

**FY2006
Specialty Crop Block Grant Program
Final Report – Agreement #12-25-G-0532**

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Background

As provided for by the Specialty Crops Competitiveness Act of 2004, the United States Department of Agriculture (USDA), through the Agricultural Marketing Service (AMS), awarded Specialty Crop Block Grant Program funding during FY06 in the amount of \$116,139.35 to the Colorado Department of Agriculture (CDA). CDA allocated these funds to six projects which fell into three broad functional program areas – research, education, and market development and promotion. All projects supported CDA’s over-arching goal of increasing the competitiveness of Colorado’s specialty crops. The projects included:

Research

- Variety Trials for High Value Organic Vegetable Crops

Education

- Colorado Specialty Crops Reader and Ag Institute
- Youth Urban Gardens and Farmers Markets

Market Development and Promotion

- Colorado Proud
- Colorado Pavilion
- Rocky Ford Cantaloupe

For the most part, the projects achieved their stated goals – some producing excellent results and others, generating “lessons learned” that can be utilized to enhance the effectiveness of follow-on projects. Among the most notable of the successes was the launch of the State’s first-ever Colorado Pavilion at the 2008 Product Marketing Association Fresh Summit Expo. The Pavilion helped to increase Colorado participation at the Expo and resulted in participating companies booking sales of nearly \$4 million during the Expo.

CDA also effectively utilized the specialty crop block grant funds allocated to Colorado to leverage both public and private investment. In total, for every dollar of grant funds invested, approximately six dollars of cash and in-kind contributions were invested by the organizations to successfully implement the projects.

All final project reports are available from CDA.

Overview of Approved Projects

Title: Variety Trials for High Value Organic Vegetable Crops

Overview:

Variety trials for high value organic vegetable crops were conducted in cooperation with Colorado State University (CSU) in the summer of 2007. Research also included assessing production methods to extend production seasons and the feasibility of mitigating insect vectored diseases. The variety trials provided small-acreage producers, students, and extension personnel



with research information and training about the performance of more than twenty high-value crops raised under organic production management and in high tunnels. The inclusion of high tunnels provided for analysis of production methods to extend the marketing season, and also the feasibility of mitigating insect vectored diseases by means of insect exclusion. The trials placed a special focus on the evaluation of season extension and production methods for melon, tomato, spinach and brassicae salad mix.



Results:

Performance Measure	Goals	Actual Result
Number of crops and varieties field tested	To evaluate 300+ varieties covering 21 different crops	Field tests evaluated 330 varieties covering 21 crops
Communication of variety trial results and recommendations	To provide information to producers about the variety trials results and recommendations	Variety trial results and recommendations were presented through a Field Day event, various presentations, and were published online

Financial:

Amount Approved	Total Expenses	Matching Funds
\$18,000	\$18,000	\$18,422

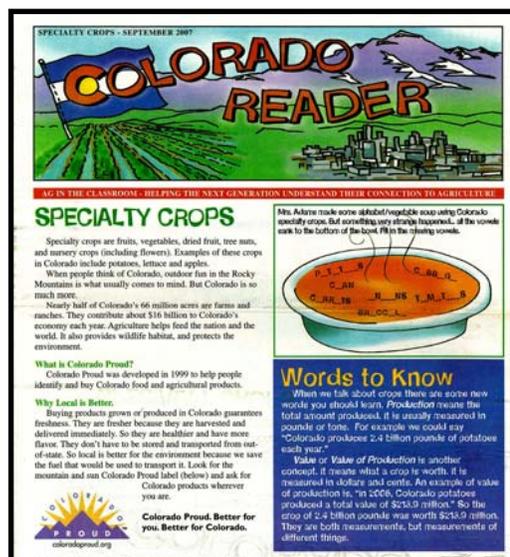
Final Analysis:

CDA recommends continuation of variety trial projects in cooperation with CSU as a means of assisting small acreage and other organic fruit and vegetable producers to identify varieties that will consistently produce well in Colorado. It is important that this type of research be ongoing as varieties that produce well one year may not produce well the next when exposed to different production conditions. There is also support from the Colorado Organic Producers Association to continue variety trial projects as the production results and varietal recommendations have been beneficial to organic fruit and vegetable producers across Colorado.

Title: Specialty Crops Reader and Food, Fiber & More Ag Institute

Overview:

The Colorado Foundation for Agriculture (CFA) developed and distributed a Colorado Specialty Crops Reader (see appendix) to Colorado schools in the fall of 2007 to promote a broader awareness of Colorado’s specialty crops among elementary students. Schools participating in the Colorado Reader program were also provided a guide to assist teachers with additional insights and ideas for demonstrations (see appendix). Educational components relating to Colorado specialty crops were also incorporated into CFA’s 2008 Food, Fiber & More Summer Ag Institute program. In total, CFA produced and distributed over 60,000 specialty crop Readers, with 34,000 being distributed to students in 1,360 elementary school classrooms across Colorado. Readers were also distributed at the National Western Stock Show, on National Ag Day at the State Capitol, and at other agricultural events.



Results:

Performance Measure	Goals	Actual Result
Reader reach and penetration	To reach 30,000 students in 1,200 classrooms across Colorado	Distributed a total of 60,000 Readers, reaching 34,000 students in 1,360 classrooms
Degree to which teachers understand Colorado’s specialty crop industry and are able to provide classroom instruction	To provide sufficient background information and resources to teachers enabling them to effectively instruct students about Colorado’s specialty crop industry	A survey of participating teachers reported that the Teachers Guide, Reader, and Ag Institute all enhanced teacher understanding of Colorado’s specialty crop industry

Financial:

Amount Approved	Total Expenses	Matching Funds
\$12,000	\$12,000	\$94,000

Final Analysis:

CDA believes the efforts undertaken by CFA were successful in reaching both teachers and students to promote a broader awareness of Colorado’s specialty crop industry, as well as providing information about the nutrition of fresh fruits and vegetables and the importance of buying local. But to have a lasting impact, engagement in the classroom needs to be ongoing and should, as appropriate, utilize more interactive applications.

Going forward, CDA recommends that CFA continue its Summer Ag Institute program aimed at educating teachers, as well as expand its Reader program to include specific issues for fruits, vegetables, and greenhouse/nursery products. CFA might also explore opportunities to create virtual farm experiences for students by working with targeted producers to develop “facebook” pages that might include information about the producer’s operation, short video clips showcasing various aspects of production, and a blog space allowing students to interact with the selected producers. Additionally, opportunities to create chef cooking demonstrations may serve to create a closer link between students and locally produced fruits and vegetables.

Title: Youth Urban Gardens & Farmers Markets

Overview:

By growing, marketing and selling fruits and vegetables, hundreds of participating youth from Fairmount, Fairview and Steele elementary schools in Denver learned about the nutritional benefits of fresh produce. These schools, located in economically disadvantaged areas of Denver, posed a unique opportunity to help participating students learn basic business skills, the importance of teamwork, and personal responsibility. Additionally, the farmers markets had a positive impact on community residents who visited the markets to



purchase locally grown fruits and vegetables, as well as participate in cooking demonstrations featuring products raised in the gardens. Youth involvement and community interest remains ongoing. The youth-run fruit and vegetable gardens and farmers markets were coordinated by Slow Food Denver (SFD) during the summer of 2007.



Results:

Performance Measure	Goals	Actual Result
Number of families purchasing fruits and vegetables each week at the farmers markets	For 75 – 100 families to purchase fruits and vegetables weekly	An average of 110 families purchased fruits and vegetables weekly
Youth awareness of the nutrition of fruits and vegetables, and increased consumption	To increase awareness among the participating youth of the nutritional value of fresh fruits and produce and to increase their consumption of fresh fruits and vegetables	Findings suggest that participating youth consumed produce items not previously tried, generally consumed more fresh fruits and produce, and learned about the health benefits of eating fresh produce ¹

- 1) SFD did not conduct a formal survey of the youth participating in the project; however, informal interviews were conducted by SFD staff and served as the basis for determining the actual result. Quotes included in the final project report attributed to both the youth and SFD staff serve to support the result.

“All of the participants agreed that they had tried new vegetables since working at the market.”

“... the market has allowed the neighborhood to buy vegetables rather than junk food.”

“... she wanted to set an example for her younger brothers ... one of the reasons she likes the market is because it encourages her and her family, as well as the community to eat healthy.”

Financial:

Amount Approved	Total Expenses	Matching Funds
\$7,500	\$7,500	\$45,071

Final Analysis:

Lessons learned early in life often shape the way individuals live their entire life. This is particularly true of eating a healthy and nutritious diet including fresh fruits and vegetables. CDA believes the project helped to positively shape the habits of hundreds of school-aged children that participated in caring for the gardens and operating the farmers markets. As with all educational projects, it is not enough to just do the project once – the effort needs to be ongoing. SFD, in cooperation with Denver Urban Gardens has worked to build a broad-based coalition to ensure that these programs are able to be continued, providing experiential training to participating youth within the Denver public school system. Perhaps one day, these programs may be replicated in other school districts and/or cities.

Title: Colorado Proud

Overview:

Colorado Proud is CDA's state branding program aimed at encouraging consumers to buy food and agricultural products grown, raised or processed in Colorado. Approximately 950 companies, many of which are suppliers and processors of fresh fruits and vegetables, were



participating in the Colorado Proud program when the advertising campaign was implemented in the summer of 2007. Project funds were utilized to extend the program's award-winning television advertising to include Colorado's Western Slope. This expanded Colorado Proud advertising from 48 to 53 of 64 counties within Colorado. The advertising, which prominently featured Colorado's bountiful array of fruits and vegetables, was timed to coincide with harvest beginning in July and running through September. With greater advertising reach, the advertising helped to enhance the awareness and ultimately, sales of Colorado specialty crops among Western Slope consumers, retailers and restaurant operators.

Based on viewer tracking surveys, household advertising reach and frequency for the Western Slope campaign was calculated at 96.7 percent and an average frequency of 11.9 times, creating an estimated 768,000 household impressions. Among the program's target audience, adults between 25-54, reach and frequency were calculated at 75 percent and an average of seven times, generating an estimated 330,000 target audience impressions. The goal had been to reach 93 percent of the program's target audience an average of nine times, generating some 600,000 impressions. Post-campaign analysis found that certain advertising slots, especially the early evening game-show and prime-time slots which accounted for about one-third of the entire media buy, simply did not perform as anticipated. Rationale for the poor performance of these advertising slots likely rests with the fact that potential viewers elected outdoor activities and enjoying the longer, warm evenings on Colorado's Western Slope rather than watching reruns. While viewer impressions generated is an important measure of output, CDA believes it is more important to consider outcome. When considering outcomes, the campaign contributed to increases in awareness/recognition of the Colorado Proud logo in a previously unreached market and the percent of consumers reporting purchases of Colorado products.

Findings from surveys conducted by Survey USA of consumers in the Denver metro area found that 61 percent of consumers are aware of the Colorado Proud program and that 82 percent of consumers had knowingly purchased at least some Colorado products in the prior 30 days – this was an eight point increase from the prior year. Although this survey was of consumers in the Denver metro area, CDA believes results for Western Slope consumers would be comparable (and perhaps, even

higher) as the Western Slope is the prime fruit growing region in Colorado and advertising reach and frequency for the Western Slope advertising was nearly identical to advertising placed in the Front Range.

Results:

Performance Measure	Goals	Actual Result
Number of counties included in advertising viewership region	Increase reach to be more state-wide	Advertising reached 53 of 64 counties – up from 48 counties in 2006
Impressions generated among the target audience by Western Slope advertising campaign	600,000 impressions	330,000 impressions
Consumers purchasing at least some Colorado products in the last 30 days	74%	82%

Financial:

Amount Approved	Total Expenses	Matching Funds
\$20,000	\$20,000	\$417,500

Final Analysis:

CDA’s Colorado Proud program plays an important role in encouraging consumers to buy food and ag products that are grown, raised or processed in Colorado. This helps to support Colorado’s fruit and vegetable producers and helps to position those producers to capitalize on current “buy local” trends. While advertising has proven an effective means of reaching consumers, Colorado Proud could be even more effective with a more fully integrated approach consisting of advertising, public relations, and retail marketing. CDA should continue to explore avenues to develop the program to be state-wide and more year-round. Retail marketing initiatives could help to facilitate the call-to-action message delivered by the advertising and public relations efforts.

Title: Colorado Pavilion

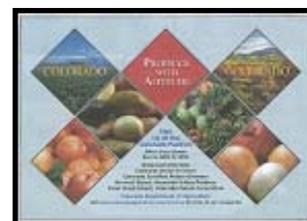
Overview:

CDA coordinated the development of a Colorado Pavilion at the Produce Marketing Association’s (PMA) 2008 Fresh Summit Exposition held in Orlando, FL. The Pavilion provided needed marketing support to produce growers by creating an expanded venue to promote their individual production and sales. Additionally, the Pavilion helped to create greater awareness among produce buyers of Colorado as a supplier of a



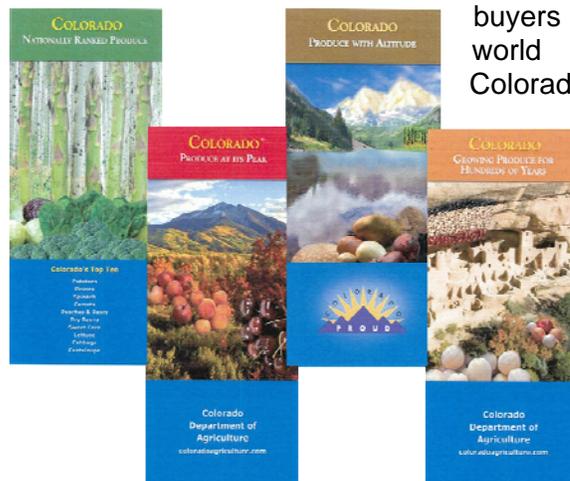
wide array of fruits and vegetables, encourage broader industry participation in the Expo and assist exhibiting companies to initiate and/or expand export sales by internationalizing their domestic trade show presence. CDA created various display elements (i.e., hanging signage, pull-up

banners, an exhibit display, and aisle signs) to help identify the Colorado Pavilion, as well as to impart key message tracks (see appendix). CDA also placed advertising in Produce News, a national produce trade publication, leading up to the Expo to generate greater awareness of the Pavilion and the participating industries and companies (see appendix).



The impact from development of the Colorado Pavilion extended primarily to the produce growers and industries exhibiting at the Expo – most notably, Colorado’s onion and potato industry associations, onion and potato shippers, and a vegetable seed company. On a broader level, Colorado’s specialty crop industry benefited from this project as produce

buyers from the U.S. and around the world became more aware of Colorado as a produce supplying state. PMA last reported that more than 17,000 produce and floral industry representatives from 70 countries attended the Expo, including 350 importers, wholesalers and retail buyers from Colorado’s top export markets.



Results:

Performance Measure	Goals	Actual Result
Industry participation	To increase Colorado participation in the Expo to two associations and four companies – one association and two companies exhibited at the Expo in 2007	Three associations and four companies participated in the Pavilion – one other Colorado company exhibited but was not part of the Pavilion
Sales	To develop new sales as a result of exhibiting at the Expo	Participants reported booking a total of \$3.7 million in sales during the Expo and projected additional sales of \$5 million to be completed in the next 12 months
Online hits from website promotion	To increase hits to the CDA online searchable food and ag directory	Information about registered attendees supplied by PMA did not include e-mail links so CDA was not able to effectively carry out the planned online promotion

Financial:

Amount Approved	Total Expenses	Matching Funds
\$50,021.53	\$50,021.53	\$104,450.00

Final Analysis:

Presence at PMA was so successful for Colorado's specialty crop industry that all participants plan to return for the 2009 Pavilion. While goals were exceeded, CDA should build on these successes for a stronger specialty crop presence and sales. Suggested improvements include increasing trade publication advertising, increasing industry association participation, enclosing meeting areas to make the spaces more useful and private, and increasing Pavilion visibility through brighter, more eye-catching hanging and aisle signage. Greater effort should also be placed on capturing contacts from hits to CDA's searchable directory and/or Produce Page and utilize such contacts to enhance promotional efforts on behalf of Colorado's produce industry.

Title: Rocky Ford Cantaloupe

Overview: Drawing upon the history and quality reputation of Rocky Ford cantaloupe, the Rocky Ford Melon Company (RFMC) sought to develop new out-of-state sales channels to complement existing commercial, road-side, and farmers’ market sales channels. RFMC launched a direct-to-consumer advertising campaign (World Famous Melons Delivered to Your Door) in the Chicago metro region utilizing newspaper advertising to pique the interest of consumers and direct them to the company’s web site where they could learn more about Rocky Ford cantaloupe and/or place online orders. Advertising was also run in the Denver market aimed at encouraging gift purchases for friends and relatives living out-of-state



(Not Everyone Can Live in Colorado). Together, these advertising campaigns were intended to be a first-step toward expanding distribution and sales of Rocky Ford cantaloupe across the nation and once again, making Rocky Ford cantaloupe a household name.

Results:

Performance Measure	Goals	Actual Result
Impressions generated by advertising	7.5 million impressions	16 million impressions
Distinctive website hits from the Chicago and Denver metro regions	1,000 hits	1,665 hits with 1,422 from Denver and 243 from Chicago
Online orders placed	300 individual orders and 1 truckload order	9 individual orders with 6 from Denver and 3 from Chicago
Value of sales	\$13,400	\$731

Financial:

Amount Approved	Total Expenses	Matching Funds
\$6,750	\$4,666	\$4,430

Final Analysis:

The project did not meet expectations for a number of reasons but all relate to miscalculations in execution of the advertising. RFMC, in an effort to generate greater reach, opted for a smaller, black and white ad in the Chicago and Denver newspapers. RFMC also opted to eliminate advertising planned for the business-oriented Crane’s Chicago. To be most effective, food advertising needs to be in color and CDA believes the small, black and white ads simply did not have stopping power, thus failing to attract the attention of consumers. CDA continues to believe the strategy has potential; however, any future advertising needs to be developed in color and with greater attention to choices of media. The unspent funds were re-allocated to CDA’s PMA project.

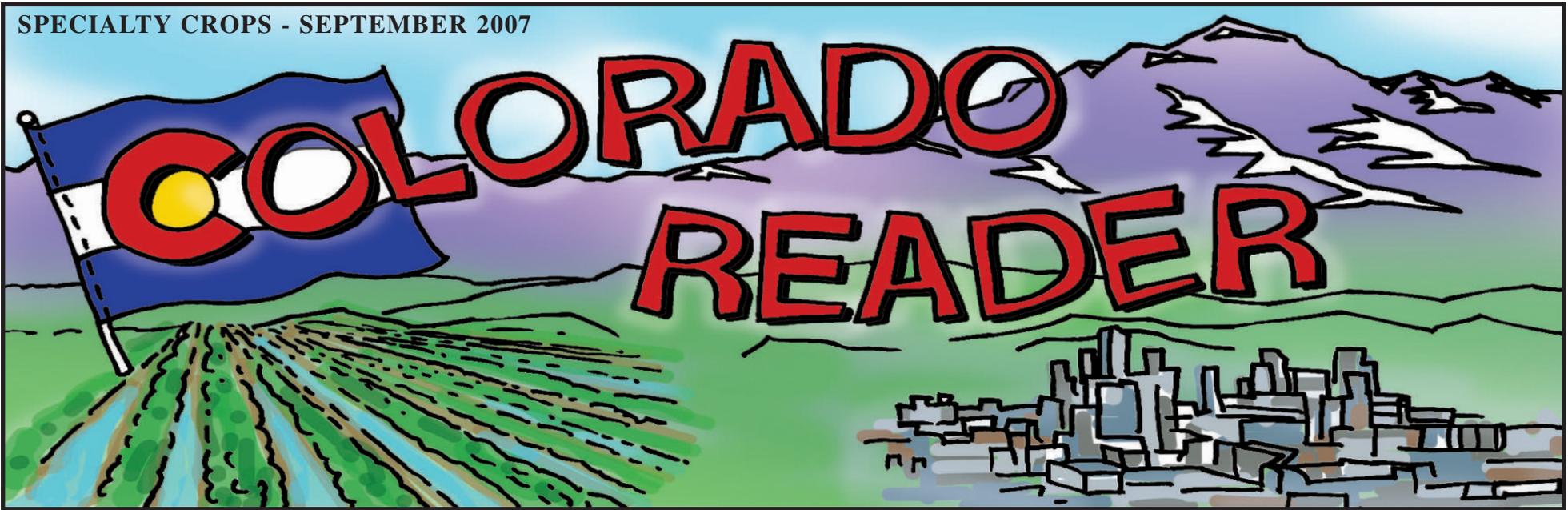
Financial Summary

	Amounts Initially Approved	Final Project Expenditures	Cash & In-Kind Contributions Reported
Variety Trials	\$18,000	\$18,000	\$18,442
Colorado Specialty Crops Reader	\$12,000	\$12,000	\$94,000
Youth Farmers Markets	\$7,500	\$7,500	\$45,071
Colorado Proud	\$20,000	\$20,000	\$417,500
Colorado Pavilion	\$41,727	\$50,021 ¹	\$104,450
Rocky Ford Cantaloupe	\$6,750	\$4,666	\$4,430
Administrative Fee	\$10,162	\$3,952	\$0
Total	\$116,139	\$116,139	\$683,893

Notes to Table: 1) Variations from the amounts approved were authorized by USDA/AMS.

* * * * *

Appendix



AG IN THE CLASSROOM - HELPING THE NEXT GENERATION UNDERSTAND THEIR CONNECTION TO AGRICULTURE

SPECIALTY CROPS

Specialty crops are fruits, vegetables, dried fruit, tree nuts, and nursery crops (including flowers). Examples of these crops in Colorado include potatoes, lettuce and apples.

When people think of Colorado, outdoor fun in the Rocky Mountains is what usually comes to mind. But Colorado is so much more.

Nearly half of Colorado's 66 million acres are farms and ranches. They contribute about \$16 billion to Colorado's economy each year. Agriculture helps feed the nation and the world. It also provides wildlife habitat, and protects the environment.

What is Colorado Proud?

Colorado Proud was developed in 1999 to help people identify and buy Colorado food and agricultural products.

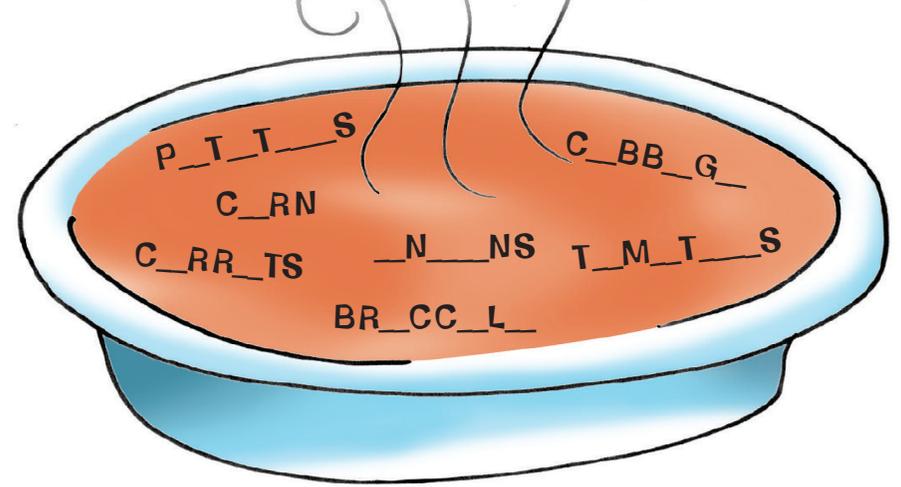
Why Local is Better.

Buying products grown or produced in Colorado guarantees freshness. They are fresher because they are harvested and delivered immediately. So they are healthier and have more flavor. They don't have to be stored and transported from out-of-state. So local is better for the environment because we save the fuel that would be used to transport it. Look for the mountain and sun Colorado Proud label (below) and ask for Colorado products wherever you are.



Colorado Proud. Better for you. Better for Colorado.

Mrs. Adams made some alphabet/vegetable soup using Colorado specialty crops. But something very strange happened... all the vowels sank to the bottom of the bowl. Fill in the missing vowels.



Words to Know

When we talk about crops there are some new words you should learn. **Production** means the total amount produced. It is usually measured in pounds or tons. For example we could say "Colorado produces 2.4 billion pounds of potatoes each year."

Value or Value of Production is another concept. It means what a crop is worth. It is measured in dollars and cents. An example of value of production is, "In 2005, Colorado potatoes produced a total value of \$213.9 million." So the crop of 2.4 billion pounds was worth \$213.9 million. They are both measurements, but measurements of different things.

Potatoes

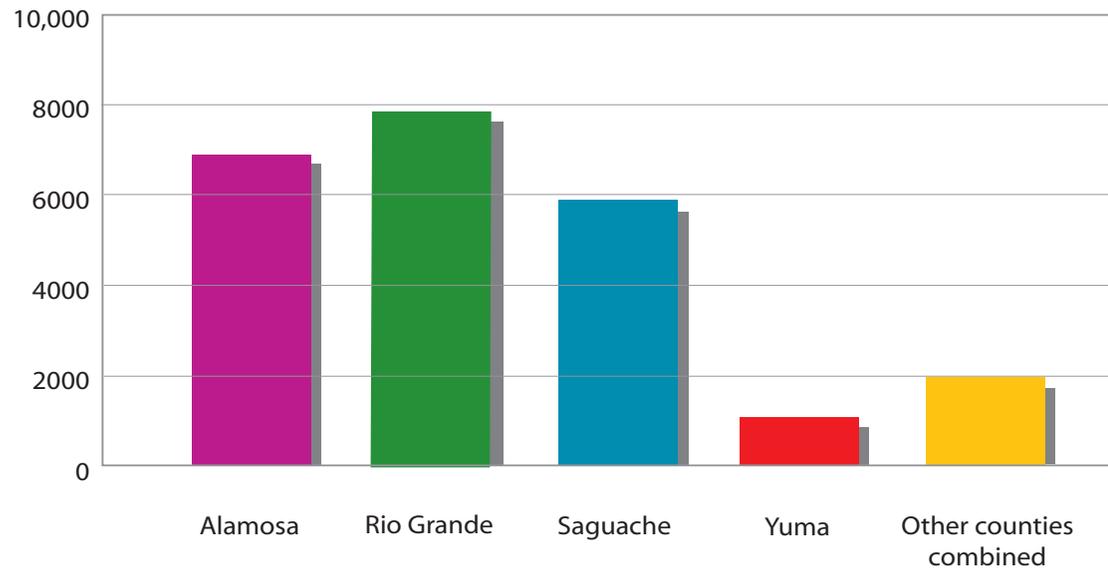
Do you like french fries with your hamburger? Good! Colorado has you covered! Ranked fifth in the U.S. for the production of potatoes, Colorado produces 2.4 billion pounds of potatoes each year.

Most of Colorado's potato crop is grown in the San Luis Valley, a very fertile, high-altitude basin in south-central Colorado. The valley is nestled between the Sangre de Cristo and the San Juan mountains. Farmers began growing potatoes in the Valley in the late 1800s, making it one of the oldest potato growing regions in the country.

With different varieties and storage, Colorado potatoes are available year-round. The fall crop is grown primarily in Alamosa, Rio Grande, and Saguache counties. The summer crop is grown primarily in Yuma county in east central Colorado.

In 2006, Colorado potatoes had a total value of \$201.8 million. In 2006, 64,000 acres were planted in potatoes. The crop was smaller (in total production) than the 2005 crop. This is due to reductions in available irrigation water.

Potato production by county, Colorado 2005-2006
Measured in 1 million pounds



Potatoes are very nutritious. They are naturally fat free, sodium free, a good source of fiber, high in potassium, and high in Vitamin C. Look for a variety of Colorado potatoes including: Yukon Gold, Russet, Fingerling and Purple year-round at your grocery store, farmers' market or restaurant.

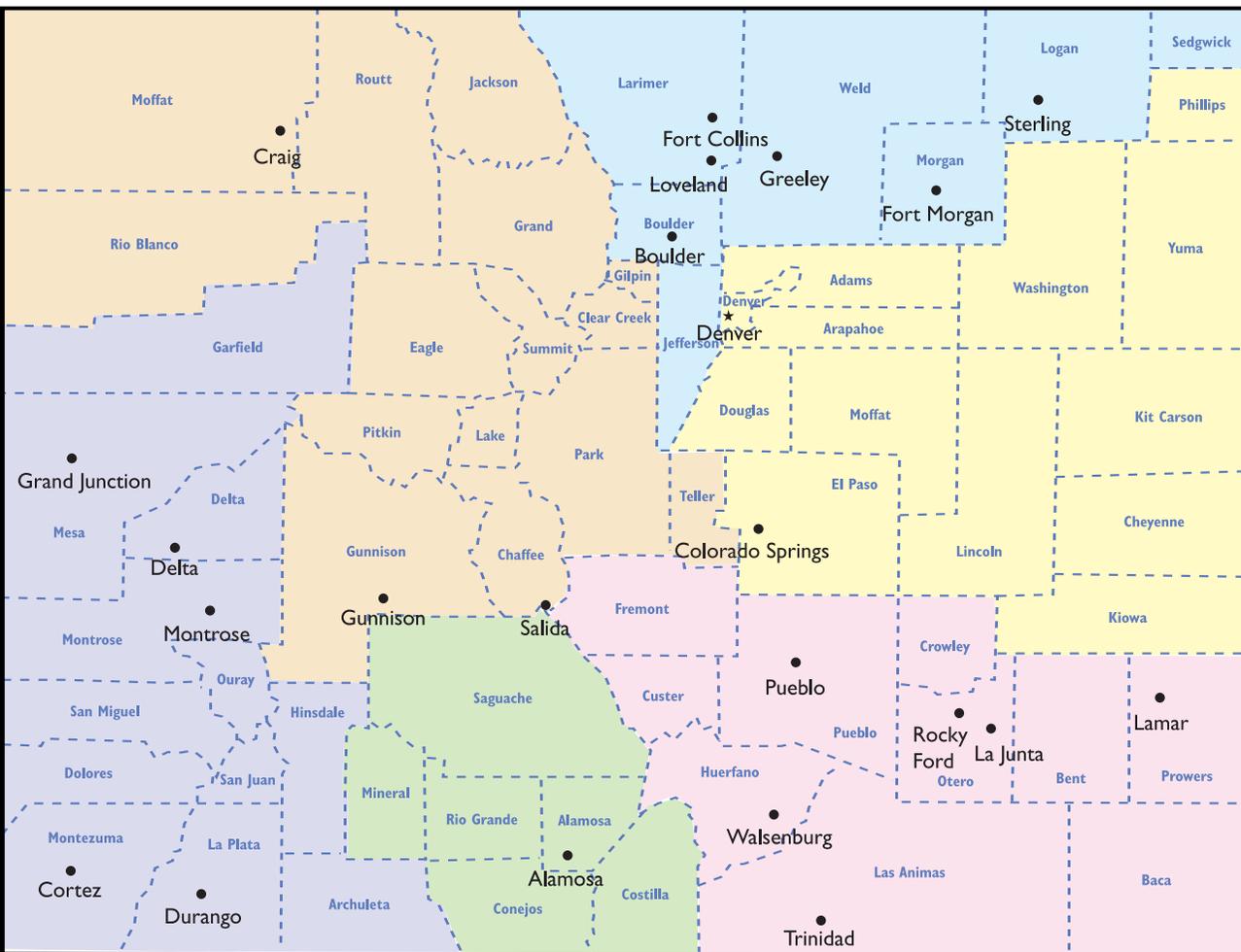
In October 1995, the potato became the first vegetable grown in space. NASA experimented with growing potatoes in space with the goal of feeding future astronauts on long voyages or future space colonies.

Using the bar chart above and the map to the left, answer the following questions:

1. What agricultural region in Colorado produced the most potatoes from 2005-2006?

2. What region produced the second most potatoes?

3. According to the article and bar chart, are there more summer or fall potatoes grown in Colorado?



Colorado Agricultural Regions



COLORADO VEGGIES

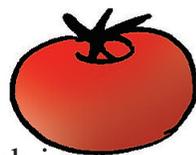
Some of the Colorado counties that are big vegetable producers include: Adams, Bent, Boulder, Lamar, Larimer, Prowers, Pueblo, and Weld counties.

Broccoli



You can count on your local grocery store, farmers' market and restaurants to provide Colorado grown broccoli. It is naturally low in fat and sodium and high in vitamin C and vitamin B9 (folate). It's also a good source of fiber, potassium, calcium, magnesium, iron, zinc, vitamin A, B vitamins, and vitamin K. Fresh Colorado broccoli can be found from July through mid-October.

Tomatoes



Tomatoes are low in fat, high in vitamins A and C, very low in sodium and a good source of potassium, magnesium, iron, zinc and fiber. In addition, processed tomatoes (used in

ketchup, spaghetti and pizza sauce) contain lycopene. Lycopene helps prevent certain kinds of cancer, heart disease and some very serious eye diseases as well.

Look for fresh Colorado tomatoes mid-July through mid-October and greenhouse tomatoes year-round.

Asparagus

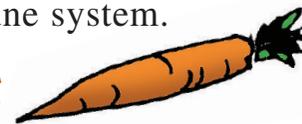


Asparagus is an early season crop, harvested in Colorado during the month of May and early June.

Asparagus contains high levels of vitamin A, vitamin C, vitamin E, vitamin B9 (folate) and fiber. They are a good source of B vitamins, phosphorus, and calcium. These nutrients play an important role in the

fight against cancer. Asparagus is also low in fat and sodium, making it the perfect choice for a healthy heart. It also helps you fight sickness by boosting your immune system.

Carrots



Comprising about 10% of our total vegetable crop value, the Colorado carrot crop is the third largest in the nation.

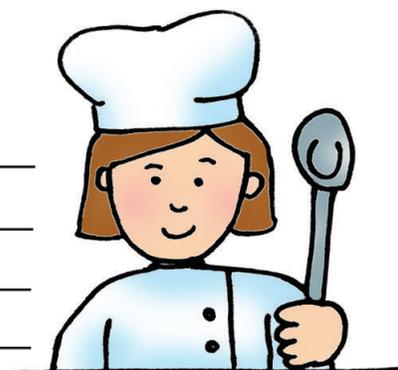
Carrots are low in sodium, fat free, high in vitamin A and a good source of vitamin C, B vitamins, vitamin D, vitamin E, vitamin K, as well as calcium and phosphorous.

Look for Colorado carrots at your local grocery store or farmers' market from August through November.

The school cook is sick today and the principal would like you to plan lunch using the most nutritious vegetable above. Using the checklist below, find out which vegetable has the most nutrients and write a suggestion for a recipe or how to serve the vegetable for the school lunch. Use complete sentences with proper capitalization, punctuation and spelling.

	vitamin A	B vitamins	vitamin B9 (folate)	vitamin C	vitamin D	vitamin E	vitamin K	high fiber	low fat or fat free	low sodium	calcium	iron	magnesium	phosphorous	potassium	zinc	Totals	
broccoli																		_____
tomatoes																		_____
asparagus																		_____
carrots																		_____

My suggestion: _____



Onions

The onions that Colorado is known for are called dry bulb storage onions. These are the large yellow, white and red onions found at your supermarket.

Onions were the highest ranked vegetable in both value and production in Colorado during 2006. This crop totaled 360 million pounds with an estimated value of \$54.1 million. Harvest for onions is from August through October. Storage is good through March of the following year. This provides a steady supply for most of the year.

Dry, sweet onions from Colorado are ideal for long storage because of their low moisture content. Colorado ranks sixth in the nation for onion production.

Onions are fat free, very low in sodium, a good source of fiber and high in vitamin C.

Sweet Corn

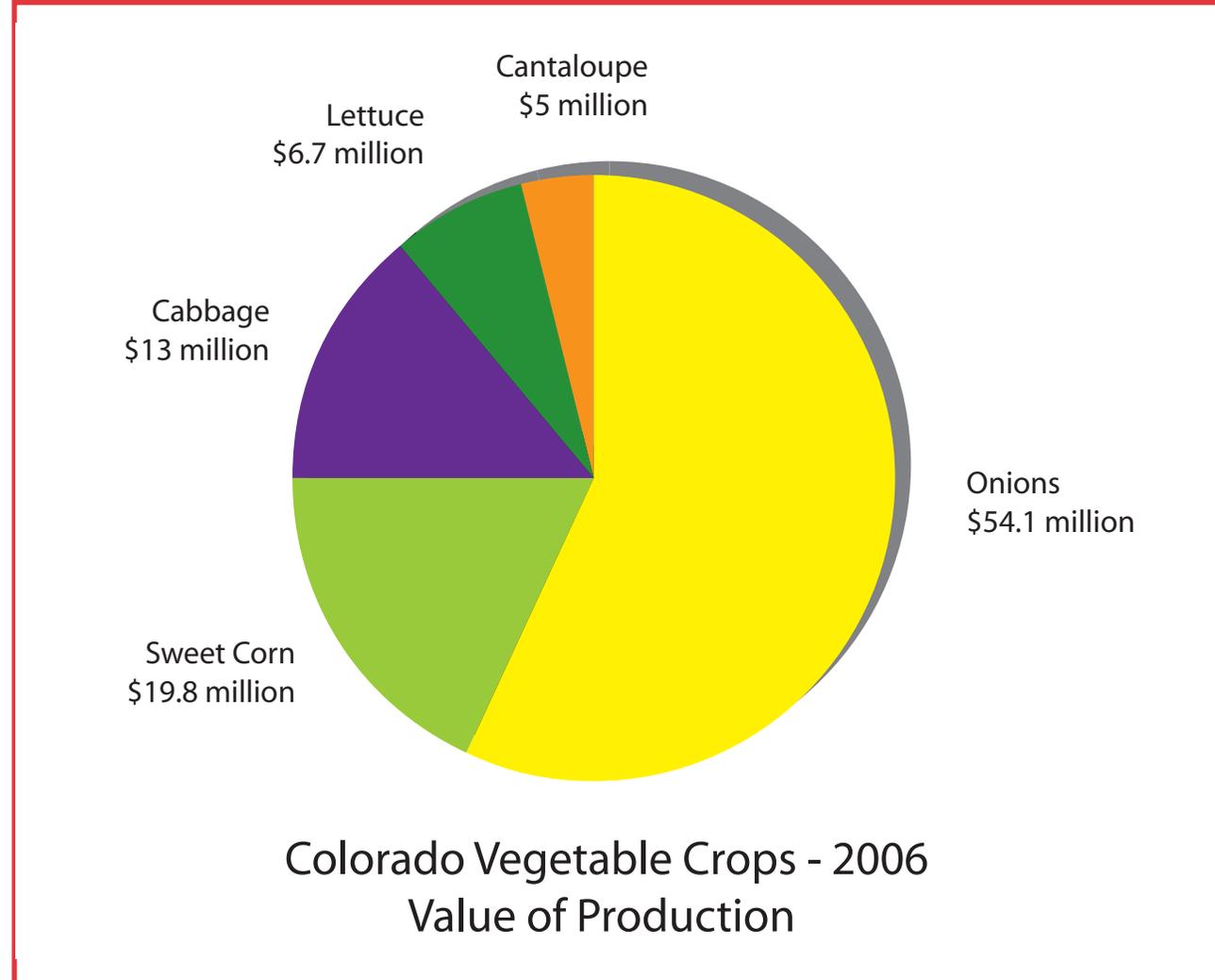
In Colorado, during 2005, sweet corn's value ranked second among vegetables produced, and second in total production. 140 million pounds were produced on 9,000 acres. The value of the 2006 crop was \$19.8 million. Sweet corn can be found fresh in Colorado from mid-July through September.

Sweet corn is sodium free, low fat, high in fiber and a good source of Vitamin C. Colorado ranks sixth in sweet corn production in the United States.

Cabbage

Colorado cabbage ranked third in production and third in value. Colorado production for 2006 was 130 million pounds. The value of production was \$13.1 million—a little lower than 2005.

Cabbage is harvested in Colorado from



end of June through mid-November.

Several studies suggest that eating cabbage lowers the risk of getting cancer. It contains many nutritious vitamins and minerals.

Lettuce

Lettuce had the fourth highest vegetable production in Colorado during 2006. It also ranked fourth in value of production. 44 million pounds were produced with a value of \$6.7 million. Growers received an average of 15 cents per pound sold.

Colorado is the nation's third largest lettuce producer. Fresh Colorado leaf and head lettuce can be found at your local store from June through October.

Cantaloupe

Cantaloupe ranked fifth in both production and value in Colorado in 2006. 1,600 acres were harvested and production was 27.2 million pounds. Value was \$5 million with the average price received by the farmer at 18.4 cents per pound.

Our state is famous for the cantaloupe grown in Rocky Ford, Colorado. Rocky Ford was once considered the “Melon Capital of the World. Harvest occurs from August through mid-October each year.

Cantaloupe is very low in sodium, fat free and is high in vitamins A and C.

**COLORADO CONTENT STANDARDS
COVERED IN THIS READER:**

ECONOMICS

Standard II - Students understand how different economic systems impact decisions about the use of resources and the production and distribution of goods and services.

GEOGRAPHY

Standard I - Students know how to use and construct maps, globes, and other geographic tools to locate and derive information about people, places, and environments.

Standard II - Students know the physical and human characteristics of places, and use this knowledge to define and study regions and their patterns of change.

MATHEMATICS

Standard II - Students will apply algebraic and/or other mathematical methods to understand and explore models, data, graphs, patterns, functions, and spatial relationships.

Standard III - Students will use mathematical strategies, data collection and analysis, statistics, and probability in everyday life situations.

Standard VII - Students will communicate the reasoning used in problem-solving situations.

READING AND WRITING

Standard I - Students read, listen to, and understand a variety of materials.

Standard II - Students write and speak for a variety of purposes and audiences.

Standard III - Students write using conventional grammar, usage, sentence structure, punctuation, capitalization, and spelling, and speak using conventional grammar, usage, sentence structure, and punctuation.

Standard IV - Students apply thinking skills to their reading, writing, speaking, listening, and viewing.

SCIENCE

Standard III - Life Science: Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment.

Agriculture Word Search



Word Bank:

APPLES

ASPARAGUS

BROCCOLI

CABBAGE

CANTALOUPE

CARROTS

COLORADO

CORN

FLOWER

FRUIT

GERMINATION

GREENHOUSE

LETTUCE

NURSERY

ONIONS

PEACHES

PEARS

POTATOES

PRODUCTION

SEEDS

SPECIALTY

TOMATOES

VALUE

VEGETABLES

THE TOP 3 COLORADO FRUITS

Peaches

The leading fruit crop in Colorado for the 2006 season was peaches. 28 million pounds of peaches were produced—valued at \$17.03 million. In 2006, peach producers received an average price of 65.5 cents per pound.

Peaches bloom from April 5-April 25 and are harvested between August 5 and September 20. Warm summer days and cool nights help create the juicy peaches Colorado is famous for.

Delta and Mesa counties produce the most peaches in Colorado. More than 1/2 million peach trees are located in western Colorado.

Apples

Apples ranked first in Colorado production but second in value for the 2006 crop. Total production was 15 million pounds, valued at \$5.02 million. Growers were paid an average of 35.9 cents per pound.

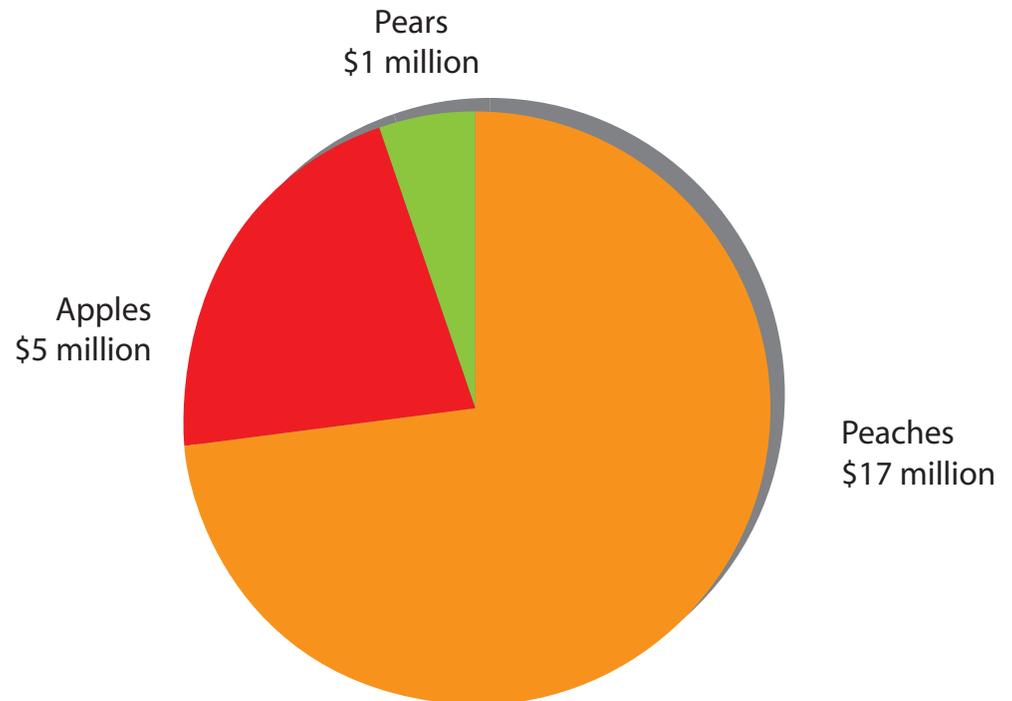
Most Colorado apples are harvested in September, however you can find them from August through June. They can be stored through June 1st of the following year. Colorado's apples are primarily grown in Delta, Montrose and Mesa counties. Varieties include Red Delicious, Golden Delicious, Jonathan and Rome.

Colorado apples regularly win taste tests in supermarkets. Our high-altitude makes them taste better. Apples are sodium free, fat free and a good source of fiber.

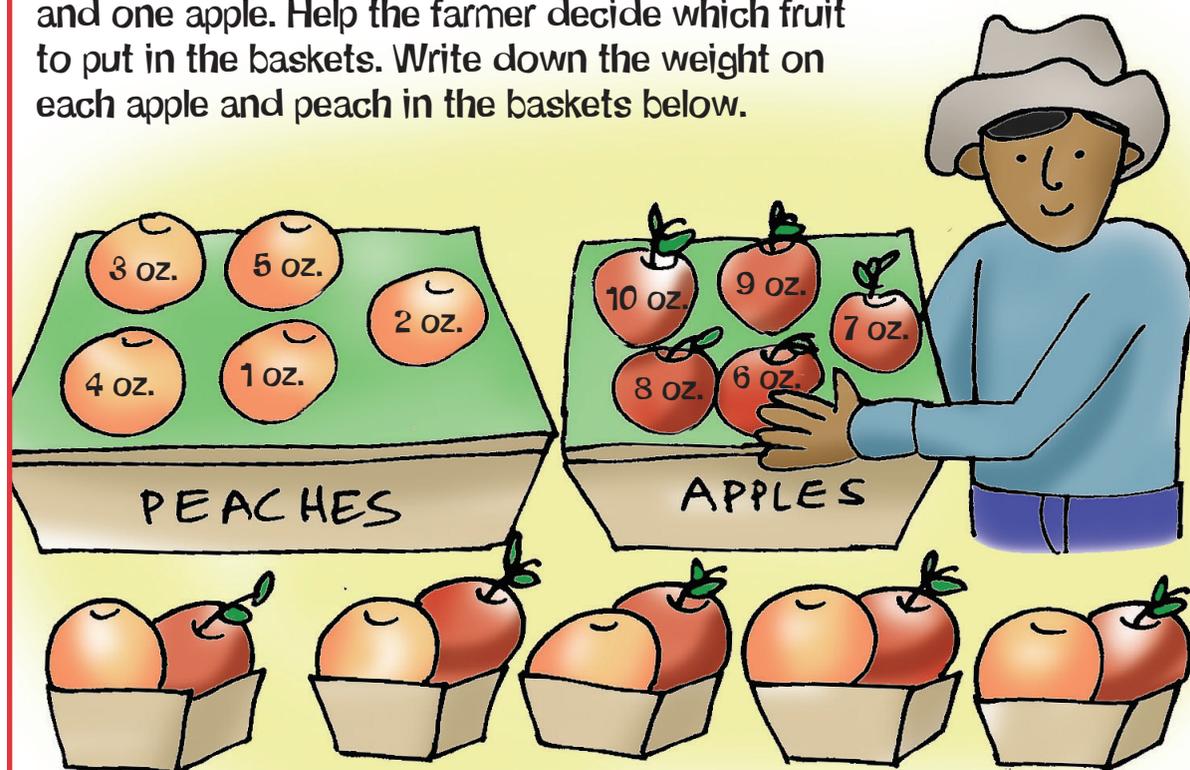
Pears

The 2006 Colorado pear crop was 4.6 million pounds and was valued at \$1.09 million. Producers received 27.09 cents per pound. Pear trees bloom April 20-May 5 and are harvested from August 10-September 20. The principle pear growing counties in Colorado are Mesa and Delta counties.

Colorado Fruit Crops - 2006
Value of Production in Millions

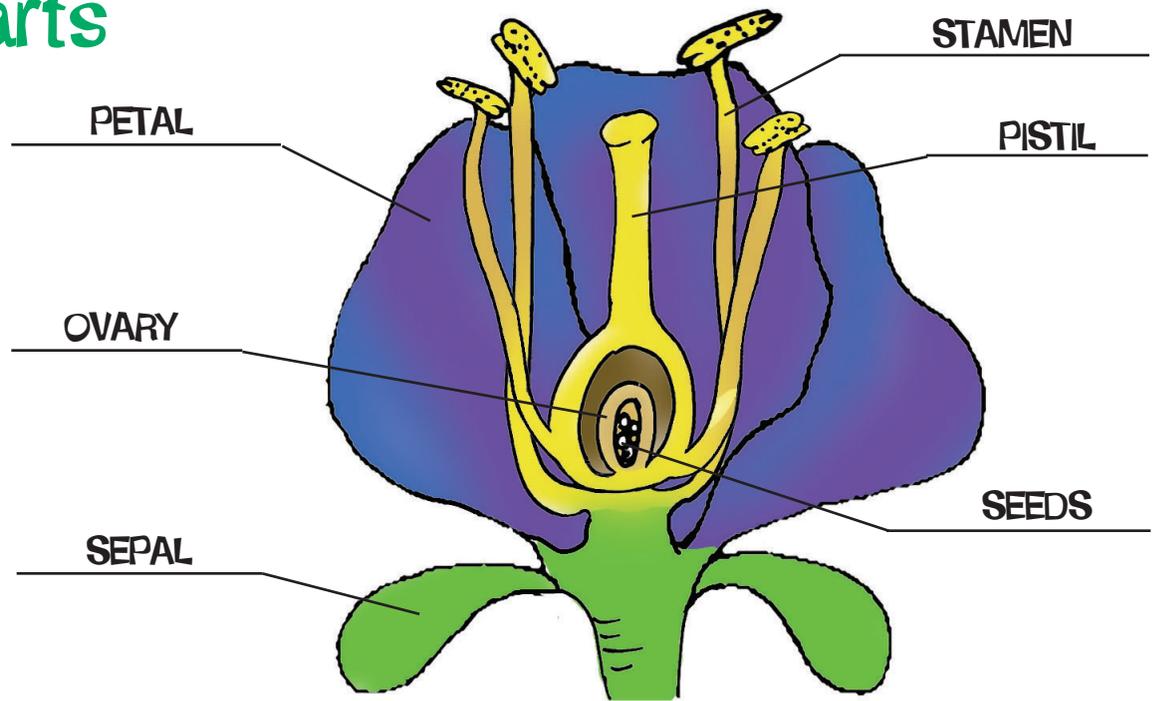


A peach and apple grower in Palisade, CO decided to give some of his fruit to his neighbors. His fruit varied in size, but the farmer wanted to make sure each neighbor got a basket that weighed exactly the same. Each basket needs to have one peach and one apple. Help the farmer decide which fruit to put in the baskets. Write down the weight on each apple and peach in the baskets below.



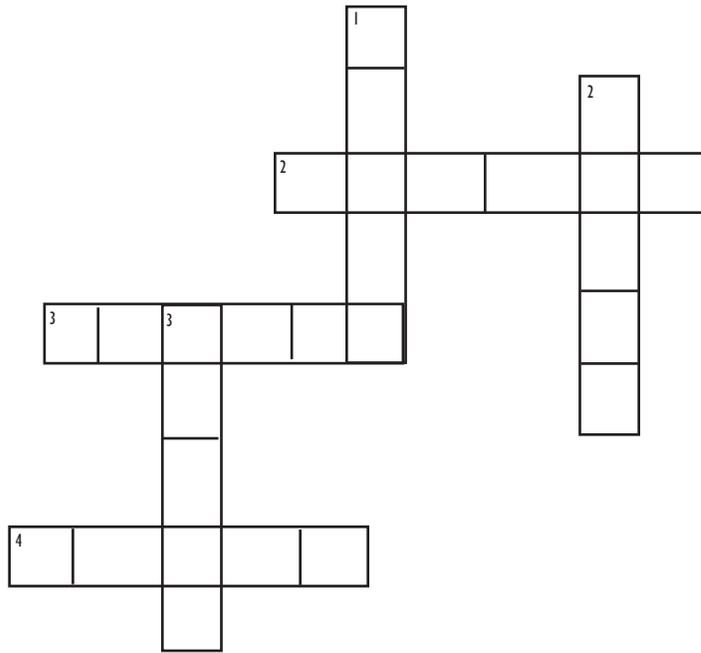
Flower Pieces & Parts

Plants reproduce by using flowers to lure bees inside. While the bees do this they rub against the pollen spores and collect pollen on their legs. When they go to another flower the pollen gets knocked off onto the flower which is then pollinated or fertilized. The fertilized plant then will start to grow pods or other seed casings with the seeds in them. The seeds then are transported by wind, water, animals, or humans to a new location.



WORD BANK:

PETAL, STAMEN, PISTIL, SEPAL, Ovary, SEEDS



Complete the crossword puzzle. Then use the words from the puzzle to label the flower parts.

ACROSS

2. The tall, thin part of a flower with a knobbed tip that holds the pollen.
3. The large center stalk, shaped like a water bottle.
4. The ball shaped lower part of the pistil holding young seeds.

DOWN

1. The brightly colored part of a flower.
2. A fertilized plant ovule containing an embryo.
3. The green part that surrounds the flower bud and extends from the base of a flower.

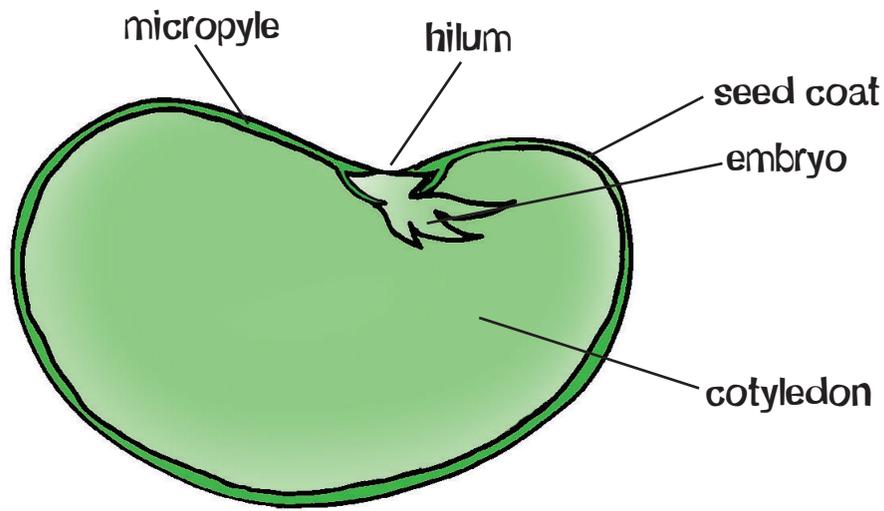
Greenhouse/Nursery Crops

Colorado grows a large variety of crops in greenhouses. Our greenhouse vegetables are grown under 4.2 million square feet of glass or plastic. Other crops include flowers such as: carnations, lilies, snapdragons and tulips. Some are potted flowering plants such as: african violets, easter lilies, roses and poinsettias. Other plants include: hanging baskets, herbs and flowers for transplantation into gardens. The value of these crops in 2005 in Colorado was \$292 million.

Nursery crops are grown all over Colorado, but primarily in Adams, Boulder, Chaffee, Douglas, El Paso, Jefferson, La Plata, Larimer, Mesa, Montezuma, Morgan and Weld counties.

Greenhouse and nursery crops provide \$1.1 billion to Colorado every year. 1,500 companies employ 12,200 people. Colorado ranks number one nationally in greenhouse tomato production, number two in rose and carnation production and number ten in total greenhouse production.

Anatomy of a Bean Seed



micropyle - the small pore in a seed that allows water absorption

hilum - the scar on a seed coat at the location where it was attached to the plant's stalk during development

seed coat (testa) - the outer, protective skin covering the seed

embryo - developing plant still inside the seed

cotyledon - part of the seed that contains stored food used for initial growth

Examining a Bean Seed

Materials:

Dried lima beans, paper plates, water, magnifying glasses

Prep:

On the day before starting the experiment, soak dried lima beans in water. They will absorb some of the water and get a soft outside covering (seed coat).

Directions:

1. Give each student a lima bean on a paper plate. Identify the seed coat.
2. Carefully rub the seed between your thumb and fingers. The seed coat will crack and slip off the seed easily.
3. Identify the cotyledon. This is the large oval part of the seed containing the food the seed needs before it can get nutrients for the soil and water.
4. The bean seed has a slit going down the middle of the seed. Split it open into 2 halves. Inside is a tiny plant called an embryo. A bean seed has two parts. Therefore, it is a dicotyledon, or dicot for short.
5. Observe the bean parts using a magnifying glass.

Hydroponic Seed Germination

Hydroponic means growing plants without soil. In Colorado some tomatoes and lettuce are grown without soil in greenhouses. The water solution they grow in provides the nutrients the soil normally would.



Materials:

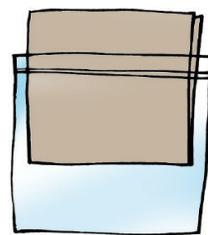
Ziploc plastic bags, paper towels, Lima beans (beans), masking tape, markers, pencils, a cup, stapler, writing paper, water

Prep:

To prevent mold, dip the seeds in a diluted bleach solution for 15 seconds (1 tablespoon bleach to 1 quart of water). Don't rinse before putting in the bags.

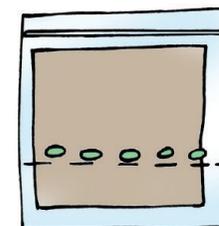
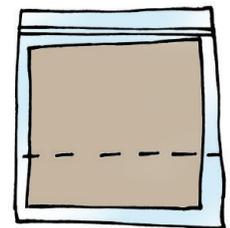
Directions:

1. Give each student a ziplock plastic bag with their name written on the masking tape.



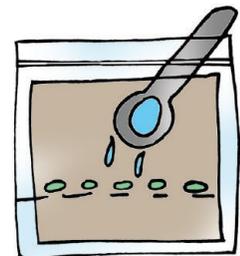
2. Give one sheet of paper towel to each student. Fold the paper towel so it fits inside the ziploc bag.

3. Staple across the bag and through the paper towels about 1 inch from the bottom of the bag.



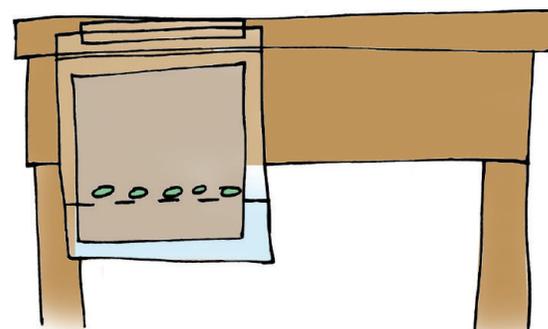
3. Give each student five lima beans. Position the beans spread out above the staples.

4. Add 3 tablespoons of water to the bag, soaking the paper towel.



5. Close the bag and hang from a desk making sure the bag isn't in direct sunlight.

6. As the seeds sprout, students will write and draw a picture of the seed growth each day.



Do not plant the seeds when done, throw away the bag with seeds in it.

Teacher's Guide

AG IN THE CLASSROOM—HELPING THE NEXT GENERATION UNDERSTAND THEIR CONNECTION TO AGRICULTURE

Colorado Proud

For a directory of farmers markets, and agritourism in Colorado please contact

Colorado Farm Fresh

*Colorado Department of Agriculture
Markets Division*

700 Kipling St., Suite 40000

Lakewood, CO 80215

(303) 239-4119

(303) 239-4125 (fax)

www.coloradoproud.org

State of Colorado Department of Agriculture

700 Kipling St., Suite 4000

Lakewood, CO 80215-8000

Telephone: (303) 239-4100

Fax: (303) 239-4125

<http://www.ag.state.co.us/>

USDA Kids' Science Page

National Agricultural Library

Explore subjects such as animals, environment, food & nutrition, general science and plants. Get ideas for science fair projects, find a list of recommended childrens' books, articles on careers and biographies of leading scientists.

<http://www.nal.usda.gov/kids/>

A Science Fair Project Resource Guide - Internet Public Library, University of Michigan

<http://www.ipl.org/youth/projectguide/>

Great Plant Escape - University of Illinois Extension

An online elementary program for 4th and 5th grade students. Each of the lessons in this program is interdisciplinary, designed to introduce students to plant science and increase their understanding of how foods grow. Activities enhance student's math, science, language arts, social studies, music and art.

<http://www.urbanext.uiuc.edu/gpe/index.html>

Comments, questions, suggestions and feedback about the *Colorado Reader* are welcome.

Contact: Colorado Reader Publisher:
Colorado Foundation for Agriculture
Bette Blinde, Director, P.O. Box 10,
Livermore, CO 80536
Phone (970) 881-2902
Fax: (970) 881-2587

More on Colorado Proud

According to a recent survey, nearly 92% of Coloradoans would buy more Colorado grown and produced products if they were available and identified as being from Colorado.

The Colorado Department of Agriculture developed Colorado Proud in 1999. It is a free marketing program designed to help consumers, restaurants and retailers identify and purchase Colorado food and agricultural products.

The bright distinctive Colorado Proud logo series will help residents of our state, other states and other countries easily identify high-quality Colorado foods.

The Colorado Proud logo may be used to

promote any food or agricultural item that has been grown, raised or processed in Colorado. Non-food items must be at least 50 percent agricultural origin by weight, and that



agricultural base must have been grown, raised or processed in Colorado. Fresh produce and herbs must be grown in Colorado in order to use the logo.

The Colorado Organic logo may be used to help market Colorado agricultural products that have been certified by a federally accredited organic certification program.



The Colorado Cuisine logo may be used by restaurants that feature Colorado products on their menus.



Adapted from Colorado Farm Fresh 2007 for more information visit www.coloradoproud.org.

Home Grown Idea

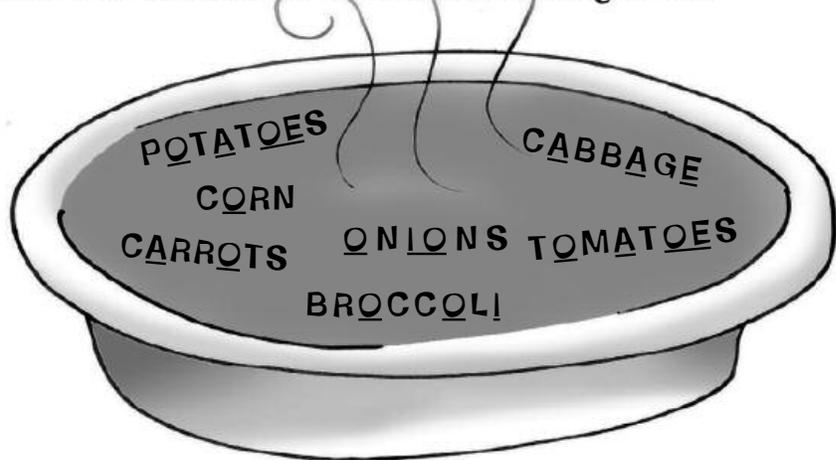
Here are some things students can do with family or friends while learning about plants:

- Take a walk around the neighborhood and look for plants

(continued on page 2)

Page 1: Answers

Mrs. Adams made some alphabet/vegetable soup using Colorado specialty crops. But something very strange happened... all the vowels sank to the bottom of the bowl. Fill in the missing vowels.



(continued from page 1)

and their parts.

- Have a tasting party. Sample raw or cooked root vegetables such as carrots, beets, turnips, rutabagas, or radishes.
- Plant the tops of root vegetables. Cut off the root vegetable at its fattest end. Leave about 1/2 inch of

Page 2: Answers

Using the bar chart above and the map to the left, answer the following questions:

1. What agricultural region in Colorado produced the most potatoes from 2005-2006?

San Luis Valley

2. What region produced the second most potatoes?

East Central

3. According to the article and bar chart, are there more summer or fall potatoes grown in Colorado?

fall potatoes

Page 3: Answers

The school cook is sick today and the principal would like you to plan lunch using the most nutritious vegetable above. Using the checklist below, find out which vegetable has the most nutrients and write a suggestion for a recipe or how to serve the vegetable for the school lunch. Use complete sentences with proper capitalization, punctuation and spelling.

	vitamin A	B vitamins	vitamin B (folate)	vitamin C	vitamin D	vitamin E	vitamin K	high fiber	low fat or fat free	low sodium	calcium	iron	magnesium	phosphorous	potassium	zinc	Totals
broccoli	X	X	X	X			X	X	X	X	X	X	X		X	X	13
tomatoes	X			X				X	X	X		X	X		X	X	9
asparagus	X	X	X	X		X		X	X	X	X			X			10
carrots	X	X		X	X	X	X		X	X	X			X			10

My suggestion: Answers will vary, but should be written about broccoli.



the vegetable. Place it on a water-filled saucer until it begins to sprout. When it sprouts, place it in soil. The best vegetables to sprout are those that have a part of the stalk at the top like a carrot. It is best to try more than one top at a time as not all of them will sprout.

- Take a family walk around the neighborhood. Collect samples of many different types of leaves. Make a collection of the leaves that you find. Dry the leaves between sheets of newspaper. Put a heavy book on top and leave them for a week or more. Tape the leaves to sheets of construction paper or iron the leaves between sheets of wax paper. (Before using an iron, ask an adult to help you!) Then look at the different shapes of the leaves. Look at the midrib and at the veins. Count how many parts each leaf has. Find out what this plant is.

What parts of the plant do we eat?

Here's the list of edible plant parts. Have you eaten any of these recently?

ROOTS

- carrots
- beets
- turnips
- rutabagas

SEEDS

- lima beans
- peas
- green beans
- sunflower seeds
- black-eyed peas
- pinto beans

FRUITS

- tomato
- apple
- cucumber
- strawberries
- blueberries

STEMS

- celery
- rhubarb
- onions

FLOWERS

broccoli
cauliflower
squash blossoms
nasturtiums

LEAVES

kale
lettuce
spinach
cabbage
collards
mustard

Which part of the plant do you think these are?

radish
asparagus

from The Great Plant Escape -University of Illinois
Extension

More on Flowers

Cracking Nature's Color-Code for Flowers

Remember the rhyme that begins “Roses are red,
violets are blue...”?

Turns out, that's not always the case anymore. Just
ask Robert Griesbach. He's a plant geneticist at the

Page 5: Answers

ARS Floral and Nursery Plants Unit, located in
Beltsville, Maryland.

There, Griesbach and other plant scientists are
writing a new nursery rhyme, creating roses that are
blue, not red.

New advances in science are making it possible to
change the natural colors of many flowers—not just
roses. Griesbach's lab, for example, has also created
orange petunias, a new, “high-tech” variety you're
not likely to spy in the flower garden.

That's because the scientists plucked a gene from
corn plants and stuck it in the petunia's cells. There,
the corn gene works like a chemical switch. “It tells
the flower how to make a new pigment for orange-
colored petals instead of blue ones,” explains
Griesbach.

But why stop at just orange or blue? What about a
rainbow of colors for flowers like roses, which are
normally either red, yellow, pink or a creamy white?

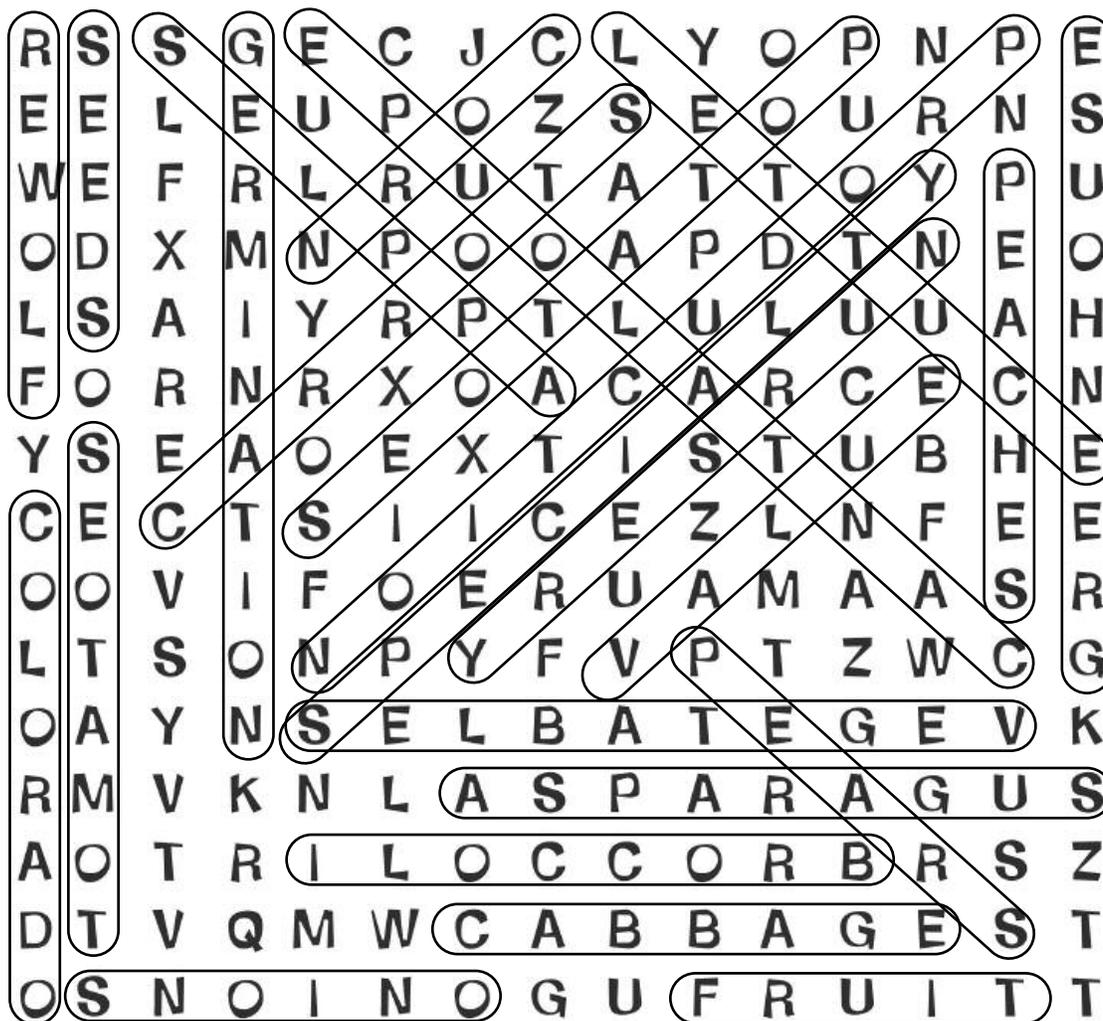
Imagine handing a bouquet like that to your
mom on her birthday. She'd flip!

Rainbow-
colored roses
sound
impossible?
Not really, says
Griesbach.

The trick is
to find the right
genes and mix
just the right
amounts of
three funky-
sounding
pigments.
One is called
flavonoids
(they've got
nothing to do
with flavor).
Another is
carotenoid
and a third is
chlorophyll,
which you've
probably
heard of.

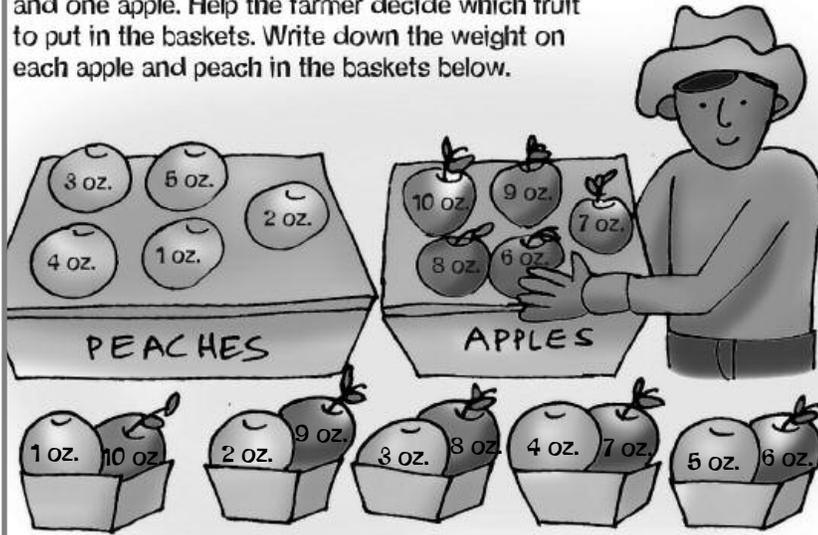
“By mixing
and matching
these three
pigments,” says
(continued on
page 4)

Agriculture Word Search



Page 6: Answers

A peach and apple grower in Palisade, CO decided to give some of his fruit to his neighbors. His fruit varied in size, but the farmer wanted to make sure each neighbor got a basket that weighed exactly the same. Each basket needs to have one peach and one apple. Help the farmer decide which fruit to put in the baskets. Write down the weight on each apple and peach in the baskets below.



(continued from page 3)

Griesbach, "an endless array of colors can be created."

His lab discovered you can change the color of roses, for example, by changing the acidity level or pH of the flower's cells. This helps shuffle around sandwich-like storage forms of flavonoid and other pigments in the cells. So, instead of blood-red, the rose's petals turn blue.

Griesbach says sticking genes from one flower or plant into another could create a new palette of splashy colors to choose from.

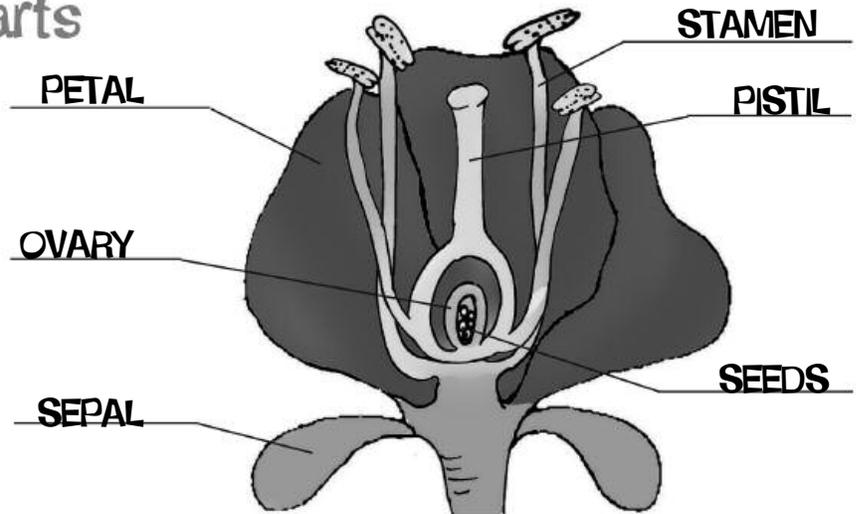
If Mom likes to grow her own flowers, for example, this would give her more of a choice in where or when to plant her very favorite varieties.

By Jan Suszkiw, Agricultural Research Service, Information Staff Sci4Kids (USDA)

Page 7: Answers

Flower Pieces & Parts

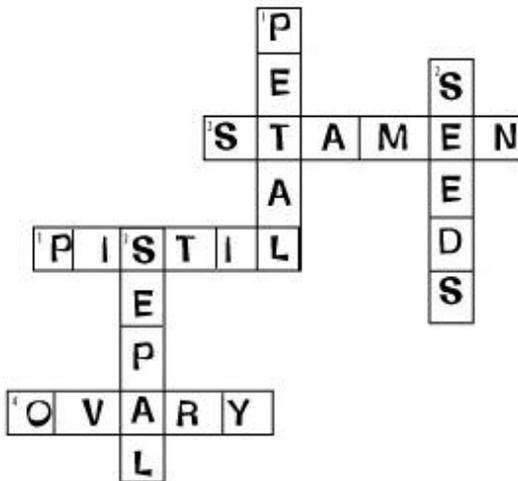
Plants reproduce by using flowers to lure bees inside. While the bees do this they rub against the pollen spores and collect pollen on their legs. When they go to another flower the pollen gets knocked off onto the flower which is then pollinated or fertilized. The fertilized plant then will start to grow pods or other seed casings with the seeds in them. The seeds then are transported by wind, water, animals, or humans to a new location.



WORD BANK:

PETAL, STAMEN, PISTIL, SEPAL, OVARY, SEEDS

Complete the crossword puzzle. Then use the words from the puzzle to label the flower parts.



- ACROSS**
- The tall, thin part of a flower with a knobbed tip that holds the pollen.
 - The large center stalk, shaped like a water bottle.
 - The ball shaped lower part of the pistill holding young seeds.

- DOWN**
- The brightly colored part of a flower.
 - A fertilized plant ovule containing an embryo.
 - The green part that surrounds the flower bud and extends from the base of a flower.

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Botanical Interests
Colorado Onion Growers
Colorado Certified Potato Growers
Harvest Select, Mountain Valley Produce
Farm Fresh Direct, Colorado Potato Committee

Colorado Department of Agriculture
visit www.coloradoagriculture.com/produce for links to our companies

COLORADO
NATIONALLY RANKED PRODUCE

Colorado's Top Ten

- Potatoes
- Onions
- Spinach
- Carrots
- Peaches & Pears
- Dry Beans
- Sweet Corn
- Lettuce
- Cabbage
- Cantaloupe

COLORADO
PRODUCE AT ITS PEAK

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