fly to a garden 2 miles away from its hive?



Math Bee Activity (Continued)

7. If a worker bee completes 10 trips to a garden $\frac{3}{4}$ of a mile away, how many total miles has she flown? How much time has she spent flying in the day?
8. How many miles does the average worker bee travel in one day?
9. What is the maximum number of eggs a queen bee could lay in one week?
10. How many days would it take for a queen to lay 12,000 eggs?
11. What is the maximum number of eggs a queen bee could lay in one year?
12. If a hive has 48,000 bees, approximately how long would it take the queen to lay that many eggs?
13. If a hive has 60,000 bees and 1 percent of those bees are drones, how many drones are in the hive?
14. There are 1,000 milligrams in a gram, about 28 grams in an ounce, and 16 ounces in a pound. How many milligrams of pollen equals one pound?



15. A bee can beat her wings 183 times per second. How many times can she beat her wings in one minute?
16. If one worker bee can gather $\frac{1}{12}$ of a teaspoon of honey in her lifetime, how many bees would be necessary to gather 1 pint of honey?
17. If honey bees visit 2 million flowers to make one pound of honey, how many flowers would the bees need to visit to make one ton of honey?
18. During its first day a larva eats so much that its weight increases five and a half times. If the same thing happened to a student weighting 70 pounds today, how much would he or she weigh tomorrow?
19. If a worker bee can visit ten flowers a minute, and visits 600 flowers before returning to the hive, how long will she be out foraging?

**Source**

“The Honey Files: A Bee’s Life” Teaching Guide, produced by the National Honey Board, 2001.

Standards: *English-Language Arts* Grade 3 Reading 2.3, 2.6 • Grade 4 Reading 2.2 • *Math* Grade 3 NS 1.1, 1.2, 2.1 • Grade 4 NS 1.1, 1.2, 1.5, 1.6, 2.1, 3.0 • Grade 5 NS 1.2, 2.1, 2.2 • Grade 6 NS 2.1

Artists, Writers & Shutterbugs!

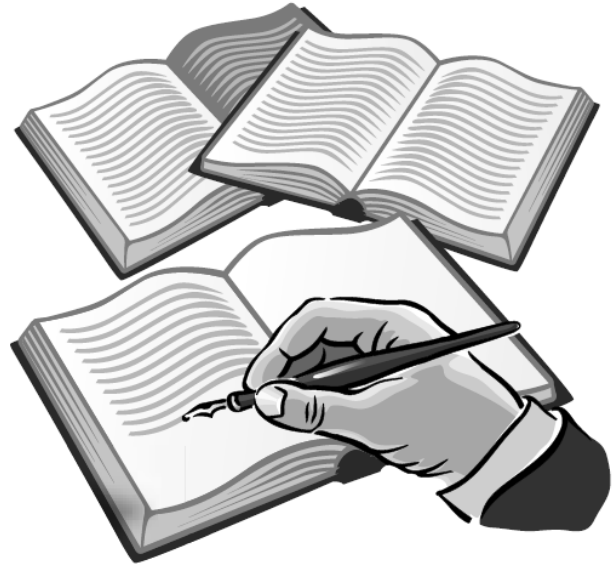
(Page 4)

Agriculture is everywhere you look! It is in the green grass of your neighborhood park, in the forests, and in the fruit stands along the side of the road. These natural surroundings have inspired many great artists, writers and photographers.

Activity

Writing: Have your students work in small groups to write rhyming couplets based on an agricultural theme. Remind students that the last word in each line they write must rhyme. Then, have them combine their couplets to make a poem. Write the poems on chart paper and have students read them aloud together.

Challenge: Ask students to create story-length poems that follow the guidelines described above for rhyming couplets. Students can illustrate their poems and then bind them together to make a class poetry book. Have students create covers for their books and place them in the classroom library.



Example

Up on a hill I saw a tree.
And on a branch there was a bee.

I don't know if the bee saw me.
I think he was watching TV.

Standards: *English-Language Arts* **Grade 3** Reading 2.3, 2.6, Writing 1.1, 2.1, Listening and Speaking 1.4 • **Grade 4** Reading 1.2, Writing 1.1, 1.2, 1.3, 1.5, 1.7, 2.1, 2.2, Listening and Speaking 1.7 • **Grade 5** Writing 1.1, 1.3, Listening and Speaking 1.4 • **Grade 6** Writing 1.1, 1.2, 1.3, Listening and Speaking 1.4 • **Grade 7** Writing 2.1, Listening and Speaking 1.4 • **Grade 8** Writing 2.1, Listening and Speaking 1.4

Corn is A-"Maize"-ing!

(Page 6)

Name _____

The most abundant variety of corn grown in the United States is dent corn. In California, dent corn is planted each spring and is often double cropped—with a second planting occurring in the summer. Seeds are planted approximately two inches deep either into moist, flat ground that is formed into seedbeds after the seed germinates, or into pre-formed seedbeds that are irrigated until germination occurs.

The corn plant has a stalk, and “ears” of corn grow where the leaves join the stalk. An ear consists of a corn cob covered with rows of kernels (800 kernels on average). Each kernel is a seed that can grow into a new plant. Leaves, called husks, protect each ear.

A tassel (the male plant-part) at the top of a cornstalk contains hundreds of small flowers that produce pollen, which is distributed by wind and gravity to the thread-like silks of the ears. The silks are connected to the female part of the plant. Each silk will carry pollen to a spot on a developing ear and produce a kernel.

Stalks can grow from seven to 12 feet tall. Corn is harvested with a combine from August through September. The combine strips the husks and removes the kernels from each ear.

Activity - What's My Line?

Below you will find some important events in the history of corn. Draw a line to match the dates with the correct event to form an accurate timeline.

William James Beal produced the first experimental corn hybrid in a laboratory.

Corn yields and quality improve through crossbreeding and hybridization. Crops are developed that contain built-in protection against insect pests, disease-causing organisms and harsh environmental conditions.

Hybrid corn is commercialized by Henry Wallace in the 1920s. Growing hybrid corn eliminated the need to save seeds because the increased yields outweighed the increased costs of annual seed purchases. By 1945 hybrid corn accounted for 78% of U.S. grown corn.

< 5,000 B.C.

5,000 B.C. - 1500 A.D.

Early 1800s

1870-1890

1900s-1920s

1933

Present day

When Europeans started to settle along the eastern coast of North America, two races (varieties) of corn dominated in this region—the Northern Flints and the Southern Dents. Settlers cross-pollinated these two races and created the Corn Belt Dents, the ancestor of nearly all the corn hybrids in the U.S.

Plant breeders can precisely select single genes that produce desired traits, such as insect resistance and herbicide tolerance.

Early farmers domesticated wild plants by saving the seeds from the best plants and planting them as next year's crops. This is the earliest form of genetic modification.

Native Americans improved on corn farming by selectively sowing seeds from plants with preferred characteristics for the next year's crop. Settlers from Europe begin breeding corn.

Standards: English Language Arts Grade 3 Reading 2.3, 2.6 • Grade 4 Reading 2.2 • Grade 5 Reading 2.1, 2.2 • Grade 6 Reading 2.4
History Grade 3 Continuity and Change 3.1 • Grade 4 California: A Changing State 4.1 # 5 • Grade 6 Historical and Social Sciences/
Chronological and Spatial Thinking 1, 2 • Grades 7-8 Historical and Social Sciences/Chronological and Spatial Thinking 1, 2

California's Top Commodities

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Name _____

Activity

Circle the words in the word find box from the list below. Words may be forward, backward or diagonal.

R	E	B	M	I	T	T	S	M	X	A	N	S	S	E
M	I	R	S	A	B	E	F	T	L	J	U	O	N	Y
Z	U	C	U	E	O	R	L	M	H	M	R	I	O	G
H	K	J	E	T	G	G	O	N	L	C	S	H	M	Y
A	Y	U	A	N	L	N	R	C	J	Y	E	C	E	K
Y	B	M	T	C	D	U	A	A	C	L	R	A	L	C
Y	O	J	T	S	V	P	C	R	P	O	Y	T	S	A
T	E	C	U	T	T	E	L	I	O	E	L	S	T	T
S	E	I	R	R	E	B	W	A	R	T	S	I	U	T
C	H	I	C	K	E	N	S	K	C	O	E	P	N	L
M	I	L	K	C	A	R	R	O	T	S	L	A	L	E
Y	F	Q	I	K	X	P	T	U	P	H	S	F	A	Y
G	H	O	B	K	V	T	I	O	V	W	G	Y	W	M
R	R	H	C	D	O	Q	R	Q	T	O	L	C	T	P
N	Q	E	Q	N	Y	C	Z	N	O	K	B	Y	Q	L

ALMONDS
BROCCOLI
CARROTS
CATTLE
CHICKENS
COTTON
CROPS

FLORICULTURE
GRAPES
HAY
LEMONS
LETTUCE
MILK
NURSERY

ORANGES
PISTACHIOS
RICE
STRAWBERRIES
TIMBER
TOMATOES
WALNUTS

Standards: *English-Language Arts* Grade 3 Reading 2.6, 2.7 • Grade 4 Reading 2.2

Dollars and "Sense"

(Page 7)

Name _____

Small-scale Farm

Like all business-owners, producers of agricultural products practice good financial skills to successfully run their businesses. One of the most important aspects of good financial sense is budgeting. Perform the following activity to better understand the importance of a good budget, a critical first step in a business' financial plan.

Activity

Mr. Potter makes \$50 a week selling olives from his small-scale farm. He spends \$3 each week on bags, and \$15 each week on gas for his ATV to haul the fruit in from his orchard to the farmer's market. In addition, he pays his grandson \$5 each week to help bag the fruit. He would really like to purchase more olive trees to increase his fruit production. The trees cost \$45 each. He would like to buy six trees.

1. How much money does Mr. Potter spend each month in bags and gas?
2. How much does his grandson make every month?
3. After Mr. Potter pays his bagging, gas and grandson', how much more will he have to make in order to buy six new olive trees?

The Power of Credit

There are times when farmers and ranchers have to rely on purchasing equipment or supplies with credit. Buying on credit allows the producer to receive the goods now, but pay for them over a period of time. When purchasing something with credit, the business or banking institution charges interest fees that are attached to the amount borrowed.

Activity

Mr. Potter has used his credit card a lot lately. His credit limit is \$500, and he has a balance of \$350 already charged on the card. He may decide to charge three of the olive trees at \$45 each on his credit card. If he does, how much will the trees actually cost him if he is charged 18% interest?

Activity

Look through the newspaper and search for banking institution advertisements. Shop for the best interest rates offered for savings accounts and loans.

Standards: *English-Language Arts* Grade 3 Reading 2.3, 2.6 • Grade 4 Reading 2.2 • *Math* Grade 3 NS 1.1, 1.2, 2.1 AF 1.1, 1.2, MR 1.0, 1.1, 1.2, 2.0 • Grade 4 NS 1.1 AF 1.0, MR 1.0, 1.1, 1.2 • Grades 5-8 MR 1.0, 1.1, 1.2

Healthy Plants

(Pages 8-9)

Fertilizer labels have a standard format and always list three main numbers. The first number represents the percentage of nitrogen (N) in the particular fertilizer. The second number represents the percentage of phosphorus (P_2O_5), and the third number represents the percentage of potassium (K_2O) in the fertilizer. Students will examine fertilizer labels, research the nutrient needs for a particular crop, and then create a fertilizer label specifically geared for that particular crop.

Activity

1. Distribute sample fertilizer labels. In groups, have students examine the labels. As a class, create a template for a standard fertilizer package. Discuss what the three numbers mean on the front label.
2. Have each student select a crop for which they will find out its nutrient requirements. They may use encyclopedias, the Internet, a local agricultural commissioner's office, or information from the University of California Cooperative Extension.
3. Have students create fertilizer labels for their specific crops.
4. As a class, compare the fertilizer labels the students developed. Could one fertilizer be used for more than one commodity? Discuss what other factors might be considered when determining what fertilizer to purchase—price per unit, package size, soil type, climate, availability of composts and manures.
5. Invite an agronomist or fertilizer manufacturing representative to your class to discuss the uses and sales of fertilizers.



Standards: *English-Language Arts* **Grade 3** Reading 2.3, 2.6 • **Grade 4** Reading 2.2 • **Grade 5** Reading 2.1, 2.4 • **Grade 6** Literary Response and Analysis 3.1 • **Grade 7** Reading 2.1 • **Grade 8** Reading 2.1

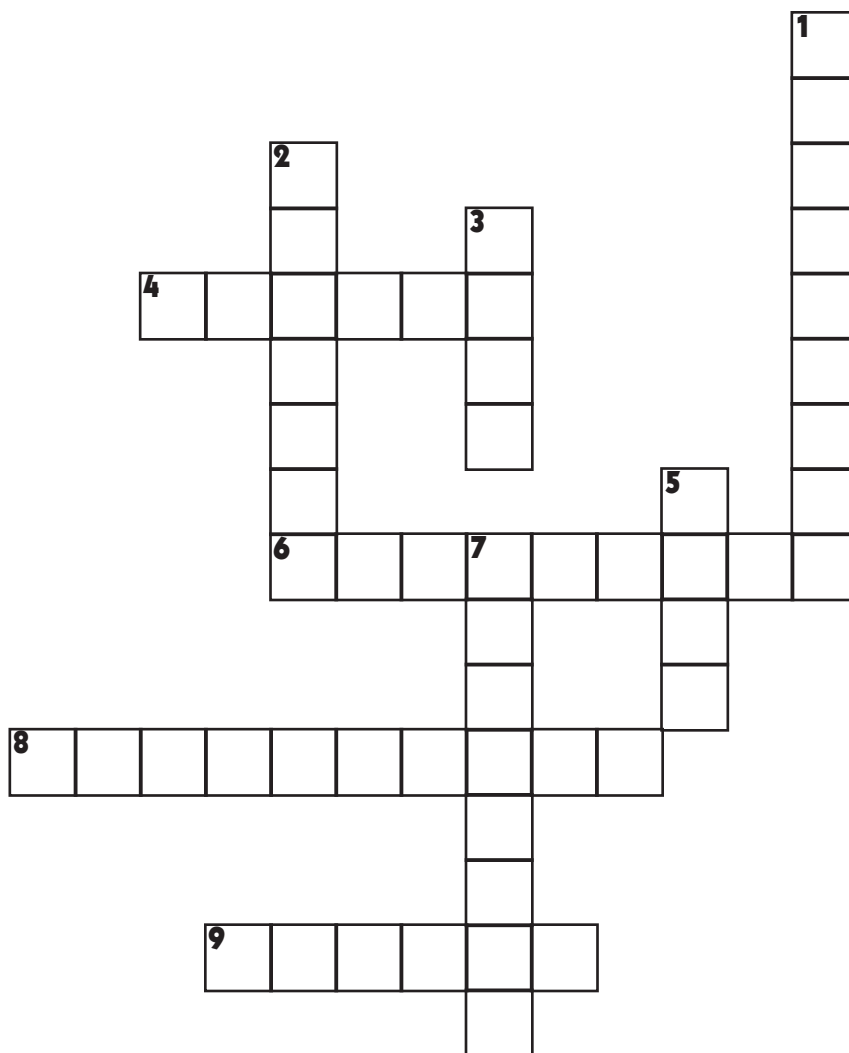
Health Hut

(Pages 8-9)

Name _____

Activity

Complete the puzzle.



Down

1. Helps plants resist pests and droughts
2. Keeps stems strong
3. Makes plants green
5. Keeps young plants strong
7. Helps plants grow quickly

Across

4. Prevents slow growth and weak plants
6. Helps plants capture energy from light
8. Stimulates root growth and helps plants make seeds
9. Prevents leaves from wilting

Standards: *English-Language Arts* Grade 3 Reading 2.6, 2.7 • *Grade 4* Reading 2.2 • *Math* Grade 3 Math Number Sense 1.1 • *Social Studies* Grade 3 3.5 #1

Lesson Objectives and Answer Keys

What's the Buzz? (page 2)

All students will calculate equations specific to bee facts.

Answers

1. 90 milligrams
2. 700 milligrams
3. $90 \div 80 = 1.125$
4. Student's weight $\times 1.125$
5. $45 \text{ days} \div 7 =$ approximately 6-12 weeks
6. 8 minutes
7. 1.5 miles roundtrip $\times 10$ trips = 15 miles; 1 hour
8. $1.5 \times 2 = 3$ miles roundtrip $\times 10$ trips = 30 miles
9. $3,000 \times 7 = 21,000$
10. $12,000 \div 3,000 = 4$ days
11. $3,000 \text{ eggs} \times 365 \text{ days} = 1,095,000$ eggs
12. $48,000 \div 3,000 = 16$ days
13. $60,000 \times .01 = 600$ drones
14. $1,000 \times 28 = 28,000$ milligrams in 1 ounce
 $28,000 \times 16 \text{ ounces} = 448,000$ milligrams in 1 pound
15. $183 \times 60 = 10,980$ beats in 1 minute
16. 12 bees to make 1 teaspoon $\times 3 = 36$ bees to make 1 tablespoon of honey
 $36 \times 16 = 576$ bees to make 1 cup of honey
 $576 \times 2 = 1,152$ bees to make 1 pint of honey
17. $2,000,000 \times 2,000 = 4,000,000,000$ flowers visited to make 1 ton of honey
18. $70 \times 5\frac{1}{2} = 385$ pounds
19. $600 / 10 = 60$ minutes or 1 hours

Source

"The Honey Files: A Bee's Life" Teaching Guide, produced by the National Honey Board, 2001.

Artists, Writers & Shutterbugs! (page 5)

All students will construct a rhyming poem related to agriculture.

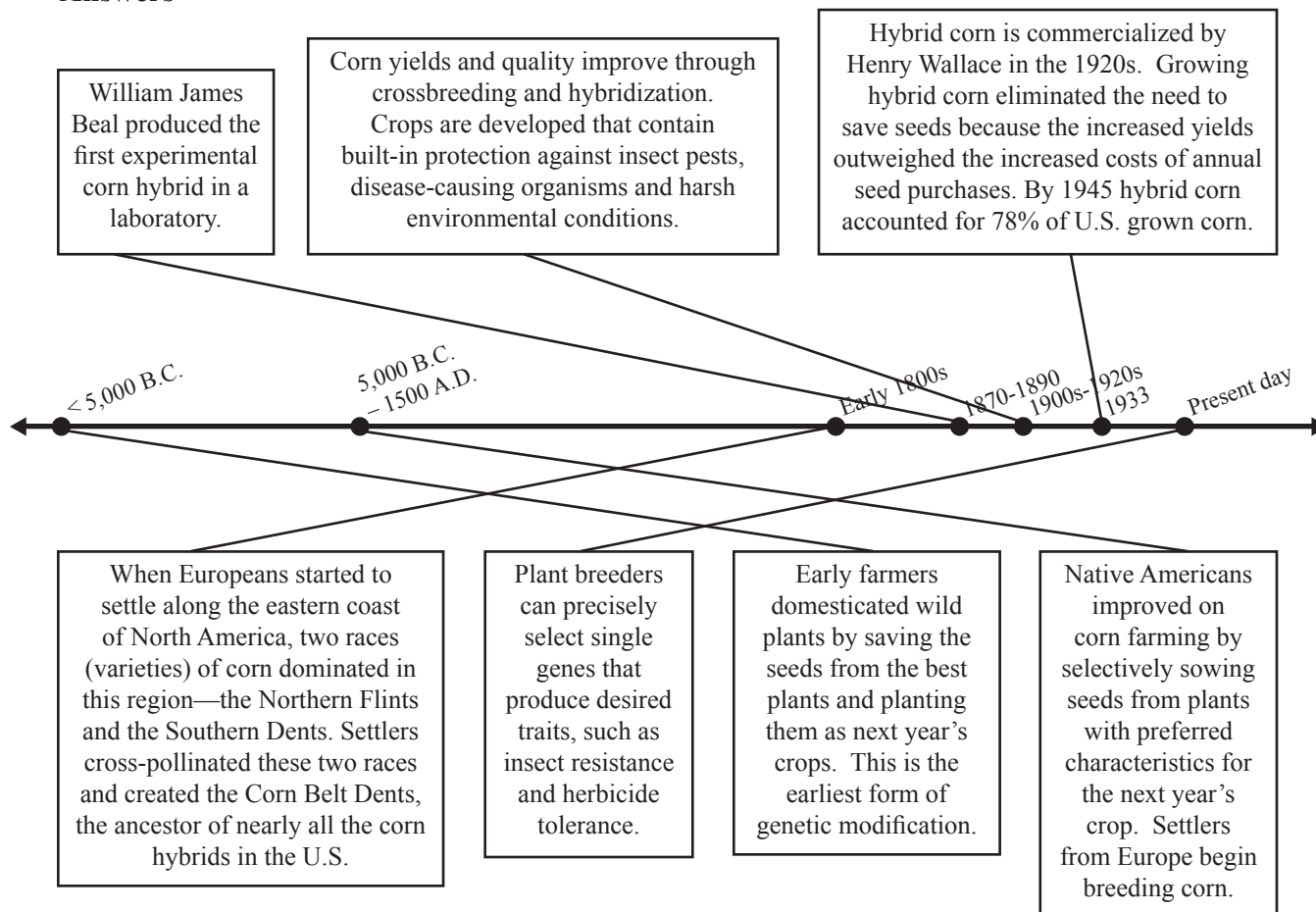
Answers

Responses will vary.

Corn is A-"Maize"-ing! (page 6)

All students will read factual information and create a chronological timeline.

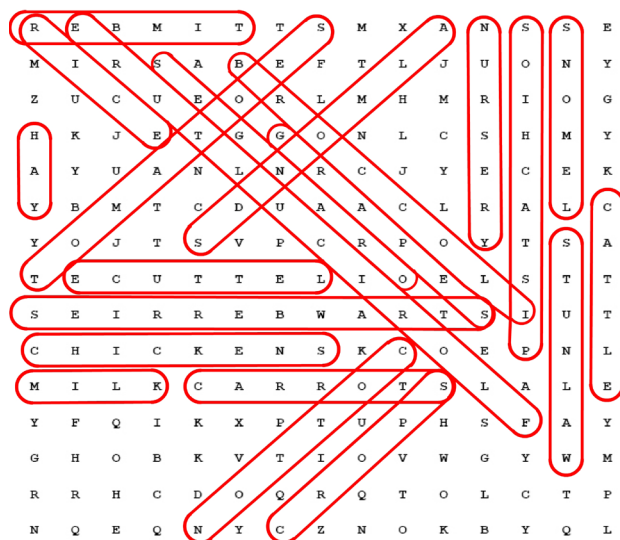
Answers



California's Top Commodities (page 7)

All students will recall words related to agriculture.

Answers



Dollars and "Sense" (page 8)

Small-scale Farm

All students will calculate expenses for running a hobby farm.

Answers

1. \$72
2. \$20
3. $\$200 - \$72 = \$128 - \$20 = \$108$
 $\$45 \times 6 = \270
 $\$270 - \$108 = \$162$
Mr. Potter needs \$162 more to buy his trees.

The Power of Credit

All students will research and discover interest rates.

Answers

$\$45 \times 3 = \135
 $\$135 \times 18\% = \24.30
 $\$135 + \$24.30 = \$159.30$
The trees will cost \$159.30 with interest.

Healthy Plants (page 9)

All students will examine and analyze information, then illustrate what they discover by utilizing clear and coherent writing strategies and drawing.

Answers

Responses will vary.

Health Hut (page 10)

All students will recall words related to natural fertilizers.

Answers

