Tomato Time

Lesson 1. Tomato Production in California and in our Local Region

Activity Directions
Choose one or a combination of these teaching methods to introduce students to this general information about tomato production in California:

- Guided discussion reinforced by use of maps and photos (Supplementary Materials)
- Reading assignment using the following facts (Supplementary Materials)
- Writing assignment about tomato production using the following facts
- Math assignment that focuses on the numerical information

Tomato Production Information

1) California is famous for the production of both ***processing and fresh market tomatoes***. Processing tomatoes are the main ingredient of most canned tomato products such as tomato paste, spaghetti sauce and ketchup. Fresh market tomatoes are generally eaten raw in salads or on sandwiches or used in home preparation of cooked tomato dishes.

2) About 300,000 acres of California farmland is used to grow processing tomatoes. About 40,000 acres of CA farmland is used to grow fresh market tomatoes. In Yolo County, 37,000 acres are used for processing tomatoes and generally less than 1,000 acres for fresh market tomatoes.

3) California produces about 96% of the processing tomatoes grown in the US.[i] This is 50% of the processing tomatoes grown worldwide. Yolo County produces 20% of the processing tomatoes grown in California or 10% of the processing tomatoes grown worldwide.

4) California produces about 33% of the fresh market tomatoes grown in the US. Sacramento County is one of the largest producers of fresh market tomatoes in our state.

5) Processors turn most of the processing tomatoes into concentrated tomato paste. The soluble solids (sugars) in tomatoes get concentrated over six times when they turn from fresh tomatoes into paste. Pizzas are a big end user of tomato paste.

6) The world's largest and most efficient tomato processing plant is located nearby in Williams, California. It is Morning Star's paste plant. This facility processes approximately 630 tons of tomatoes (126,000) pounds of tomato paste per hour.

7) UC Davis was instrumental in the development of the mechanical tomato harvester which became the UC Blackwelder. Separately, a local tomato grower (Bob Button) also built a tomato picker in his own shop. The Button-Johnson is built locally in Woodland. Development of the mechanical harvester dramatically changed the labor that is used in tomato harvesting in CA. This reduced the number of jobs for field workers and reduced the cost of tomatoes for the consumer.

Bibliography

Hartz, Tim and Miyao, Gene. *Processing Tomato Production in California*. UC Division of Agriculture and Natural Resources Publication 7228.

Le Strange, Michelle, and Wayne L. Schrader. *Fresh Market Tomato Production in California*. UC Division of Agriculture and Natural Resources Publication 8017.

Miyao, Gene, Yolo County Farm Advisor, *Personal correspondence with JC Hillhouse*, January 2002.

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[c] http://www.ers.usda.gov/topics/crops/vegetables-pulses/tomatoes.aspx

Tomato Time

Lesson 2. Tomato Plant Life Cycle

Use the ***Tomato Time*** plant life cycle cards (template for reproduction is in Supplementary Materials) to allow students to learn stages of development of the tomato plant. These cards show an image of the plant on one side and name the plant life cycle stage on the other.

Materials

- *Tomato Life cycle cards*

Optional Additional Materials

- *Tomatoes*
- *Tomato seeds*
- *Tomato plants*
- *Plant Parts Chart*

Activity Directions

1) Students are given a set of the life cycle cards and asked to put them in the order in which they think they take place over time. Students can use the images only, words only, or a combination of the two. This can be done in small groups or individually. Ask students to explain why they chose the order that they did.

2) Students will typically lay the cards in a line starting with the earliest stage on their left. If so, ask them to keep the life cycle cards in the same order, but try arranging the cards in a circle. This reinforces the concept of the cycle.

3) Enrich this experience with real samples of tomatoes at these different life cycle stages. If there are tomatoes growing in the school garden, visit them and discuss what stage they are at in their life cycle. Do mature plants have flowers on them? Do they have fruits on them? Which comes first? Look at real tomato seeds available in seed packets from a nursery and then look at a real tomato fruit and see what is inside of it. Do the seeds look the same? Use the Plant Part Chart in Supplemental Materials to help guide children about the parts of the tomato plant that they are seeing at each life cycle stage.

Tomato Time

Lesson 3. Making Salsa Fresca (Fresh Salsa)

Adapted from "Kids Cook Farm Fresh Food" by Sibella Kraus

In this activity, students work in small groups and use tomatoes to make (and eat) a bowl of fresh salsa. This recipe has been adapted for 2nd graders. There is no use of sharp knives by children. The recipe directions are simple and can be read by teacher and students together or by students on their own.

Tomatoes and other ingredients may be harvested from the school garden when available (see *Lesson 7. Growing Tomato Plants at School*) or they may be purchased. If at all possible, buy tomatoes that have been grown locally and picked recently because they will be freshest and tastiest. These are generally available at local farmers' markets. This activity should be conducted in September or early October at the latest, to take advantage of the tail end of the tomato harvest season.

For this activity, you will divide your typical class of 18-20 kids into 4 cooking groups of 4-5 children each. Each group is provided with a cooking kit. The small groups allow for involvement by each child in every step of the process. The recipe is carefully designed so that each child can chop one tomato, prepare one sprig of cilantro, peel and press one small clove or piece of garlic. When you see "4-5" in the recipe, adapt for either 4 or 5 children in the cooking group. The salsa turns out great either way.

Activity Directions

1) Start by having all children wash their hands with soap. Discuss the importance of keeping hands away from their noses and mouths while preparing food.

2) Next, orient the children to the items in their cooking kit. Each piece of equipment has a purpose and will be used in preparing the salsa.

3) Demonstrate to the class how to prepare each ingredient and then let the students do it themselves in their small groups. Children can use the recipe sheet provided (Supplementary Materials) to read along with each step in the salsa preparation. Pass out each ingredient after you have demonstrated how to prepare it. Show them what it means to "dice" a tomato, and how to

separate cilantro leaves from the stem and then chop the leaves into smaller pieces. When it comes to juicing the ½ lime, each child can take one turn with the juicer and then pass the lime and juicer on to the next person in their group. After 4 or 5 children have had a vigorous turn at it, the lime is generally well-juiced.

Preparation required before doing the activity with the class

This activity involves a good amount of preparation beforehand to collect all the cooking equipment and ingredients. Assign this to one or two parents or aides if possible.

1. Collect the following cooking kit equipment for each group of 4 or 5 children
    - *1 medium-sized mixing bowl*
    - *1-2 mixing spoons*
    - *2 or 3 small cutting boards*
    - *5 small knives for tomatoes (plastic or metal <u>with serration</u> works great)*
    - *1 garlic press*
    - *1 juicer*
    - *One 1/4 cup measure*
    - *One copy of the salsa recipe (Supplementary Materials)*

2. Harvest, purchase or collect the following ingredients or items
    - *20 small tomatoes*
    - *20 sprigs of cilantro or one bunch cilantro*
    - *One small to medium sized red onion*
    - *1 head of garlic*
    - *2 limes*
    - *Salt shaker*
    - *Two bags of corn chips (no fancy flavors)*
    - *Small paper cups and napkins*

3. Wash tomatoes and cilantro.

4. Finely chop one medium red onion.

5. Separate garlic into cloves and cut any large cloves into 2 or 3 smaller pieces.

6. Cut limes in half or plan to do that for the children during the activity.

Recipe for Salsa Fresca

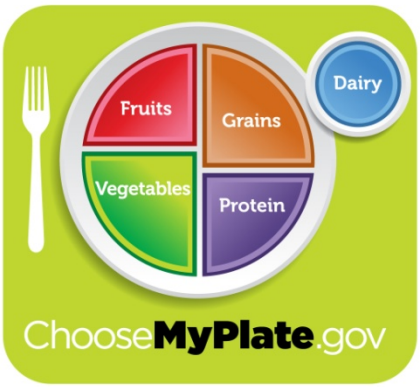
(Children can follow along as the leader instructs them)

Ingredients	**Directions for Preparation**
4-5 small tomatoes	Remove the stem. Dice and add to bowl.
4-5 sprigs of cilantro	Remove leaves from stem. Chop and add.
1/4 cup finely chopped red onion	Measure and add.
4-5 small cloves or pieces of garlic	Peel, squeeze through garlic press, and add.
Juice from 1/2 lime	Juice using citrus juicer and add.
4-5 shakes of salt	Add.

Tomato Time

Lesson 4. Eating from MyPlate

Immediately after the excitement and bustle of making salsa, take time for a discussion about eating and nutrition. Below is some background information for talking with students about the role of tomato as a food and its importance to our health. You can follow that with a more general discussion of MyPlate to encourage good eating habits.



Tomato Versatility

Ask students for examples of foods containing tomatoes.

On average, Americans consume almost 80 pounds of tomatoes per person every year. These versatile fruits end up in everything from pasta and pizza to barbecue sauce and can be stuffed, boiled, stewed, pureed, deviled, glazed, pickled, grilled and fried. Ketchup, tomato sauce, pizza, tamales, cocktail sauce, tomato juice, meatloaf and barbecue sauces have many different flavors, but tomatoes are a main ingredient in these.

Nutrition Information

Ask students if they know of any vitamins that tomatoes contain.

A tomato stores a lot of good stuff in its 26 calories, such as ½ gram of fiber, 25% of the RDA for vitamin A, one gram of protein, a bit of vitamin B6, riboflavin, niacin, almost half the RDA for vitamin C and even a pinch of the minerals: zinc, iron, magnesium, manganese, and copper. It is low in sodium and high in potassium, which is just what your body needs.

Ask students if they have ever seen a green tomato. What makes a tomato red?

Lycopene, the nutrient that gives tomatoes their red color, is also a top antioxidant. Lycopene can help lower the risk of all cancers, particularly prostate cancer. While lycopene is found most abundantly in tomato

products, it is also found in guava, watermelon, and pink grapefruit.

Tomatoes are usually picked when green, and they ripen off the vine in transit to your home. They make more lycopene as they get riper and redder. Our body absorbs more lycopene from tomatoes when they are cooked into sauce, paste, and salsa than it does when they are raw. Tomato processing concentrates the amount of lycopene in the final product.

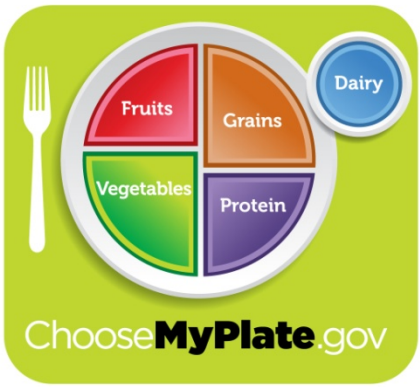
Is it a fruit or is it a vegetable?

Ask students if they think a tomato is a fruit or a vegetable. Talk about what is a fruit for a plant vs. what we usually think of as fruits (and vegetables) from a culinary point of view.

The United States Congress passed the Tariff Act of 1883, requiring a 10% tax on imported vegetables. A few years later, a tomato importer decided to challenge the law on the grounds that a tomato was technically a fruit, not a vegetable, and should be exempt from the tax. The case posed merit enough to go before the Supreme Court.

In Nix vs Hedden, 149 U.S. 304 (1893), Justice Gray wrote, "Botanically speaking, tomatoes are fruits of a vine, just as are cucumbers, squashes, beans, and peas. But in the common language of the people... all these are vegetables, which are grown in kitchen gardens, and which, whether eaten cooked or raw, are, like potatoes, carrots, parsnips, turnips, beets, cauliflower, cabbage, celery and lettuce, usually served at dinner in, with or after the soup, fish or meats which constitute the principal part of the repast, and not, like fruits generally as dessert."

Eating from MyPlate Activity



June 2011: USDA changes from myPyramid to MyPlate

Background Information

Reasons for the change:

1. The plate is a highly recognizable, easy-to-understand icon. The visual of portions of food on a plate makes much more intuitive sense, as compared to portions previously represented by sections of the pyramid. Almost anyone of any age can look at the plate and gain an immediate visual picture of how much of each kind of food group he/she should be eating at each meal.
2. The portions are in line with and support the *2010 Dietary Guidelines for Americans.* It is easier to see on a plate that about half of a meal should consist of fruits and vegetables.
3. This format is much easier to use as an educational tool than the pyramid, which required a complex translation from vertical stripes to daily servings.
4. **For resources and information, go to: http://www.ChooseMyPlate.gov**

Activity

Share the new MyPlate icon with students.[1] Explain that when you look at this plate, it is very easy to see what you are supposed to eat and how much.

1. **Ask them to identify the major food groups represented on the plate -- fruits, vegetables, protein, grains and dairy-- and give examples of what they eat from each group.**
    - *Name some favorite fruits and vegetables.*
    - *What kinds of food are included in the protein group?*
    - *What kinds of foods are in the grains group? What are "whole grains"? (if they don't know, explain what they are and why they are more healthful--vitamins, fiber, etc.)*
    - *Besides milk, what could be in the dairy group?*

[1] You can download blank copies of MyPlate in English or Spanish for students to color, available at www.choosemyplate.gov under "Print Materials."

2. **You need to eat different amounts of different foods.**
    - *How much of the plate is taken up with fruits and vegetables? (Half) So about half of your meal should be fruits and vegetables.*
    - *What about grains and protein? (Half)*

3. **Messages to reinforce[2]:**
    - *Enjoy your food, but eat less.*
    - *Avoid oversized portions.*
    - *For milk, switch to fat-free or low-fat (1%).*
    - *Drink water instead of sugary drinks.*

4. **Let's look at the salsa you made.**
    - *What food groups do salsa and chips fall into?*

5. **Distinguish between "everyday" snacks and "sometimes" snacks**.
    - *Fruits and vegetables are good choices for snacks to eat anytime. Fats and sugars are "sometimes" snacks – it's okay to eat them every once in a while, but these foods are the least helpful for maintaining good health and long-lasting energy.*
    - *Ask students to give examples of "everyday" and "sometimes" snacks.*

6. **Discuss the need for physical activity.**

7. **Reinforce the main ideas:**
    - Eat a variety of different foods.
    - Choose whole grain products.
    - Eat about half of your food as fruits and vegetables each day.
    - Limit the amount of fat and sugar.
    - A moderate quantity of protein foods is required daily.

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[2] From www.ChooseMyPlate.gov "Dietary Guidelines 2010: Selected Messages for Consumers." This document contains additional messages geared for adults. The messages here are highlighted to support the discussion points. Use age-appropriate language for these messages.

Tomato Time

Lesson 5. Seed Saving with Tomatoes

When the tomato growing season is nearing its end, but before the temperatures start dropping in the fall, it is time to save seeds from the tomato crop so they can be grown again the following spring.

Seed saving for tomatoes is only appropriate with *non-hybrid* tomato varieties. If you save seed from a hybrid crop and replant that, the subsequent crop will be very different and generally not as good. Seed packets are not always explicit in giving you information about whether or not a variety is hybrid. Look for terms *heirloom*, *heritage*, or *open-pollinated* to describe varieties that are not hybrid. We recommend the variety 'Ace' for this activity because it is hardy, productive, and has a good-size fruit for the salsa recipe, but feel free to explore other great varieties that can be grown here.

Materials

<u>Day 1</u>

- *Serrated plastic knives*
- *Cutting boards, plates or suitable surface for cutting tomatoes*
- *Jar*
- *Fabric and rubber band to cover jar opening*

<u>4-5 Days Later</u>

- *Strainer*
- *Large jar or pitcher and water for cleaning seeds*
- *A plate, cutting board or cookie sheet*

Activity Directions

Day 1

1. Children pick tomatoes from the garden. For seed saving, you want to harvest from as many ***different plants of the same variety*** as possible. However, you don't need more than a few tomatoes from any one plant. Ideally you would harvest 1-2 fruits from at least five different individual plants of one variety.
2. Slice tomatoes in half and squeeze the inside juicy seedy stuff into a single wide-mouth plastic container. Set the meaty part of the tomato aside to be eaten or composted. Add water to the seeds to double the total volume of liquid.
3. Leave the seeds at room temperature for 4-5 days or until a film of mold forms on the surface. This does not look nice but it is an important part of the tomato seed saving process. It breaks down the jelly coat surrounding the seed making the seed cleaner for storage and most importantly, eliminating chemicals in that gel that otherwise prevent the seeds from sprouting. If there are flies in the room, cover the container with cheese cloth or other fabric to keep them out of the mixture during these days.

4-5 Days Later

4. Remove the mold film. Add enough water to double the liquid mixture once more and stir thoroughly. The good tomato seeds sink to the bottom. The ones that float are unlikely to germinate. Pour excess liquid off the top along with the "floaters" and rinse the remaining seeds several times through a strainer. It is easiest to do this at a sink.
5. Spread the cleaned seeds on a glass or ceramic plate, a cutting board or a cookie sheet. Do not put them on paper or plastic wrap because they will stick as they dry and be difficult to remove.
6. Place them in the classroom away from direct sunlight or heat to dry for several days.
7. Once dry, have the children inventory the seed that has been saved. Apply math lessons in counting and estimation to complete this task.
8. Store the seed in a jar or a paper envelope in a dark location that is not subject to extreme changes in temperature or humidity. A classroom cabinet or desk drawer will work fine to keep seed viable for 1-2 years. For longer term storage, use an airtight container and store in a cool, dry place or refrigerate.

Bibliography

Ashworth, Suzanne. *Seed to Seed.* Seed Savers Exchange, Inc. Decorah, Iowa. 1991.

Tomato Time

Lesson 6. Field Trip to a Local Farm

Plan a field trip for April or May to visit a local farmer who grows tomatoes. Find out what the farmer's job is all about. How are growing practices on a farm different from those in the school garden? Where do farmers sell their tomatoes and how do they get the product from the farm to the market? If possible, help the farmer with a task at the farm such as planting, weeding or watering.

Be Prepared

A farm can be a big place but second graders generally thrive in this open environment. They are able to move around and take in new sights at the pace required to see a farm operation. However, make sure that you come prepared! ***Farms are not child-proof!*** Give your students and chaperones clear guidance before the tour. Students should stay well clear of farm equipment, even while it is not in use, unless specifically invited to look closer or touch. Students should dress in clothes they can get dirty and wear close-toed shoes.

Some growers may be happy to host your class but may not be accustomed to working with large groups of children. A good conversation with the grower before the tour to talk over logistics and expectations is a must so that no one gets surprised. If possible, arrange for reasonable hands-on activities to complement discussion. Make sure that the travel time and the activities at the farm allow for the snacks and bathroom breaks that the students are accustomed to.

Prepare your students with a classroom session before the farm visit. Review rules that the students should abide by during the visit. Prepare students for the trip by using a map to show the route from the school to the farm. With the map, compare and contrast land use in urban, suburban, and rural environments. Discuss the contrasts students will see in the landscape while traveling from their school to the farm.

Setting up a Farm Visit

A few farms in this region typically will host groups of school children and may advertise. Other farms may be willing to host your group, but you will need to do more work to find them. For help with this, try these local resources and check the Supplementary Materials for more specific ideas.

1) First look to any farm families associated with the school. If they don't grow tomatoes, they may have associates who do. Personal connections generally work well.

2) Community Alliance with Family Farmers (CAFF) has representatives who work with growers throughout this region. This group has been specializing in Farm-to-School Programs that connect growers to elementary schools. www.caff.org/programs/farm2school

3) Check with your county UC Cooperative Extension Farm Advisor. Ask to speak with a specialist who works with tomatoes or with small farmers in general and see if he or she can recommend a local grower.

4) Be prepared to pay a field trip fee of up to $5.00/student. A farmer's time is valuable and compensation for hosting your group makes it possible.

After the Visit

Use this rich experience to inspire grade-level appropriate English-language arts activities such as writing a narrative based on their experience at the farm or writing a friendly letter to thank the farmer for the visit

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Lesson 7. Growing Tomato Plants at School

The final lesson in this program is planting tomato plants in your school garden in the spring. These will be the plants that will be harvested the following fall by the new second graders for their salsa making activity. This final activity gives the children complete exposure and familiarity with all parts of the tomato plant life cycle. It also allows them to do something important and generous for the upcoming class of second graders.

While you can have earlier tomatoes in this region, your goal with this planting is to have tomatoes ready to harvest in September after the start of school. To achieve this, plant your seeds in containers early to mid-April and transplant into your school garden, mid-to-late May. This allows a few weeks for the class to watch the plants grow and to make sure they are established before school lets out.

For a class of 20 to make salsa, you will need 5 productive plants that have been maintained throughout the summer. If you have the space, plant 8-10 plants to increase your likelihood of a good harvest.

You may want to experiment with other varieties, but initially we recommend that you use 'Ace' variety tomatoes. This variety is readily available, the plants are hardy, the tomatoes are a good size for the salsa recipe, and most importantly it is not a hybrid which makes it an appropriate variety for seed saving as described in Lesson 5.

Materials

- *tomato seed*
- *potting mix*
- *flats, 6-pack containers, or newspaper pot molds*
- *plant labels*
- *gardening tools for bed preparation and transplanting*

Activity Directions

Seeding tomatoes in seed flats, 6-packs, or newspaper pots

1. Fill your seed flat with moist potting mix. Make small depressions in each cell with your finger. Drop 1 seed (2 if your seed is more than one year old) into each cell and gently cover. Water lightly with fan sprayer or watering can.

2. You can keep the flats in a greenhouse or cold frame if available or in a warm sunny south-facing window while the young plants grow. This will be the best environment for rapid growth. The flats will need to be checked and watered lightly each day. You should see the seedlings emerging in 6-8 days.

Transplanting Tomato Seedlings into the School Garden

1. Four weeks after seeding the tomatoes, prepare a bed or a portion of a bed in the school garden for planting. See the reference on bed preparation in the Supplementary Materials and/or talk with a local gardener to gain insight into working your local soil.

2. After plants are 6-8 inches tall (generally 4-6 weeks from seeding), transplant them into your beds. Tomato seedlings are transplanted deep. This means that the stem is buried up to the first leaves. Space the plants 2 feet apart. Dig the holes first, fill with water and then transplant your young tomatoes. Plants will need to be supported with tomato cages or trellising. These can be put in place immediately or added 3-4 weeks after transplanting. You may have more seedlings than you need or than you have space for in the garden. If so transplant extras into 4" pots and let the children take them home.

3. Water the tomato plants in your garden every 2 days for the first week after transplanting. After that, switch to **deep** watering every 4-6 days. This encourages the tomato plant roots to grow deep into the soil and discourages excess weed growth. Make sure that arrangements are made for taking care of the plants in the school garden over the summer.

4. Mulch with straw all around the young plants to protect them from extreme outdoor conditions. Mulching will also keep weeds from growing up around the plants and competing with them for water, nutrients or sunlight. Two to three weeks after transplanting, remove any weeds that have grown up around the young plants.

Recipe for Salsa Fresca (Fresh Salsa)

Adapted from "Kids Cook Farm-Fresh Food"

Cooking Directions

Prepare each ingredient as directed and put into the mixing bowl. Stir just until all ingredients are evenly mixed. Enjoy with chips.

Ingredients	Directions for Preparation
4-5 small tomatoes	Remove the stem. Dice and add to bowl.
4-5 sprigs of cilantro	Remove leaves from stem. Chop and add.
1/4 cup finely chopped red onion	Measure and add.
4-5 small cloves or pieces of garlic	Peel, squeeze through garlic press, and add.
Juice from 1/2 lime	Juice using citrus juicer and add.
4-5 shakes of salt	Add.

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4-5 shakes of salt	Add.

Planting the Tomato Plant
Tomato / El Tomate

Planting Instructions:

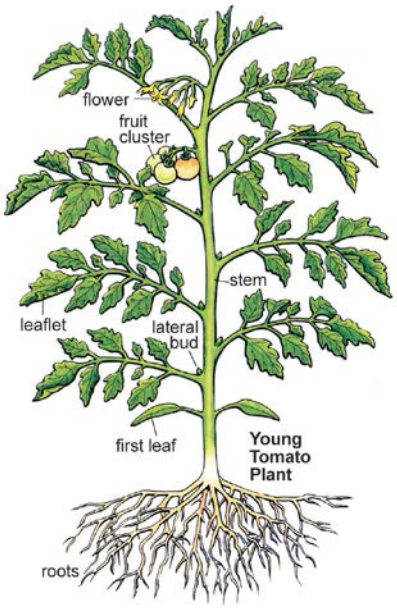
1. ***We will be planting tomatoes from seedlings.***

2. ***Plant seedlings in rows, spaced about 2 feet apart.***

3. ***Plant the seedlings "as deep as you dare" up to the first set of leaves. Why? Because tomato stems buried under the ground will sprout roots. The more roots, the stronger and healthier the plant will be.***

4. ***Since tomatoes are vine plants, we need to provide cages or poles to support the plants as they grow taller.***

5. ***Depending on the variety of tomato, you can expect to harvest tomatoes in about 8 to 10 weeks.***



Preparing Soil for Planting

To forget how to dig the earth and to tend the soil is to forget ourselves.
~ Mohandas Gandhi

Introduction to Soil

There are many appropriate ways to prepare soil for planting. The following are some guidelines to help you as you learn what works best for you and your garden.

Soil composition

Soil is made from decomposed rock particles, organic matter from decomposing plants and animals, air, water, and living organisms. Soils differ in the quantities and characteristics of each of these components, but all five are essential for healthy soil.

Soil texture and type

Soil type is generally classified by the size of the broken down rock particles in the soil: sand has a large particle size, silt has a medium particle size, and clay has a very fine particle size. The proportion of sand, silt and clay particles determines the texture of your soil and affects drainage and nutrient availability.

Soil water-holding capacity

This refers to how much water the soil will hold. Sandy soils have large particles and a very low water holding capacity—water drains through them quickly. Clay soils have very fine particles and a very high water holding capacity. Knowing this is important because it tells you something about how often and how much you will need to water your plants.

Soil structure is determined by how individual soil particles aggregate. Good soil structure allows for water, oxygen, and microorganisms to penetrate the soil and that in turn increases the amount of nutrients available to plants. Structure can be influenced greatly by management. Consistently adding compost to a soil will improve its structure, increase its water holding capacity, and make it easier to work in the long run.

Soil testing

A professional soil test will provide you with a wealth of information about your soil, including its type, pH level (relative acidity or alkalinity) and nutrient levels. If you are starting a new garden and have concerns about potential soil toxins, such as lead, in your area, a soil test that screens for common environmental toxins is a good idea.

Preparing soil for planting

Your primary goal is to loosen the soil so that roots, water, and oxygen can easily penetrate the soil environment. Secondary goals are to mix in compost or other soil amendments and to build a bed or "plant place" that is distinct from paths or "people places."

Pre-irrigate to prepare the soil

The amount of moisture in your soil before you start digging is the most important factor in determining how difficult and how effective your work will be.

- Too little water and the ground is hard and the clods don't break up easily. The beneficial "crumb" structure is fragile when the soil is too dry and can break down into dust when worked.
- Too much water and the ground is heavy. Mud sticks to your implements and you tire yourself out just moving the weight of water in the soil. The crumb structure is also fragile under wet conditions and is easily compacted when worked.

Irrigate areas well at least two days before you plan to work them. Test the soil for the right moisture level by making a ball of soil in your hand. If the soil is wet enough to stick together but then dry enough to break apart into small pieces when squeezed or tapped, you are at the right moisture level for digging.

Suggested steps for “single digging” a bed

This means loosening the soil one implement depth below the surface. Single digging can be easy and fun, after the first few times your soil is worked and once you have had crops growing in it for a few seasons.

1. Clear all plants and other debris off the bed.
2. Thoroughly wet the bed as described above.
3. Thoroughly loosen the soil using a digging fork or spading fork. If children are helping with bed prep, consider using hand trowels instead of large tools.
4. Rake the surface smooth and level and rake up the edges of the bed so that they are clearly defined.
5. Add compost and any other amendments to the surface.
6. Work in amendments using a hula hoe.
7. Re-rake the surface so that it is flat and smooth and re-rake the edges of the bed.

“Double digging” refers to loosening the soil TWO implement depts. Below the surface. This method involves a lot of work and is usually not recommended for school gardens. See John Jeavons *How to Grow More Vegetables* (Ten Speed Press, Berkeley, CA) for more information about this method of soil preparation.

Other methods for difficult or never-before worked soils

When first putting in garden beds, you may want to consider using a rototiller. While rototilling may not be child-friendly or ideal for your soil in the long run, it can be a great way to get the beds started initially.

Tools

The MINIMUM tools needed for soil preparation by hand:

- Digging fork
- Soil rake

The FULL range of tools you could use for soil preparation:

- Digging fork
- Soil rake
- Digging spade
- Trowels
- Shovel
- Hoola hoe
- Twine, stakes and hammer
- Wheelbarrow
- Board for standing on (double digging only)

Tips for working the soil with kids

- When demonstrating tools, always review safety rules such as not to leave tools on the ground and to keep metal parts of tools below the hips.
- When working with a large group of children or small children consider using hand trowels instead of large tools to prepare the soil.

Additional Resources

- Building Fertile Soil. http://casfs.ucsc.edu/publications/gardenideas/soilfert.html
- Cover Crops. http://casfs.ucsc.edu/publications/gardenideas/covercrops.html
- Master Gardeners of San Diego. Great school garden tutorial with info on building beds. http://www.mastergardenerssandiego.org/plantaseed/main.html
- *Gardens For Learning,* 56-59

TOMATO TIME

Tomato Production Background Information for Teachers

1) **California is famous for the production of both *processing and fresh market tomatoes***. Processing tomatoes are the main ingredient of most canned tomato products such as tomato paste, spaghetti sauce and ketchup. Fresh market tomatoes are generally used in home preparation of cooked tomato dishes or eaten uncooked in salads and sandwiches.

2) **California produces 99% of the processing tomatoes grown in the U.S.** This is about half of the processing tomatoes grown worldwide! California also produces 30% of the fresh market tomatoes grown in the U.S.
   - The land devoted to processing tomatoes is much more than that devoted to fresh market tomatoes. If you see large fields of tomatoes as you travel through our state, you are almost always looking at processing tomatoes.
   - In Yolo County, about 37,000 acres are used for processing tomatoes and less than 1,000 acres for fresh market tomatoes.

3) **Yolo County produces 20% of the processing tomatoes grown in California**. This is about one tenth of the processing tomatoes grown worldwide. Yolo County is second highest of any county in the state for production of processing tomatoes. Processing tomatoes were Yolo County's highest value agricultural commodity in 2009 and accounted for almost one-third of the total value of all agricultural crops grown in Yolo County.

4) **Processors turn most processing tomatoes into concentrated tomato paste.** The soluble solids (sugars) in tomatoes get concentrated over six times when they turn from fresh tomatoes into paste. Pizzas are a big end user of tomato paste.

5) **The world's largest and most efficient tomato processing plant is located nearby in Williams, California**. It is Morning Star's paste plant. This facility processes approximately 630 tons of tomatoes (200,000) pounds of tomato paste per hour.

6) **UC Davis was instrumental in the development of the mechanical tomato harvester which became the UC Blackwelder.** Separately, a local tomato grower (Bob Button) built a tomato picker in his own shop in Woodland. Development of the mechanical harvester dramatically changed the labor used in tomato harvesting in California, reducing the number of jobs for field workers and the cost of tomatoes for the consumer.

TOMATO TIME

Tomato Production Background Information for Students

1.) California is famous for growing both ***processing tomatoes*** and ***fresh market tomatoes***. Processing tomatoes are the main ingredient of most canned tomato products like tomato paste, spaghetti sauce and ketchup. Fresh market tomatoes are generally eaten uncooked in salads or on sandwiches or used in home cooking

2.) The state of California produces almost all of the **processing tomatoe**s grown in the US. This is roughly half of the processing tomatoes grown worldwide! If you see large fields of tomatoes as you travel through our state, almost always you are looking at processing tomatoes.

3.) Yolo County produces one fifth, or 20% of the processing tomatoes grown in California. That's about one tenth of the processing tomatoes grown worldwide. Another way to say that is that one out of every 5 processing tomatoes grown in California comes from right here in Yolo County. And one out of every 10 processing tomatoes grown anywhere in the world came from right here in Yolo County. Yolo County is second highest of any county in the state for production of processing tomatoes.

4.) Processors turn most of the processing tomatoes into concentrated paste. Pizzas are a big end user of tomato paste.

5.) University of California at Davis along with a local tomato grower in near Woodland developed the mechanical tomato harvesters used today. The mechanical harvester changed how people help pick tomatoes which reduced the number of jobs for field workers but also lowered the cost of tomato products in our stores.

Cities and Farms

Adapted from Kids Cook Farm Fresh Food, Sibella Kraus

Background

About one hundred years ago, Davisville was a farming town surrounded, much as it is now, by rich soils and vast orchards. Farmers had no easy way to water their plants, so the crops they chose were often trees like apricots, prunes and cherries that could make it through the long, hot summer without irrigation. Farms were much smaller then because people and animals did the majority of work instead of machines. This meant more people were living in the countryside working on farms, and there was no central city like Davis is today. Farmers traded their crops with each other and brought them to markets in San Francisco and Sacramento.

Today most people who live in Davis do not work on farms. In fact, sometimes it is easy to forget how important local farms are because we don't even know what farmers really do. In Davis, we are lucky to have planners and policy makers who work to protect our farmland and open spaces. Together with farmers and people like you, these people are trying to figure out how we can continue to preserve our local agriculture. After all, city people need fresh food, and being close to beautiful orchards, natural fields and streams, and healthful open spaces, makes people feel good.

Good Humus Farm

At Good Humus Farm, Jeff and Annie Main grow about one hundred different kinds of fruits and vegetables on twenty acres of land. Their farm is organic, which means they use only natural fertilizers and avoid chemicals for controlling weeds and bugs and diseases in their plants. They work very hard to take good care of their soil so it will keep providing delicious food for people in Davis for as long as they are alive. Some of the things they grow are served in the Davis schools. They sell their produce at the Davis Farmers' market twelve months of the year.

Kids Cook Farm Fresh Food. California Department of Education Press. www.cde.gov/resources.

Farmer Field Visits
Resource List

GO TO: **www.localharvest.com** for a map-based searchable site to locate organic farms nearest you.

Community Alliance with Family Farmers

Diana Abellera, **Farm to School Director**, (510) 832-4625 ext **14**
Email: **farmtoschool@caff.org** **or** abellera@caff.org
Web site: http://www.caff.org/programs/farm2school.shtml
CAFF has produced a handbook for both farmers and teachers on the nuts and bolts of farm visits for students. This handbook contains useful information, and can be downloaded for free:
Making the Farm Connection: http://caff.org/programs/f2sManual.shtml

Yolo, Solano and Sacramento Counties

Since 2006, CAFF has arranged farmer field visits for 2nd graders in the Davis Joint Unified School District. Some Sacramento and Capay Valley farms visited by the children are listed below.

- **Eatwell Farm**, Nigel Walker, 5835 Sievers Road, Dixon, CA. (530) 852-7162 Eatwell Farm is a 65 acre organic farm in the Sacramento Valley with a variety of year-round crops and an organic lavender and sunflower farm. **http://www.eatwell.com**

- **Full Belly Farm,** Dru Rivers, Judith Redmond and others, Road 43, Guinda, CA 95637. 530-796-2214. Full Belly Farm is run by a partnership of four families. It is a diverse organic fruit, vegetable, flower, nut and livestock farm situated on Cache Creek in northern California. They are home to many educational tours, school groups and the annual October Hoes Down Harvest Festival which celebrates rural life and reacquaints the public with the process of growing food sustainably. **http://www.fullbellyfarm.com**

- **Good Humus Farm,** Jeff and Annie Main**,** Capay, CA 95607, 530-787-3187. Good Humus is a 20-acre family farm located in the Hungry Hollow Hills of Yolo County. Jeff and Annie have been producing mixed fruits and vegetables, herbs, flowers and value-added agricultural products year-round since 1976. In recent years, they have been increasingly involved with local school districts' lunch programs and farm-to-school visits. They also host summer programs emphasizing regional environmental awareness for urban school students. **http://www.goodhumus.com**

- **Impossible Acres,** Clyde and Katie Kelly, 26565 Road 97D, Davis, CA 95616. This farm features pick-your-own produce: boysenberries, blackberries, raspberries, cherries, peaches, apples, pumpkins, corn and gourds. They also feature goats, ponies, chickens, hayrides, mazes, and scarecrows. The farm provides easy access to the picking fields. Very kid-friendly. **http://www.impossibleacres.com**

- **Pacific Star Gardens,** Robert and Debbie Ramming, Rd 97, Woodland, CA. 530-666-7308. Robert and Debbie sell their organic produce at the Davis Farmers' Market and also have U-Pick strawberries and a produce stand at their farm. They have sponsored student tours for three years. Check the CAFF website for more information.

- **Riverdog Farm,** Trini Campbell or Tim Mueller, P.O. Box 42 , Guinda, CA 95637. 530-796-4100. In 1990 Riverdog Farm began as a 2-acre organic vegetable garden in Napa County. Currently the farm is located in Guinda, where rich creek bottom soil, intense summer heat, and winter frost make exceptionally tasty vegetables. They grow year-round and have sponsored school groups.

- **Terra Firma Farm,** Paul Holmes and Paul Underhill, Winters, CA. 530-756-2800. Terra Firma Farm grows a diverse array of crops on over 99 acres of fields and orchards, including walnuts, apricots, and citrus. They are CCOF certified organic, and operate a successful CSA (Community Supported Agriculture) business. **http://www.terrafirmafarm.com**

Bay Area Farms & Agricultural Education Programs

- **Ardenwood Farm**, 34600 Ardenwood Blvd. Fremont, California. This is a turn-of-the century farm & working museum where people participate in farm chores. Open Tues- Sun. For more information, call (510) 796-0199, visit **http://www.ebparks.org**, or e-mail ardenwood@ebparks.org.

- **Connolly Ranch**, 3141 Browns Valley Road, Napa. A 12-acre urban farm adjoining Westwood Hills Park. This working ranch offers tours, as well as numerous farm education classes and activities for children (ages 0-6) and school-aged children (ages 6-12). For information, call (707) 224-1894, or visit: **http://www.connollyranch.org/**

- **Deer Hollow Farm**, Rancho San Antonio Open Space Preserve, Los Altos Hills. A working farmstead and education center managed by the Mountain View Recreation Division. Open Tuesday through Sunday, 8 am to 4 pm; early closing at 1 pm.on Weds. For information, call (650) 903-6430 or visit **the Deer Hollow Farm website.**

- **Emma Prusch Farm Park**, San Jose. The park captures the site's past as a dairy farm that continued into the 1960s. This farm within a city has farm animals, vintage farm equipment, community gardens, and a rare fruit orchard. For information, call (408) 794-6262 or visit **http://www.pruschfarmpark.org/**

- **Hidden Villa**, 26870 Moody Rd., Los Altos Hills. 1,600 acres of farm and open space preserve, with many programs for school groups, children, and families. For information about guided weekend tours and "Saturdays on the Farm" for ages 6-10, call (650) 949-8648 or visit **http://www.hiddenvilla.org/**

- **Little Farm**, Tilden Park, Berkeley. A small, but well-maintained farm complete with farm animals large and small. For more information, call (510) 525-2233 or visit **http://www.ebparks.org**,

- **Loma Vista Farm and Garden**, 150 Rainier Ave., North Vallejo, (707) 556-8765. This farm offers a variety of activities and events that are appealing to children. Check the web site for a tentative baby animal birthing schedule: lambs, pygmy goat kids, chicks, peachicks, and ducklings. The farm is open from 9 a.m. to 2:30 p.m., Mon - Fri, closed on weekends. A $3 donation per child is welcomed. To arrange school field trips or inquire about special events, contact Farmer Rita at (707) 556-8765. **http://www.lomavistafarm.org/**

- **Slide Ranch**, 2025 Shoreline Highway, Muir Beach. A 20-acre agriculture outdoor education program situated near the ocean. Numerous scheduled educational programs are offered. For more information, call (415) 381-6155 or log onto http://www.slideranch.org/

Tomato Time Resource List

Tomatoes on the Web

California Tomato Commission. Industry link for fresh market tomatoes.
http://www.eatcatomatoes.org.

California Tomato Growers Association. Industry link for processing tomatoes.
http://www.ctga.org.

UC Cooperative Extension Vegetable Research and Information Center.
http://vric.ucdavis.edu/veg_info_crop/tomato.htm

Harvest of the Month. Highlights a different fruit or vegetable each month, with tasting ideas, recipes, nutrition facts, scientific and historic information, literature links and other activity ideas related to the featured produce. Look for tomatoes in September 2006.
http://www.harvestofthemonth.com

Photos of Tomato Production.
http://www.plowcreek.org/farm/tomato-photo.htm

Garden-Based Education Teaching Materials

Ashworth, Suzanne. ***Seed to Seed.*** Seed Savers Exchange, Inc. Decorah, Iowa. 1991.

California Department of Education. ***A Child's Garden of Standards: Linking School Gardens to California Education Standards.*** CDE Press. 2002. Downloadable at
www.cde.ca.gov/ls/nu/he/documents/childsgarden

California Department of Education. ***Fresh Fruit and Vegetable Photo Cards.*** 2010.

California Department of Education. ***Kids Cook Farm-Fresh Food.*** CDE Press. 2002. Downloadable at
http://www.cde.ca.gov/ls/nu/he/kidscook.asp

California Foundation for Agriculture in the Classroom.
Wonderful resources for teachers, from literature to curriculum guides. It's also a great site for kids with virtual tours and science fair project ideas. http://www.cfaitc.org

California Foundation for Agriculture in the Classroom. Schinski, Kathleen and Frances Vaughn. ***Tomato Trivia K-3.*** *2009. http://www.agintheclass-edc.org/PDFs/TomatoTriviaCAITCF.pdf*

Costa, Temra. ***Making the Farm Connection: From the Soil to the Salad Bar.*** Community Alliance with Family Farmers. Guidebook for planning a farm field trip. Free to download: http://www.caff.org/publications

Pranis, Eve and Joy Cohen. ***GrowLab: Activities for Growing Minds.*** National Gardening Association. 1990. To order: http://kidsgardening.org.

Nutrition Information

California Dairy Council. Free resources for California teachers. http://www.dairycouncilofca.org

USDA. MyPlate. Check out the new USDA icon replacing MyPyramid. The site offers plenty of information and resources on dietary guidelines and how to make healthy eating choices. http://www.choosemyplate.gov/

Children's Literature

Alarcon, Francisco. *Laughing Tomatoes and Other Spring Poems.* Children's Book Press. 1997.

Child, Loren. *I Will Never Not Ever Eat a Tomato.* Candlewick Press. 2000.

Sources for Seeds and Supplies

Lee Valley Tools Ltd. 800-871-8158.
http://www.leevalley.com

Gary Ibsen's Tomato Fest.
http://www.tomatofest.com/heirloom_tomato_seed_home.html

Serrated knives:
www.foodservicewarehouse.com Search for rounded tip serrated knives. The "Update International (SK-20P)" is $3.59/case of 12 knives.