Greetings from the Garden of Agriculture!

Open the garden gate to explore the growing food frenzy on the farm! Food is fuel, and just like humans, animals and plants also need food to grow. Farmers and ranchers are responsible for producing the supply of food, clothing and shelter that we all need daily. It is up to the rest of us to keep the nutritious supply of food flourishing in California, the nation and the world for years to come.

Nutrients are important for humans, and are necessary to ensure we get the vitamins and nourishment we need to maintain a healthy diet. Plants provide us with nutrition, but they also require it, too. That's why it is important that our fruits, vegetables and other plants get their own proper care. Replenishing the land that we use with the appropriate nutrients will help maintain the flow of a healthy food supply. Learn how to sustain healthy plants and a healthy lifestyle through California agriculture. Test your knowledge and learn fun facts about where your food comes from, how food grows, and how to keep plants alive and growing through winter, spring, summer and fall.

The 6th edition of What’s Growin’ On? was created and reviewed by educators to demonstrate the importance of agriculture and to show how it affects every individual in every aspect of our lives. The activities and information on the following pages will connect you and your students to the world of farmers, ranchers and growers and invite you to engage in hands-on opportunities to learn more about growing safe and healthy food. Your students will be inspired to learn even more about their food and fiber after engaging in these fun and educational articles and activities. By bringing real life agricultural scenarios into your classroom, your students will gain a personal understanding of the process involved in producing food, clothing and other necessities often taken for granted. Nutrition, science, history, math and many other subject areas are demonstrated in the following pages while allowing a glimpse into the world of California agriculture that sustains each and every one of us every day. Thank you for joining the thousands of teachers across our state dedicated to improving agricultural literacy, and for enhancing the awareness and education of your students.
A worker bee visits between 50-100 flowers during a food-hunting trip.

Did You Know?

Bears don’t actually go after the honey. They eat the brood for the protein.

Activity

Label the diagram of the worker bee below with each of the following body parts: Abdomen, Forewing, Head, Hind wing, Honey sac, Legs, Midgut (or ventriculus), Pollen basket, Stinger, Thorax, Wax gland. Check your answers at kids.cfaitc.org/wgo6/bees.

Riddle:

Male bees (drone) have a grandfather, but no father. How can that be? Find out at kids.cfaitc.org/wgo6/bees.

Honey Bzzz... Experience the life of a bee with your own tour guide, Jafina. Jafina describes the everyday chores of a drone bee and how to get promoted to a worker bee. This award-winning story “Honey Bzzz...” by Amelia Clyatt from Golden Eagle Charter School, can be viewed at www.cfaitc.org/imaginethis/honey.

Look in the grocery ads of your newspaper. Clip ads with honey or honey products. Add up the total cost of the products.

Standards: English-Language Arts (ELA) – Grade 4 – Reading 2.6; Grade 5 – Reading 2.2; Grade 6 – Number Sense 1.4

Bees collect nectar and pollen from blossoms, trees and shrubs.

Without pollination, we would not have many fruit and vegetable crops. Some of the crops bees pollinate are: alfalfa, almonds, apples, avocados, cantaloupes, cherries, cucumbers, honeydew, kiwifruit, peas, plums and watermelons.

Worker bees live 5-6 weeks and queen bees live 2-3 years.

A drone is a male honey bee that is produced from an unfertilized egg.

Bees keep their hives “air conditioned” by fanning their wings when they are hot and huddling together when they are cold.

A worker bee will generally travel within a 2-mile radius, but has been known to travel up to 8-9 miles.

An apiarist is a beekeeper. Beekeepers raise bees to produce honey and wax, to pollinate crops and for many other reasons.

We need to respect bees. If a bee comes near you, remain calm and stand still to prevent being stung.

A colony is a community of several thousand worker bees, drones and one queen bee.

Hives are man-made structures created to house bees. A Skep hive is a natural hive built by the bees.

Bees and flowers evolved during the age of dinosaurs. After the Ice Age, man hunted bees with torches to find and consume their honey. The smoke from their torches had a calming effect on the bees, making it easier to collect the honey.

Many of the greatest creative minds in our nation’s history were inspired by the majestic beauty of farms and fields. A waving corn field, blossoming orchard or herd of grazing cattle on a hillside have all brought out the inner artist in countless Americans. See how you, too, can allow modern-day agriculture to take you to new creative heights through many artistic mediums...

**Classic Art**
- Painting
- Sketching
- Sculpting

**The Written Word**
- Poetry
- Novels
- Non-fiction
- Journalism
- Song-writing

**Photography**
- Artistic photography
- Photojournalism

**Performing Arts**
- Singers
- Dancers
- Musicians
- Actors
- Cowboy poetry

**Try This Activity**
- Take a photograph or draw a sketch of an agricultural item or scene.
- Write a poem relating to agriculture. Recite it for classmates.
- Write and perform a puppet show, play or song.
- Read a biography about an agricultural pioneer (John Deere, Luther Burbank, George Washington, etc.). Dress up and tell “your” story to your classmates.
- Make up a line dance or square dance inspired by country line or square dance routines.

**Standards:**
Visual and Performing Arts – Grade 3 - Visual Arts, Creative Expression 2.3, 2.4

**California Farm Water Coalition Poster Contest**
www.cfwc.com/kids_corner

**California Farm Bureau Photo Contest**
www.cfbf.com/programs/photo

**Student Contests:**
Imagine this...
www.cfaitc.org/Imaginethis

**Show Your Artistic Side!**

**Activity**

**Across the Nation...Activity**
In 1947 Marilyn Monroe was crowned Miss California Artichoke Queen.

**Gather with the real buckaroos in Elko, Nevada for the annual Cowboy Poetry gathering. The event takes place the last weekend of January at the Elko Convention Center.**
The olive tree is one of the oldest known cultivated trees in the world. They have a life span of 300-400 years.

California produces nearly all the olives in the United States over 34,000 acres!

The first olive trees were planted at the San Diego Mission by Franciscan Monks in 1769.

Different Grades – Different Purposes

The olive tree is very efficient at extracting nutrients from the soil. Nitrogen is usually the only nutrient which must be added or supplemented as a fertilizer.

California’s Sacred Fruit
...a living link to California’s past

Pressing the olive oil:
A screw press was made from local wood. Olive paste was layered under the press and then the screws tightened to squeeze out the oil and vegetable water.

Grinding the fruit:
Donkeys pulled a large round grindstone, held in place by wooden timbers around a trough made of stone to grind all the olive pits and flesh into a paste.

Separating the oil from the vegetable water:
The oil and water from the screw press were poured into wooden barrels. The pure oil floated to the top. The lesser quality oil settled beneath the top layer.

The harvest:
Harvesters used ladders made from tree branches to pick the fruit off the trees and gathered the olives in buckets tied to their shoulders or waist. They also beat the fruit off the branches with long sticks and gathered the fruit from the ground.

The paste was spread on round woven mats made from local reeds and taken to the wooden press.

Try This Activity

Making olive oil was a long, hard process! Can you make olive oil like the California missionaries? Put the above steps from the “Making Olive Oil at the California Missions,” wheel in chronological order by placing the letter next to the step number. To check your answer, visit kids.cfaitc.org/wgo6/olives.

Step 1: ___
Step 2: ___
Step 3: ___
Step 4: ___
Step 5: ___

Standards: Math – Grade 3 – Statistics, Data Analysis, and Probability 1.0; Grade 5 – Math Reasoning 1.1, 1.2; History-Social Science – Grade 4 - 4.2.6, ELA Grade 6 – Reading 2.5


Once in barrels, the oil separated into three distinct layers. These became the three olive oil products traditionally used at the mission. Each quality of oil had a purpose in mission life.

The clear oil rose to the top of the barrel. This top-quality olive oil fulfilled two purposes at the mission: Sacramental Use – pure olive oil was blessed by the Fathers to be used during Baptism and Confirmation.

Cooking Oil – was used for baking bread, for sautéing vegetables and other fine cooking purposes.

The second layer of oil was used as fuel for oil-burning lamps.

The pomace sank to the bottom of the barrel. Pomace is the solid matter that is left after the olives are crushed and the oil has been removed. The pomace was used to make soap and to grease wagon wheels, mills and even squeaky doors.

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Corn is A-"Maize"-ing!

History

Corn, also known as maize, is a cereal grain that was domesticated in Mesoamerica as many as 10,000-12,000 years ago. Corn is a member of the grass family and grew wild in what is modern-day Mexico. Native Americans grew corn as a crop and fertilized the seed by planting it with dead fish. The decaying fish contained nitrogen, which corn needs for good growth.

Today, corn is cultivated on every continent except Antarctica. The three types of corn grown for human consumption are dent corn (grain), sweet corn (vegetable) and popcorn (food snack).

Technology and Change

More than 95% of U.S. corn acreage planted is hybrid corn. Hybridization is a breeding process used to improve plant characteristics and increase yield. Hybrid varieties were developed to adapt to specific growing conditions and locations, and they are continually being improved through biotechnology. Biotech corn offers in-plant protection from insects and herbicides, reduced need for plowing and higher crop yields. In 2006, 61% of U.S. corn acreage was planted with biotech seed.

Cryin’ for Corn!

Supply and Demand

In the last few years the demand for corn has skyrocketed. There are so many uses for corn that the price has also soared. One of the newest uses of corn is in the development of ethanol as a fuel for automobiles. Ethanol is one of many alternative fuels developed to help solve the world’s energy crisis. When any product is in high demand and in short supply, the price goes up.

Activity

Crossword Puzzle

(Check your answers on kids.cfaitc.org/wgo6/corn)

Complete the crossword!

Hint: All the answers are corn by-products.

1. Moldy antibiotic that fights infections
2. A sweetener in many sodas and juices
3. Corn produces this fuel for cars
4. Runs iPods, cell phones and flashlights
5. Sticky stuff like paste
6. A splash of color for the lips
7. Product that cleans your teeth
8. Your car seats and couches are covered in this
9. TNT
10. Doctor’s hands operate in them

Sources: http://www.cfaitc.org/Commodity/Commodity.php

40% of the world’s corn is produced in the U.S.

Did You Know?

- California grows 18% of the world’s sweet corn but isn’t one of the top 10 corn producers in the U.S. Which states grow the most corn? Visit kids.cfaitc.org/wgo6/corn to obtain answers.

- 85% of all corn is used to feed livestock.

- Did You Know? Corn is used to make nearly every kind of paper except newspaper.

- Cryin’ for Corn!

Direct Answer:

1. Moldy antibiotic that fights infections
2. A sweetener in many sodas and juices
3. Corn produces this fuel for cars
4. Runs iPods, cell phones and flashlights
5. Sticky stuff like paste
6. A splash of color for the lips
7. Product that cleans your teeth
8. Your car seats and couches are covered in this
9. TNT
10. Doctor’s hands operate in them
Dollars and “Sense”
Agriculture Economics

An Acre of Production

Then...
1900
40 bushels
of corn
per acre

Now...
2006
149.1 bushels
of corn
per acre

Did You Know?
One acre is about the size of a football field, without the end zones, or 43,560 square feet.

California’s Top 10 Commodities for 2006

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Milk and Cream</td>
<td>$4,475,793</td>
</tr>
<tr>
<td>2. Grapes</td>
<td>$3,706,859</td>
</tr>
<tr>
<td>3. Nursery Products</td>
<td>$3,095,717</td>
</tr>
<tr>
<td>4. Cattle and Calves</td>
<td>$2,927,786</td>
</tr>
<tr>
<td>5. Almonds</td>
<td>$2,522,886</td>
</tr>
<tr>
<td>6. Lettuce</td>
<td>$1,813,261</td>
</tr>
<tr>
<td>7. Strawberries</td>
<td>$1,340,101</td>
</tr>
<tr>
<td>8. Oranges</td>
<td>$1,055,666</td>
</tr>
<tr>
<td>9. Hay Alfalfa</td>
<td>$1,038,935</td>
</tr>
<tr>
<td>10. Chickens</td>
<td>$891,702</td>
</tr>
</tbody>
</table>

Commodity Cash
Design your own dollar bill. Choose one of the top 10 commodities produced in California. Draw a picture of your commodity in the center. Add the total production value of your commodity for the most recent year in the space provided (example: Milk would have a value of $4,475,793).

Standards:
Visual and Performing Arts – Grade 3 – Creative Expression 2.4; Math – Grade 4 – Number Sense 1.0; Grade 5 – Number Sense 1.1

Use the dollar bill below, or print your own money online at kids.cfaitc.org/wgo6/money.

Fuel Farming
America’s farm fields don’t just produce fuel for our bodies. Crops such as corn, safflower, sugar cane and soybean are used to produce renewable fuels. Use the following facts to create a bar graph to illustrate the growth of this fuel production trend since 1980.

<table>
<thead>
<tr>
<th>Year</th>
<th>Millions of gallons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>175</td>
</tr>
<tr>
<td>1985</td>
<td>610</td>
</tr>
<tr>
<td>1990</td>
<td>900</td>
</tr>
<tr>
<td>1995</td>
<td>1400</td>
</tr>
<tr>
<td>2000</td>
<td>1630</td>
</tr>
<tr>
<td>Today</td>
<td>2810</td>
</tr>
</tbody>
</table>

Standards:
Math – Grade 3 – Number Sense 1.1, 2.1, 3.3, Algebra and Functions 1.1, 1.2, 2.1; Math Reasoning 1.0, 2.3, 2.4, 2.6; Grade 4 – Number Sense 1.1, 2.1, 2.3, 2.4, Statistics, Data Analysis, and Probability 1.0, Math Reasoning 1.0, 2.3, 2.4, 2.6; Grade 5 – Number Sense 2.1, Algebra and Functions 1.0, Math Reasoning 1.0, 2.3, 2.4, 2.5; Grade 6 – Math Reasoning 1.0, 1.3, 2.4, 2.5; Grade 7 – Number Sense 1.2, Math Reasoning 1.1, 1.3, 2.3, 2.6.

Standards:
Visual and Performing Arts – Grade 3 – Creative Expression 2.4; Math – Grade 4 – Number Sense 1.0, Grade 5 – Number Sense 1.1.
establish healthy growth, all plants require certain nutrients that normally come from the soil. Just like you need your vitamins, plants require certain nutrients for survival. They also require sun, water, and air.

So What is a Fertilizer?

Any type of substance that is added to soil or water to increase the nutrients available to plants is considered a fertilizer. Fertilizers can be in a form of solids, liquids and gases.

Who Uses Fertilizers?

Farmers and gardeners do. The type they apply depends on what the plants need. A crop like corn needs lots of nitrogen so a fertilizer with a high first number, like 12-0-6, would be used.

Why Use Fertilizers?

Fertilizers serve to replenish the soil with nutrients. Without the correct amount of nutrients, plants cannot grow properly.

Where Do Fertilizers Come From?

The environment! The elements found in fertilizers are natural and come from above, below or on the Earth’s surface. They are natural resources; therefore, we must manage them properly.

Potassium (K)

• The regulatory ingredient involved in lots of enzymatic reactions.
• Helps plants transfer nutrients.
• Helps build flowers, with good stem strength.
• Helps plants make seeds.

Sulfur (S)

• Helps make plant proteins.
• Promotes slow growth and weak plants.
• Gives flavor and orients their smell.

Calcium (Ca)

• Central part of chlorophyll, which helps plants capture energy from light.
• Added to sandy soils.
• Added to celery, potato and citrus plants.

Magnesium (Mg)

• Central part of chlorophyll, which helps plants capture energy from light.
• Added to sandy soils.
• Added to celery, potato and citrus plants.

Iron (Fe)

• Required for chlorophyll production.
• Makes plants green.
• Helps grasses, corn, alfalfa and tree crops stay strong.

Boron (B)

• Essential for seedling plant growth.
• Helps grasses, corn, alfalfa and tree crops stay strong.

Nitin (Ni)

• Helps make vitamin A.
• Prevents leaves from wilting.
• Required for protein production.
• Helps bees and some grass grow strong.

Copper (Cu)

• Helps make vitamin A.
• Prevents leaves from wilting.
• Required for protein production.
• Helps bees and some grass grow strong.

Manganese (Mn)

• Essential for seedling plant growth.
• Helps grasses, corn, alfalfa and tree crops stay strong.

Chlorine (Cl)

• Helps make vitamin A.
• Prevents leaves from wilting.
• Required for protein production.
• Helps bees and some grass grow strong.

Sodium (Na)

• Essential for seedling plant growth.
• Helps grasses, corn, alfalfa and tree crops stay strong.

Magnesium (Mg)

• Central part of chlorophyll, which helps plants capture energy from light.
• Added to sandy soils.
• Added to celery, potato and citrus plants.

Zinc (Zn)

• Regulates plant growth.
• Keeps young plants strong.

The Fresno Bee

Ad Number: 180050
Size: 11.5" x 11.5"
File: HS
Last User: None
Last Date: Wed Dec 29, 2007

What’s the Recipe for a Healthy Plant?

There are 17 natural nutrients plants need to be healthy. Three of them are: nitrogen, potassium and phosphorus. As plants grow, they take the nutrients from the soil. Farmers realize how important it is to return those nutrients so the next crop will grow. Fertilizers serve to replenish the soil with nutrients. Without the correct amount of nutrients, plants cannot grow properly.

Try This Activity

Read this fertilizer label and calculate the percentage of the nitrogen, phosphorus and potassium.

N=____ P=____ K=____

Try This Activity

Use the chart to decode the answers in the puzzles below.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
</tr>
</thead>
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<tr>
<td>J</td>
<td>K</td>
<td>L</td>
<td>M</td>
<td>N</td>
<td>O</td>
<td>P</td>
<td>Q</td>
<td>R</td>
</tr>
<tr>
<td>S</td>
<td>T</td>
<td>U</td>
<td>V</td>
<td>W</td>
<td>X</td>
<td>Y</td>
<td>Z</td>
<td></td>
</tr>
</tbody>
</table>

Try This Activity

Use the Health Hut menu to write a recipe for one of the “Healthy Products” on the right. Write a paragraph describing why you chose the nutrients you did. Be sure to get proper spelling and grammar and well-written topic and concluding sentences. Isn’t it amazing what plants need in order to grow?

Standards: Science – Grade 3: 1b, 3a, 3d; Reading – Grade 3: 2.3, Reading 2.4

“Healthy Products”

• Sweet juicy watermelon.
• Crispy green celery.
• Long stem roses.
• Your favorite plant.

Want to make a smoothie you can drink? Check out kids.cfaitc.org/wgo6/

Smoothe for Humans

• Sweet juicy watermelon.
• Crispy green celery.
• Long stem roses.
• Your favorite plant.

Using the Health Hut menu, pick ingredients from the Basic Blend, Super Supplements and Combo Blast menu and write a recipe for one of the “Healthy Products” on the right. Write a paragraph describing why you chose the nutrients you did. Be sure to get proper spelling and grammar and well-written topic and concluding sentences. Isn’t it amazing what plants need in order to grow?

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Who Uses Fertilizers?

Farmers and gardeners do. The type they apply depends on what the plants need. A crop like corn needs lots of nitrogen so a fertilizer with a high first number, like 3-2-0, would be used.

How are Fertilizer Boxes Labeled?

To find out the percentage of each particular nutrient, the three main nutrients are listed on the front of any fertilizer box, bottle or bag, there are three numbers. The numbers are always in a standard way so consumers do not get confused. On the smaller label, the three numbers are always in the front of any fertilizer box, bottle or bag, there are three numbers. The numbers are always in a standard way so consumers do not get confused. On the other substances are listed on a smaller label.

Sulfur

• Helps make plant proteins.
• Promotes new growth and weak plants.
• Helps build resistance to root diseases.
• Helps strong and others their smell.

Calcium

• Helps new seeds to form.
• Helps keep stems strong.
• Helps keep flowers and buds on stems and branches.

Iron

• Required for chlorophyll production.
• Makes plants green.
• Helps grasses, corn, alfalfa and tree crops stay strong.

Manganese

• Helps make Vitamin A.
• Prevents leaves from setting.
• Required for protein production.
• Helps trees and other grass grow strong.

Copper

• Helps make Vitamin A.
• Prevents leaves from setting.
• Required for protein production.
• Helps trees and other grass grow strong.

“Let’s see… I’ll start with the Basic Blend, add supplement shots of iron, zinc, and copper... and I’ll top it off with a combo blast.”

“Got it! Well, here are the recipes…”

Basic Blend

• Nitrogen: Helps plants grow quickly.
• Found in chlorophyll, which helps plants capture energy from light.
• Part of DNA and RNA, the genetic material that makes plants what they are.

Potassium

• The essential mineral involved in lots of important reactions.
• Helps plants react to stress and drought.
• Helps build resistance to root diseases.
• Helps strong and others their smell.

Phosphorus

• The energy—helps store and transfer energy.
• Annual plants like marigolds require a lot of phosphorus.
• Stimulates root growth.
• Helps flowers bloom.
• Helps plants make seeds.

Nitrogen

N=____ P=____ K=____

Try this Activity

Read this fertilizer label and calculate the percentage of the nitrogen, phosphorus and potassium.

Try this Activity

Use the chart to decode the answers in the puzzles below.

Chemistry Code

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

18 15 11 13 1 6 19 3 4 5 14 2 16 18 15 9 11 12 14 20 13 5

12 6 14

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• Helps plants make seeds.
Plants are the primary source of matter and energy entering most food chains.
California produces 99% or more of these 12 commodities that are distributed in the United States. Identify the counties where the commodities are produced. Draw a line from the commodity stamp to the appropriate counties on the map.

- **Walnuts** - San Joaquin, Tulare, Stanislaus
- **Olives** - Tulare, Tehama, Glenn
- **Almonds** - Stanislaus, Kern, Merced
- **Raisins** - Fresno, Madera, Tulare
- **Clingstone Peaches** - Stanislaus, Sutter, Yuba
- **Persimmons** - Fresno, Tulare
- **Pomegranates** - Tulare, Fresno
- **Rice** - Colusa, Sutter, Glenn
- **Artichokes** - Monterey, Riverside, San Benito
- **Figs** - Madera, Merced
- **Dried Plums** - Sutter, Tehama, Glenn
- **Ladino Clover for Seed** - Sacramento, Glenn

Did You Know?
Ladino Clover is grown for pasture. California produces 99% of the seed for the rest of the country.

Try This Activity
California produces 99% of the nation's dried plums, valued at $130,500,000. What is the value of the remaining 1%?

Get more information:
- [Commodity cons](https://kids.caftc.org/wgo6/passport)
- [Standards](http://nass.usda.gov)
The Fresno Bee

Ready... Set...

Germinate or Terminate?

Some substances promote seed growth better than others. Compare these substances as seed sprouting nurseries. Hypothesize which liquids will provide the best environment for the seedlings and write a list of your favorites.

Try This Activity

Get five sealable bags, five cotton balls (or substitute paper towels or coffee filters) and five of the following substances (or choose some of your own): liquid fertilizer, coffee, lemon juice, shampoo, tap water, vinegar or paint. Soak each cotton ball in a different liquid, then label each one in its own paper bag, put five seeds in each. Observe for one week.

Standards: Science – Grade 3 - 6d, 6e; Grade 4 - 6d, 6f, Grade 5 - 6b, 6d, 6h; Grade 6 - 7a; Grade 8 - 9a; ELA – Grade 4 - Reading 2.4; Writing 2.1a; Grade 5 - Writing 2.3a

Desktop Garden
Create a tiny garden for your desktop!

Preparing your Garden Plot

1. Take a clean lid from a peanut butter jar or plastic soupcup lid.
2. Lay a damp tissue inside the lid.
3. Sprinkle seeds on the area where you want growth to occur: Leave room for small rocks or other items you want to use to perk up your garden. (Use mustard seeds or cress seeds. They are speedy growers and will sprout anywhere as long as they are damp!)
4. Cover the lid with a thick piece of cardboard to block the light and allow seeds to germinate.
5. Check your garden everyday until you see little shoots growing, then you may remove the cardboard. Be sure to continue to keep your tissue damp.
6. Once your seeds have sprouted let them grow by watering your desktop garden regularly. Decorate your gardens with small cars, rocks and even marbles.

Spuds for your Buds!

Make a flower shop bouquet using a potato, straws and flowers. Lay the potato on its side and stick a few straws into the top of the potato. Fill the straws with water and then place the stems of the flowers inside the straws.

Can Plants Grow Without Water?

The ancient Aztecs in Tenochtitlan (present day Mexico) were short of farmland because they were located near a lake, high in a mountainous area. To make up for this problem, they began planting on the tops of rafts called Chinampas. Today, some growers use a method called hydroponics where plants are grown in water and have support from fertilizers but no soil.
Standards:
- English Language Arts (ELA)
  - Grade 3: Reading 2.7, Writing 1.1
  - Grade 4: Reading 2.2, Writing 1.1, 2.3b, 2.3c
  - Grade 5: Reading 2.3b, 2.3c, Listening and Speaking (LS) 2.2b, 2.2c
- Science
  - Grade 3: Physical 1.a, Life Science 3.a
  - Grade 4: Physical 1.b, Life Science 3.b
  - Grade 5: Physical 1.g, Life Sciences 2.e, 2.f, 2.g

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**Grow!**

**Kooky Containers**

Don’t have room for a garden? Not a problem! You can grow plants inside anything that will hold soil and has holes in the bottom for water drainage. Try some of these alternative garden containers:

- Tires
- Old boots/shoes
- Plastic deli containers
- Milk cartons/jugs
- Hanging latex gloves
- Wheelbarrows
- Empty cans (soup, coffee, etc.)
- Old bathtubs
- Horse troughs
- Buckets

---

**In a Hurry?!**

These plants will reward you with fast results! Expect to see growth within three weeks. Remember to water, but not over water. Use containers that are at least 6" wide.

**Mangos** – Scrub hairs off husk. Dry husk, cut tips off husk. Cut husk open for the seed inside. Soak seed. Plant!

**Radishes** – Poke tip of finger in soil, place one radish seed in each hole and cover.

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**S.O.S: Save our Soil**

Have each of your friends scoop up some soil from different areas and put it into a sealable bag. Compare the different bags. Put each bag of soil to its own jar. Fill to the top with water. Shake. Let it settle. See if you can identify the sand, silt, and clay that makes soil.

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**Ecosystem**

Recycling! Wet some sheets of newspaper and form them over a small pot until the newspaper is dry. When it dries, pull off the newspaper pot and plant seeds in it. After they sprout, transplant the entire newspaper pot and sprouts directly into the ground!

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**Photosynthesis**

Process by which green plants, using chlorophyll and the energy of sunlight, produce carbohydrates from water and carbon dioxide and release oxygen.

\[ 6CO_2 + 12H_2O \rightarrow C_6H_{12}O_6 + 6O_2 + 6H_2O \]

Help the plant create oxygen for you to breathe. Label each step of the process to create simple sugars (energy) for the plant.

---

**Try This Activity**

Standards:
- Science 3rd: Physical 1.a, Life Science 3.a
- Science 4th: Life Science 3.b
- Science 5th: Physical 1.g, Life Sciences 2.e, 2.f, 2.g
Going Whole Hog!

More than Just the Squeal!

Today’s pork is as lean as chicken and a healthy choice. A recent study at Purdue University shows that pork has a positive effect on diets, especially with women. Pigs are used for meat and for much more! There are hundreds of products made with pig by-products. Hogs are the source of over 40 medicines and pharmaceuticals!

• Heart valves for heart surgery
• Epinephrine for allergies
• Insulin for diabetes

Can you find a use?

Pig By-products are Found in Many Other Things, too!

Sports and Leisure
Football
Glove
Wallet

In the House
Pig ear dog treat
Buttons
Bone china
Fabric softener
Antifreeze

At School
Glue
Artist brush
Crayons
Chalk

Recycle your newspaper!
Use your paper to make a paper mache piggy bank!

Standards: Visual and Performing Arts
- Grade 3 – 2.5

Pigs are monogastic - meaning they are simple-stomached like humans. They primarily consume grain products.

Across the Nation ...

Activity

Which state is the number 1 hog producer? For the answer, visit kids.caftc.org/wgo6/hog.
Apiarist – A beekeeper.
Aztec – A member of a tribe of Indians from Mexico before the Spanish conquest.
Biography – A written account of someone’s life.
Biotechnology – The use of micro-organisms, such as bacteria or yeast, or biological substances, such as enzymes, to perform specific industrial or manufacturing processes.
Brood – The area in a bee hive within the combs in which young bees are reared; the eggs, larvae.
By-product – A part of a commodity used for something other than the commodity’s primary purpose.
Chinampas – A crop or garden floating in water.
Commodity – A transportable resource product with commercial value.
Consumer – Any living thing that depends on the energy stored in other living things for its food supply; individual that purchases and uses goods and services.
Cultivate – Tillage of the soil to promote crop growth after the plant has germinated and appeared above ground.
Drone – A male honey bee that hatches from an unfertilized egg. It is larger than a worker bee, does not gather honey and has no sting.
Ethanol – C₂H₅OH; chemical formula blended with gasoline to make gasohol.
Fertilizer – Any natural or manufactured material added to the soil to supply one or more plant nutrients.
Harvest – To cut, reap, pick, or gather any crop or product of value.
Hybrid – A plant or animal resulting from a cross between parents that are genetically unlike.
Hypothesize – An educated guess; to believe especially on uncertain or tentative grounds.
Matter – Material substance that occupies space, has mass and is composed predominantly of atoms.
Monogastic – Refers to an animal that has only one stomach or stomach compartment, such as swine or humans.
Nitrogen – N; a gas that occurs naturally in the air and soil, where it is converted into usable forms for plant use by bacteria and other natural processes. This nutrient is a constituent of protein and is vital to plant-growing processes.
Nutrient – A substance which favorably affects the nutritive processes of the body.
Pasture – Ground on which such vegetation grows, especially that which is set aside for use by domestic grazing animals.
Phosphorus – P; a chemical element found in soil in various mineral forms, but only small amounts are readily available to plant at any one time. It stimulates early growth and root development.
Pollination – The transfer of pollen from the anther to the stigma of a flower; the first step in production of a fruit or seed.
Pomace - Solid matter that is left after olives are crushed and the oil has been removed.
Potassium - K; the chemical element, an alkali metal, which occurs widely in minerals.
Queen bee – A fully developed, mated, female bee, larger and longer than a worker bee, whose function is to lay eggs.
Reeds – Any tall, slender plant, usually having coarse and jointed stems, including certain grasses and grass-like plants.
Silt – A textural class of soils.
Square dance - American country dancing in which couples form squares.
Stock report – A resource displaying the purchase and sale of stocks and bonds.
Substance – That which has mass and occupies space.
Worker bee – A female bee, other than the queen, whose organs of reproduction are only partially developed, who gathers nectar and pollen, tends to the brood, brings in water and protects the hive.

Choose five words from the glossary. Write the words on numbered lines to the right. Then find each word in the dictionary. After you find a word, write the guide words for that page on the lines.
The radish is one of the oldest vegetables in the world. No one knows where it originated.

Lightning and special bacteria called Rhizobia naturally convert nitrogen into forms that plants can use.

Phosphorus is the second most abundant mineral nutrient in the human body. Nearly 80% of phosphorus in humans is found in bones and teeth. Where do we get phosphorus? From the plants and animals we eat!

A honeybee has three pairs of legs and four wings and it is the only insect that produces food eaten by humans.

Farmer and ranchers in 2006 received only 19 cents out of every dollar spent on food. The rest went for costs beyond the farm gate: wages and materials for production, processing, marketing, transportation and distribution. In 1980, farmers and ranchers received 31 cents.

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