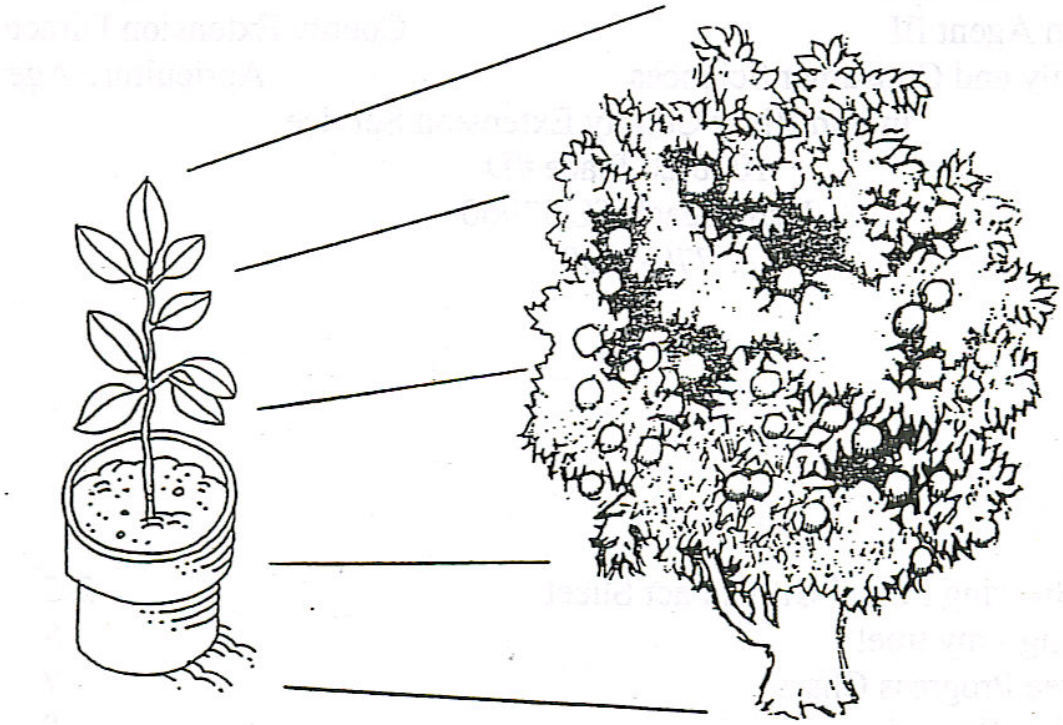
Indian River County
CITRUS TREE
4-H/FFA Record Book
2008-2009



Name_____
Mailing Address_____

_____

4-H Age_____ Year(s) in 4-H/FFA_____
Years in Citrus Tree Project_____
Name of Club/Chapter _____

Youth Horticulture Project Agreement

(To be completed at beginning of project)

The Exhibitor is responsible for caring for the Plant/Tree, which will include watering, fertilizing, insect and pest control, as well as grooming and showing. The Exhibitor will use this project as an educational tool to learn skills needed in the horticultural industry. This project will also help the Exhibitor to accept success and failure as a learning experience.

The Exhibitor will keep accurate records on the Plant/Tree.

I accept these responsibilities.

_____

Exhibitor's signature Date

The Parent(s) are responsible for providing financial help if needed, along with assistance and encouragement while the Exhibitor is raising the Plant/Tree.

I/We accept these responsibilities.

_____

Parent(s)/Caretaker(s)' signature Date

The 4-H Leader/FFA advisor is responsible for visiting the Exhibitor and the plant to give assistance when needed.

I accept these responsibilities.

_____

4-H Leader/FFA Advisor's signature Date

Completion Certificate

I hereby certify that as the Exhibitor of this project, I have personally kept records on this project and have personally completed this record book.

Signed _____

Exhibitor Date

This Exhibitor is an active member of the

_____

Club/Chapter. This Exhibitor is a member in good standing and has met the requirements needed for this project.

Signed _____

4-H Leader/FFA Advisor Date

Congratulations on choosing to be part of the most important agricultural industry in Indian River County. We hope that your participation will challenge you to consider a future career in agriculture, horticulture, or natural resources.

Feel free to call upon us if you need assistance. The University of Florida's (UFL) Cooperative Extension Service is available to help you.

Adam Cletzer
Extension Agent
4-H Youth Development

Christine Kelly-Begazo
County Extension Director
Agriculture Agent

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History of Citrus

Citrus has been mentioned in history since the days of Greek Mythology. Mighty Jupiter gave an orange to his love Juno and ever since orange blossoms have been a symbol of eternal love.

It may have even been an orange that Eve tempted Adam with because oranges were called "golden apples" in the early days.

Oranges originated in China and spread throughout the world. Grapefruit originated in the West Indies, Lemons from the Orient and Tangerines from Tangier.

Charles the 8th of France had the first orangery - an elaborate indoor grove of citrus trees in pots and for the next 200 years orangeries were status symbols of European royalty, each trying to outdo the other.

In Queen Victoria's day oranges were a highly treasured Christmas gift in England.

Christopher Columbus brought citrus to Haiti on his second visit in 1493. The Spanish explorer Ponce' De Leon and his men brought the first citrus to Florida during their explorations. The first citrus in Florida was planted between 1513 and 1565, when St. Augustine was founded. It seems probable that, as the Spanish explorers searched for the Fountain of Youth, they dropped seeds from fruit that had made the journey across the ocean with them - the first litterbugs, and lucky for us they were!

In Florida, the earliest groves developed around two important sea ports - St. Augustine and Tampa. At the time, central Florida was an unmapped wilderness. The orange came to Florida first, followed by the tangerine, lemon, lime and a host of other varieties as they developed. Grapefruit remains somewhat of a mystery to both historians and scientists - until modern times, grapefruit were not well thought of as a food item.

The Indians carried the seeds across the state of Florida. Some citrus grew wild in North and Central Florida. Explorers and visitors often found trees naturalized along the St. Johns River, loaded with golden fruit. By the Revolutionary War Florida oranges were already being shipped to Europe for sale. Formal cultivation began sometime in the early 1800s.

The Count Odette Phillip grove in the Tampa Bay area was the first grapefruit grove in Florida. It was planted in 1823.

The first navel orange groves in Florida were destroyed by soldiers during the first Seminole war because the owner, Mr. Thomas Hogg, had collaborated with the Indians. Valencias were introduced by Mr. E. H. Hart in 1870. His grove was at Federal Point, near Palatka.

Two severe freezes in 1894 and 1895 destroyed many of the original trees and since that time, a number of additional freezes have gradually pushed the citrus industry towards south Florida.

Some of the names that are still associated with Indian River Citrus are from the first groves in Indian River County in the early 1900's when Vero Beach was still part of St. Lucie County. These Indian River County Citrus pioneers included Sam Monroe, Eli Walker, O.O. Helseth, Waldo Sexton and Charles McKee.

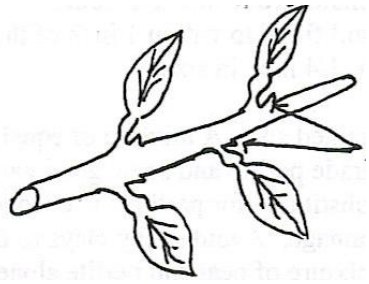
Adapted from: "History of Florida Citrus" in Florida Citrus Cookbook. and "Welcome to the Land of Citrus" from the Florida Department of Citrus and University of Florida Fruit Crops Fact Sheets.

Planting Your Citrus Tree

Stephen H. Futch
Extension Agent IV, Ph.D.
Citrus
Citrus Research & Education Center
Lake Alfred, FL 33850-2299

Most varieties of citrus can be grown in containers such as pots or tubs with a fair degree of success. The amount of care which you provide your tree will affect the growth and quality of the tree.

Since the Citrus Tree project will supply you with a budded citrus tree, a 5 gallon pot and soil, you should be aware of a few concepts about growing a citrus tree. First of all, your tree (just like the majority of trees used in the citrus industry) is a budded tree. Even though you can grow citrus from seeds, budding works best and will produce a higher quality tree. Budding is a process where a grower has combined parts of two trees to make a single tree. These trees are better adapted to Florida conditions and more productive than growing a tree from seed. The budded tree has two parts, the rootstock and scion. The rootstock is the portion of the tree which is grown in the soil and is generally grown from seeds. The scion is the part of the tree which will produce the desired variety of fruit. Budding involves removing a small rectangular patch of bark which includes a bud eye from the scion plant and inserting this bud eye into the rootstock. There are many reasons for budding the tree. Budded trees will produce fruit crops earlier than trees grown from seeds. Trees grown from seeds are taller, vigorous in growth, and very thorny. Citrus rootstocks will vary in their tolerance to different soil factors, pests, disease and environmental stress thus allowing the grower to select the best rootstock for a given site. Rootstock and scion combination will affect the quality of the fruit, growth and productivity of the combination. You can usually tell where the union between the rootstock and scion is by looking at the trunk of the tree and seeing where a size difference occurs. This union is usually several inches above the soil line.



Location of bud eyes

Figure 1. Stem from a scion tree with location of bud eyes noted. Bud eyes are used in budding citrus trees.

For more information on citrus propagation please see the University of Florida book SP. 178, Your Florida Dooryard Citrus Guide by Dr. Jim Ferguson.
http://edis.ifas.ufl.edu/TOPIC_GUIDE_Your_Florida_Dooryard_Citrus_Guide

The scion which has been selected for the project this year (2008-2009) is the **Murcott (Honey Tangerine). The rootstock is: _____.**
The actual origin of the Murcott is unknown but is probably a tangor (a cross between a tangerine and a sweet orange). The most likely possibility is that the variety originated in a USDA planting around 1916. Around 1922, a Mr. Charles Murcott Smith propagated these trees in his nursery in Pinellas County, Florida, probably obtaining the stock from the USDA. Murcott fruit is medium in size, averaging from 2 ½ to 3 inches in diameter and has a typical tangerine shape (flattened sphere). The fruit is borne terminally where they are vulnerable to wind, sunburn and frost damage. The rind is thin, smooth and while it can be peeled by hand it is somewhat more difficult to peel than a tangerine. Rind color is reddish-orange and may be yellow-orange in warmer winters. The flesh is a rich orange color, juicy and sweet with a distinctive rich flavor. Seeds will vary from 12 to 24 seeds per fruit and are white in color when cut. The fruit matures in the January - March period making it the latest maturing tangerine type fruit. The late maturation may put the fruit at risk of freeze damage.

Planting Your Tree in Your Pot:

You will want to be very careful to be sure that you are planting the tree properly to maximize the potential tree growth. The pot you have been given is a 7 gallon plastic pot with holes in the bottom or the side of the container to provide ample water drainage. Clay pots are less satisfactory because the soil in them dries very rapidly and watering problems are greatly increased.

Repotted Citrus tree

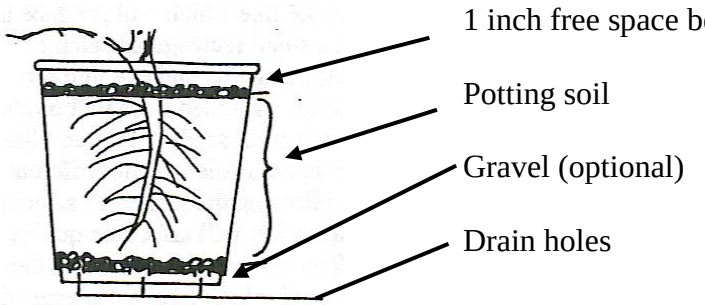


Fig. 2. A typical soil arrangement when plants are repotted includes 1 inch of gravel in the bottom of the container, then potting soil filled to within 1 inch of the top of the container. Drainage holes should be 1/8 to 1/4 inch in size.

Citrus can be grown in almost any well-drained soil. A mixture of equal parts (by volume) of Canadian peat, horticultural grade perlite and some good garden loam makes a superior medium. Wood chips can be substituted for perlite. The wood chips or perlite will assist with providing adequate soil drainage. Avoid sticky clays as they tend to hold too much water and reduce drainage. A mixture of peat and perlite alone is unsatisfactory. This mixture is so light the plants tend to blow over. Also, nutritional problems often develop in this mixture.

When transplanting, you will need to break up the root mass prior to repotting. This is especially important if the seedling is pot bound. The reason for breaking up the root mass and then spreading the roots out is to allow for better root development and contact with the soil. Breaking up the rooting mass will also allow for a mixing of the existing soil on the plant roots and the new soil which improves the water distribution between the two soils.

Place the plant into the new pot or container that has been partially filled with soil or a rooting medium such as described above. Spread the roots out and add soil. Be sure to pack the soil around the roots to remove any air pockets.

After filling the pot to within 1 inch of the top of the container, add water to thoroughly saturate the soil and to improve the compaction of the soil. You may need to add an additional amount of soil to bring the top of the soil to within 1 inch of the top of the container. Do not fill the container to the top of the pot with soil as this makes it very difficult to provide adequate space to hold water.

Growing:

Citrus thrives best out of doors in direct sunlight or no more than half shade for maximum tree growth. Trees grown in shade will not develop as well and will generally produce uneven growth. Never move a plant from little or no sun into direct sun for extended periods as trees grown in the shade will not tolerate full sun very well and damage to the young stems and foliage can occur.

A temperature range of 70^{o} to 95^{o} F is desirable. Citrus does not grow at temperatures below 55 degrees. Temperature below 32 degrees F. can damage the mature foliage. In some cases frost can occur at air temperatures above 32 degrees but when the temperature of the plant tissue drops below 32 degrees it will result in frost forming on the foliage and damage may result, especially if new tender growth is present.

You will need to water the plant as needed, thoroughly wetting the soil and allowing any excess water to freely drain out of the container. As the seasons change from warmer to cooler temperatures the need for water will be reduced. Excess water will damage or kill the plant as quickly as too little water. When the soil feels damp, you do not need to add additional water.

It is a good idea to occasionally wash off the leaves with a water spray or damp cloth. Dusty leaves usually result in mite and scale infestations.

Potted citrus as well as all citrus will require fertilization. This is more often overdone than underdone. A good rule of thumb is to **fertilize sparingly and frequently**. A small amount of water-soluble fertilizer could be applied every few weeks according to label directions. If you choose to use a dry granular fertilizer, evenly apply the fertilizer to the soil surface and then work the fertilizer into the soil.

The first application of dry granular fertilizer should be applied about two weeks after planting and repeated at approximately every six to eight weeks. If the mature foliage is deep green, the tree is receiving ample fertilizer. Excess fertilizer may result in high salt concentration in the soil and death of the plant. Even light over fertilization results in excessive vigor and less flowering. Do not use a formula higher than 8-8-8 for young trees.

Suggested fertilization rates for young potted citrus trees from 1 to 2 years old
For First Year:

Applications per year	Pounds per application*	Pounds of nitrogen per application per tree
6 – 8	0.3 (approx. 5 tablespoons)	0.08

*Use 8-8-8 (8 percent nutrient per pound of material)
Mature fruit bearing trees over 3 years old will use 12-0-12 or 15-0-14

Understanding the fertilizer label:

All fertilizer sold in the State of Florida will have important information as to the analysis or the amount of plant materials which is available from each pound of fertilizer. The analysis is generally stated in percent. By law the first three numbers on the label will always be in the order of nitrogen, phosphorus and potash. The order of additional numbers are not in any specific order but will be clearly identified on the label. Thus, from the example above - a material which contained an eight percent analysis would contain 0.08 pounds of that mineral. From the above example each pound of fertilizer would contain the following nutrients: 0.08 pound of nitrogen, 0.08 pound of phosphorus and 0.08 pound of potash. For more specific information please see the fact sheet. SL 3, *The Florida Fertilizer Label* written by Dr. J.B. Sartain and W.R. Cox with the University of Florida.

Pests:

Florida's climate is conducive to many different insects, diseases and other disorders which may be found on the fruit, leaves, stems or roots. The proper identification of the problem is important in determining the proper course of action which must be taken to minimize the pest damage to the tree. Some of the problems may be solved by washing the leaves with water spray, a mixture of water and non-detergent soap, or a mixture which may contain general use insecticide. These insecticides are generally available from a local lawn and garden center. **The Honey Tangerine is susceptible to Citrus Scab and Alternaria fungus.**

If insecticides are to be used read the directions and follow the directions very carefully. Parental supervision and assistance are very important as injury to the tree or possible even you could occur if the spray is improperly applied or mixed. To aid you with identification of possible problems please see the fact sheet HS-34A Diagnosing Dooryard Citrus Problems http://edis.ifas.ufl.edu/XC003 This fact sheet is available from the Indian River County Extension Office, 1028 20 Place Suite D. Or through the http://edis.ifas.ufl.edu/ website.

For more information on possible diseases, insect problems and control on citrus you can print off fact sheets with color pictures from the http://edis.ifas.ufl.edu/ website. Some suggested ones are:

Control of Insects, Mites and Diseases of Florida's Dooryard Citrus Trees - Circular 139:
http://edis.ifas.ufl.edu/XC002
Identification of Insect Pests HS-893
http://edis.ifas.ufl.edu/HS142
Scale Pests of Florida Citrus - ENY-814
http://edis.ifas.ufl.edu/CH059
A Guide to Scale Insect Identification - HS-817
http://edis.ifas.ufl.edu/CH195
Citrus Mealybug - ENY-812
http://edis.ifas.ufl.edu/CH057
Aphid Pests of Florida Citrus - ENY-811
http://edis.ifas.ufl.edu/Ch055
A Guide to Citrus Mite Identification - HS-806
http://edis.ifas.ufl.edu/CH179

There are many other publications concerning citrus available using EDIS but keep in mind that the Florida Citrus Pest Management Guides that are available are written for controlling pests in the groves - not for one tree - so the pesticide recommendations are per acre, the first and second publications listed above are better references.

Citrus Canker and Citrus Greening Disease:

Up until the spring of 2006, Florida's Department of Agriculture program against the disease of citrus canker had been a combination of eradication (tree removal) and quarantine. The USDA withdrew eradication program funding due to the impacts of legal constraints and the 2004/2005 hurricanes that caused canker to spread so far that eradication was no longer possible. Also, Citrus Greening disease has been spreading from the initial site in Miami-Dade to become another threat.

There are preventative measures to lessen chances of infestation of healthy trees. Both diseases have an insect associated with its spread: The Asian Citrus leafminer in canker, and the Asian Citrus Psyllid in Greening. More information on Citrus Canker and Greening is available at these websites:

http://edis.ifas.ufl.edu/PP116 *Citrus Canker Fact Sheet for Homeowners* (UFL)
http://www.apsnet.org/online/feature/citruscanker/ *Citrus Canker; the Pathogen and its Impact*, T. Gottwald, J. Graham, and T. Schubert
http://www.doacs.state.fl.us/pi/chrp/index.html *Citrus Health Response Plan*, FL Department of Agriculture website for Canker, Greening and Citrus regulations
http://www.crec.ifas.ufl.edu/extension/index.htm Citrus Research and Education Center (Extension) website
http://okeechobee.ifas.ufl.edu/News%20columns/Citrus%20Greening%20Disease.htm
Citrus Greening, Another Threat to Agriculture, Dan Culbert (UFL)
http://creatures.ifas.ufl.edu/citrus/acpsyllid.htm *Asian citrus psyllid* (UFL)

Providing Your Plant's Basic Needs:

All living things have basic needs and plants are no different. To thrive and grow, plants need:

- light
- water
- mineral nutrients
- air (carbon dioxide and oxygen), and
- adequate temperature range

Mineral nutrients come from rocks and other material in the earth breaking down. Plants take these minerals from the soil (dissolved in water) or through fertilizers applied by humans.

Basic need	**Purpose**
Light	Required for photosynthesis so plants can make sugar (food), and to trigger certain changes, such as flowering in certain plants
Water	To carry dissolved nutrients into the plant through the roots Required in photosynthesis Helps plant release energy from stored food when needed (in respiration)
Mineral Nutrients	Used for growth, repair, and proper functioning
Air	Required in photosynthesis (carbon dioxide is necessary to make food) Required in respiration (oxygen is necessary to release energy from food)

Too much of a good thing can be as harmful as too little:

Too much water can prevent necessary oxygen from reaching roots. Too much fertilizer can "burn" plants (either by using too much in quantity or by using too high a rate), or cause plant cells to grow too quickly, resulting in weak, spindly plants or dead leaves.

Water

Most container-grown plants that do not thrive are usually in poor condition due to faulty watering practices, usually **too much** water. Water is the main component of plant cells, it keeps the plant turgid (stiff), it's used in photosynthesis and it transports nutrients throughout the plant.

Plants growing in containers should be watered only as needed. The frequency of watering depends upon such variables as type and size of plant, type and size of container, temperature, humidity, potting medium and others. For most plants, the upper surface of the soil should be allowed to become dry to the touch before watering. Then water thoroughly by slowly filling the container. Good drainage of excess water from the container is essential.

The soil in plastic pots generally stays wet longer than it would in a wood or clay pot. Cool weather generally slows plant growth and thus reduces the plant's need for moisture, so watering should be less frequent during cool weather.

Soil

Soil is composed of living and non-living materials. Soil provides plants with:

- Support
- Nutrients
- Water
- Air

Soil is made up of rocks that have broken down into tiny particles over thousands of years. Here on the east coast of Florida our natural soil is made up mainly of sand. Nutrients wash away with water quickly in sand. Using potting soil provides some food from organic matter and allows the soil to hold the water longer so the plant doesn't dry out so fast.

What is organic matter? Organic matter includes the remains and waste products of living things. Plants and animals are being continuously decomposed by bacteria, fungi, and other decomposers in the soil.

The once-living remains of plants and animals must be returned to the Earth to provide nutrients for new life. When completely decomposed, these materials form humus. Humus is dark, crumbly, and spongy-textured. Its functions are:

- Loose, crumbly structure for plant roots to grow and thrive in
- Provide the majority of the nutrients used by plants
- Help retain soil moisture
- Provide good aeration
- Drainage

Fertilizer

Plants need minerals to grow. Although potting soil has some organic matter in it that helps provide food for your tree, some of it is washed away by watering. To provide the food the plant needs we add fertilizer.

Do not fertilize your tree when you plant it. It will use the food in the potting soil at first. There should be new growth evident before it is fertilized. After new growth is visible, then feed your plant.

Plants get Carbon (C), Hydrogen (H) and Oxygen (O) from water and air. The other nutrients it needs must come from the soil or from fertilizer.

On the fertilizer label it will have three numbers with dashes between them. These stand for the percent of the three primary nutrients in fertilizers.

- The first number tells the percent of Nitrogen (N) - Nitrogen is needed for healthy foliage.
- The second number tells the percent of Phosphorus (P) - Phosphorus is needed for flower development.
- The third number tells the percent of Potassium (K) - Potassium it is needed for root growth.

Secondary elements in fertilizers in smaller amounts that plants need include Magnesium (Mg), Sulfur (S) and Calcium (Ca).

Fertilizers can have other nutrients that plants need in even smaller amounts. These are called the Micro-nutrients. They include Iron (Fe), Manganese (Mn), Boron (B), Chlorine (Cl), Zinc (Zn), Copper (Cu), Molybdenum (Mo), and Nickel (Ni).

The rest of the fertilizer is made up of fillers so the plant won't get burned with too much of the Nitrogen, Phosphorus and Potassium.

Young Citrus trees like balanced fertilizers - all three numbers are the same. 6-6-6 fertilizer is a basic fertilizer and is fine for Citrus. Do not go any higher than 8-8-8 for trees 1-3 years old.

Citrus trees also need smaller amounts of other minerals such as Magnesium, Iron, Manganese, Zinc and Copper. The label would say the fertilizer has "Minor Elements"

A fertilizer with the following proportions of minor elements is good for potted citrus:

4% Magnesium
.75% Manganese
.25% Copper

For citrus trees planted in the ground, a higher rate of Magnesium (5-6%) is used to compensate for the Florida soils which are usually poor in nutrients.

What is Soil pH?

Citrus trees (and many other plants) grow best in soil that is slightly acid. What does this mean? Just like our foods, soil can be acid (sour), or neutral or anywhere in between.

What is pH? The term pH stands for *potential hydrogen.* Soil pH tells how much hydrogen is in the soil. It indicates whether the soil is too:

Acidic
Alkaline (or basic)
Neither acidic or basic

Look at this illustration for the pH values of common foods.:

pH Scale:

1	**7**	**14**
ACIDIC	**NEUTRAL**	**ALKALINE**
lemon juice	eggs, milk, fish, meat	cocoa
other citrus	chicken, melons	rice
pickled foods		ammonia
vinegar		

The words *acid* and *base* and *neutral* describe chemical characteristics of nearly all substances in our environment. Acidity can be measured by the pH scale which runs from 0 (mostly acidic) to 14 (mostly basic or alkaline); 7 in considered neutral.

The lower the number, the stronger the acid. Think of the pH scale as a measure of acidity. Anything with a pH higher than 7 is considered base.

Citrus and many other plants like to grow in soil that is slightly acidic to neutral - 6.0 to 7.0 pH. Soil can be tested at the County Extension Office and at other laboratories to determine its pH.

Why is soil pH important to plants? Plant roots absorb nutrients such as nitrogen and iron, when they are dissolved in water. If the soil is too acidic or basic, some nutrients won't dissolve easily; the nutrients become unavailable to plant roots as if they were "locked" in the soil. Nutrient deficiencies may result.

For example, when soil has a:
* pH below 6.0, then nutrients like nitrogen and phosphorus, and potassium as less available; or
* pH greater than 7.5, then nutrients like iron, manganese, and phosphorus are less available.

If a soil is too basic (pH is too high) adding organic matter such as compost, manure or humus will bring the pH of soil closer to neutral which creates better nutrient holding capacity in the soil.

An application of limestone or dolomite can be used to bring up the pH if it is too low (acid).

Source: *Take Your Pick* 4-H827 Level 4-H Gardening Project - Purdue University

Getting to know the Citrus Fruit:

Citrus fruit are covered with a rind to protect the pulp or edible portion of the fruit. The **flavedo** or thin outer peel contains numerous oil sacs or glands filled with an aromatic essential oil. It is used for flavoring.

A white spongy portion, known as the **albedo**, lies under the flavedo and contains substances that can be recovered in the form of citrus pectin. The membrane that covers each section is also rich in pectin. Pectin has a water-binding property that retains the moisture content in food, thus being good for the digestion. It is used commercially to make a jelly. When pectin is mixed with the proper proportion of acid and sugar a jell is formed. All fruit do not have enough pectin to form jells so it is added to other fruit juices in the jelly and jam making process.

Each segment of the citrus fruit contains juice and juice sacs.

About 45 percent of the fruit is juice, 22 percent flavedo and albedo, and 33 percent pressing residue.

Source: UFL, *Enjoying Florida Oranges*

Citrus By-Products

Besides the pulp and juice from citrus that we eat and drink, the citrus fruit provides a wide variety of other products.

The colored part of the citrus skin (the flavedo) contains aromatic oils. These are used to make the following:

Perfumes	Soaps	Lotions	Medicines
Cleaning products	Insecticides	Paints	Rubber

The white spongy part of the skin contains pectin. Not all fruits contain pectin. When pectin is cooked with acid and sugar in the right proportions it forms a jell. The pectin in citrus is removed and used to make a wide variety of fruit, vegetable and meat jellies, as well as jams and jelly candy.

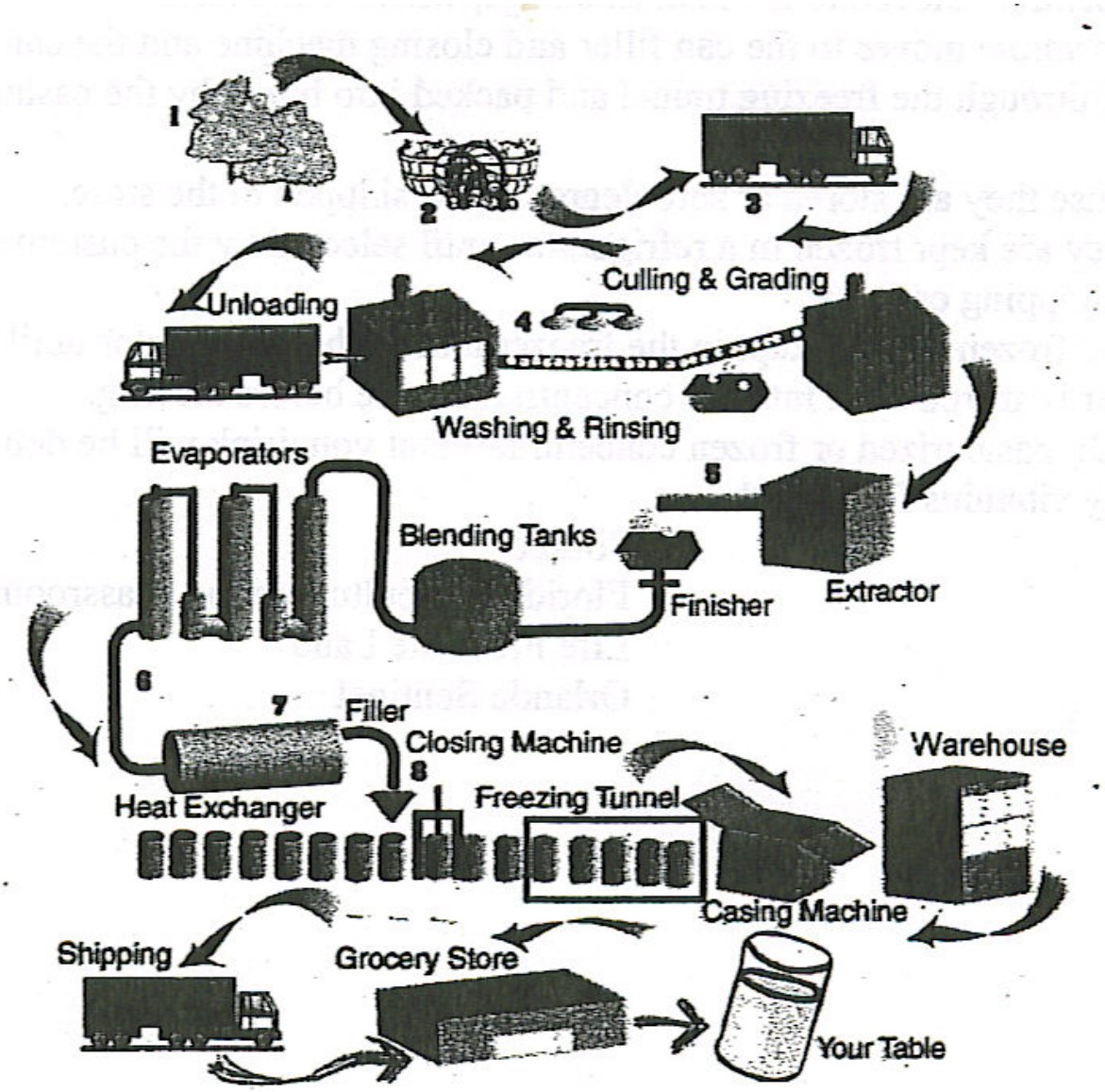
The pulp left over from squeezing the juice from the fruit is dried and used for cattle food.

Other by-products of citrus pulp include citrus molasses which is used to make alcohol and
D - Limonene, a clear oil used in adhesives, paint, varnish and medicines.

Oil from citrus seeds is used in some cooking and salad oils.

From Grove to You

Florida has the ideal climate for growing citrus - warm, sunny days, enough rain, and sandy soil which drains well. The warm humidity of our air makes for a juicy, thin peeled orange, and about the time the fruit is ready for picking Florida nights turn cooler which brings out the orange color.



1. Since citrus does not ripen off the tree, the Brix measurement test is done prior to the crop being picked to make sure the juice is sweet enough.
2. Picking crews move into the groves. An experienced person can pick 7,000 fruit in a day.
3. The fruit is carried by truck to the packinghouse where they are washed, cleaned and checked for quality. Five percent of the crop will be boxed and sold for fresh fruit. The rest will be squeezed into orange juice. Some of this juice will be bottled or canned, but most will be concentrated (some of the liquid is removed) into a thick juice, then frozen. It was three Florida scientists who invented the way to concentrate and freeze orange juice in 1945.
4. After the fruit is cleaned, conveyer belts carry the fruit to where hundreds of oranges are squeezed every second.
5. Pipes carry the juice to the finisher where a screen removes any seeds or extra pulp (the soft, juicy part of the fruit). It is at this point that some juice is bottled for fresh juice. The rest of the juice continues through other processes.
6. Pasteurized (heated to destroy bacteria) and concentrate juice continue to the blending tanks where the Brix measurement is taken to guarantee a set level of sweetness.
7. Frozen juice concentrate will leave the blending tanks to be heated quickly and concentrated in the tall evaporators.
8. The thick concentrate moved to the heat exchange, where it is cooled.
9. The thick concentrate moves to the can filler and closing machine and the can is sealed before moving through the freezing tunnel and packed into boxes by the casing machine.
10. At the warehouse they are stored at zero degrees until shipped to the store.
11. At the store they are kept frozen in a refrigerator until selected by the customer and placed in the shopping cart.
12. Once home, the frozen juice is kept in the freezer unit of the refrigerator until ready to be used. Water is stirred back into the concentrated juice before serving.
13. The juice (fresh, pasteurized or frozen concentrate) that you drink will be delicious and provide healthy vitamins for growth.

Source: Florida Agriculture in the Classroom, *Life From the Land,* Orlando Sentinel

Grapefruit - The Economic Cycle from Grower to Customer

Florida Grapefruit growers produced an average of 323***** boxes of fruit per acre weighing 85 lbs. in the 2005-2006 season.

Fresh grapefruit price received by growers from packing houses in September 2005 was $20.69***** per box.

The grocer's price in September, 2006 was $1.69***** per Grapefruit (approximately 1lb. each).

***** These amounts change year to year due to weather and other circumstances, for example, the 2004-2005 season the production was 497 boxes per acre.

Sources: *USDA Outlook Report for Nov. 30, 2005;*
USDA Citrus Fruits 2006 Summary;

Seniors: **Work It Out!**

1. What is the price **per fruit** received by the Grower from the Packinghouse?

2. How many grapefruit are produced to the average **acre** of land?

3. If the grapefruit sells for $1.69 cents in the grocery store what is the markup from what the Packinghouse pays the Grower to the final market price the consumer pays?

4. How else would money be spent on the fruit between the Packinghouse receiving the fruit and the consumer purchasing the fruit in the store?

Florida is an Agricultural Giant

Florida farmers can chant “We’re #1" in the nation as top growers of 20 crops - oranges, tangelos, temple oranges, grapefruit, tangerines, sugarcane, fresh tomatoes, bell peppers, sweet corn, fresh cucumbers, fresh snap beans, fresh squash, radishes, eggplant, watermelons and escarole, plus non-edible cut ferns, gladioli, house plants and tropical fish.

Florida is the “Winter Salad Bowl” of the US, providing 80% of the fresh vegetables grown in the United States during the months of January, February and March of each year.

In 2003, Florida farmers utilized 10.2 million of the State’s nearly 35 million acres.

In 2002 Florida farmers account for more than 50% of the Cash Receipts of the nation on the following crops:

100%	Tangelos and Temple Oranges
100%	Limes
96%	Ferns
77%	Grapefruit
76%	Oranges
65%	Radishes
65%	Tangerines
61%	Cut Floral Greens
52%	Snap Beans
43%	Tomatoes
42%	Hanging baskets

Source: *Food for Thought*, 2002 Florida Farm Bureau

Introducing - My Citrus Tree!

1. Date of purchase_____

2. Root stock of tree_____

3. Scion _____

4. Pot type_____Size_____

5. Potting soil used_____

6. Drainage material used in bottom of pot_____

7. Cost of tree_____

8. Cost of potting material_____

9. Total beginning cost _____

10. My tree was purchased from_____

11. Looking Ahead - Circle the terms that describe your variety of citrus:

A. Main season when fruit will be ripe:
- Oct. - Dec.
- Jan. - March
- April - July
- August-September

B. The skin will be:
- Thin
- Thick
- Loose
- Tight

C. The fruit will be:
- Seedy
- Nearly seedless

D. Size of fruit is:
- Small
- Medium
- Large

E. Fruit from this kind of tree is usually used for:
- Sections
- Hand eating
- Juice

Citrus Tree Progress Chart

Complete the first column the day you first plant your tree. Once a month, on about the same day measure your tree and record the information requested.

	Sept.	**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**March**
Height							
Number of Leaves							
Color of Plant							
General Appearance							
Signs of Insects							
Other Comments							

Fertilization Record

Date	Kind and Amount of Material Used	Fertilizer Analysis	Cost (if any)

Before using any pesticide - **READ THE LABEL!**

Keep a complete record of insect and disease control.

Date	Pest to be Controlled	Material Used	Amount Sprayed (concentrate & mixture)	Cost (if any)

Record of Expenses for Citrus Tree Project

Record your expenses for this project below. Record the date to the left and the expense under the column it fits best. If not listed, put under "other" and record item name in right column.

Date:	Tree(s)	Fertilizer	Insecticides	Other:	Item name
Total	**a**	**b**	**c**	**d**	

Total cost of project: a + b + c + d = _____

Project End Financial Summary

1. Cost of tree and planting supplies _____

2. Cost of fertilizer

   _____

3. Cost of insecticides

   _____

4. Other expenses

   _____

5. Total cost of project

   _____

6. Expected income _____

7. Actual income (Sale at the fair) (income) _____

8. Subtract expenses total (#5) from
   actual income (#7) to get profit (if any) (expenses) _____

Profit/Loss _____

What Do I Know About Citrus?

The answers to these questions are found in the resource materials in this project book.

For Juniors, Intermediates, and Seniors:

1. Why is a budded citrus tree used for this project?

2. What is a rootstock?

3. Where should your potted citrus tree be placed?

4. What signs should you look for when inspecting your tree for insects?

5. What is the meaning and purpose of pruning a citrus tree?

6. Why should you not fertilize a citrus tree too much?

7. What is the purpose of washing the citrus tree leaves?

8. What is a leafminer?

9. What must be added to citrus juice concentrate before you drink it?

For Intermediates and Seniors:

10. Name the three ways citrus juice is sold in stores.

11. What are the names of the two important seaports where the earliest groves developed?

12. What is the temperature range most desirable for growing citrus?

13. What is the pulp that is left over when the juice is squeezed from citrus used for?

14. What is the white spongy part of a citrus fruit called? What is this white part used for?

15. What does pH stand for?

16. Does citrus fruit have a low or a high pH?

17. Does citrus fruit get sweeter after it is picked?

18. There are 3 ways to produce a citrus tree: seeds, budding, and cuttings. Which is the preferred method?

For Seniors only:

19. What are the three main nutrients found in fertilizers? What do the 3 numbers on the label mean?

20. Name three by-products that come from the flavedo of the fruit.

21. Name one other by-product of citrus pulp.

22. In what form must minerals be before the citrus trees can use them?

23. What is the Brix measurement test used for?

24. How much of Florida's orange crop will end up being sold as juice?

25. What are the 5 environmental factors that regulate plant growth?

Reading a Fertilizer Label (Seniors)

Match the parts of the fertilizer label with the explanation of each part:

1._____ ReadyGrow Plant Food

2._____ 12-12-12

Guaranteed Analysis

3._____ Total Nitrogen 15%

4._____ 6.5% Ammoniacal Nitrogen
5.5% Nitrate Nitrogen
3.0% Urea Nitrogen

5._____ Available Phosphoric Acid (P205) 15%

6._____ Soluble Potash (K20) 15%

7._____ Primary nutrients derived from: Potassium nitrate
Urea, Ammonium phosphate, Sulfate of potash

8._____

Sulfur (S)	5.0%
Calcium (Ca)	2.0%
Magnesium (Mg)	1.0%
Manganese (Mn)	0.5%
Iron (Fe)	0.2%
Zinc (Zn)	0.1%

9._____ Secondary and micro-nutrients derived from: Dolomite,
Manganese sulfate, Iron sulfate, Zinc sulfate

a…….Amount of phosphoric acid in the product
b…….Amount of soluble potash in the product
c…….Guaranteed percentages (by weight) of the primary nutrients
d…….Guaranteed percentages of secondary and micro-nutrients
e……..Product brand name
f……..Sources of secondary and micro-nutrients
g…….Sources of nitrogen
h…….Sources of primary nutrients
I……..Total amount of nitrogen in the product

4-H/FFA Citrus Tree Record Book Score Sheet

Name_____Award_____

4-H
Age_____Club/Chapter_____

	Possible Points	Score	Comments
4-H/FFA Report form Outlines participation in club/chapter	5	_____	
4-H/FFA Club/Chapter Story covers your experiences in your club.	10	_____	
Project - Shows evidence of completing the requirements of the project.			
Progress Chart	10	_____	
Expense Record	10	_____	
Fertilization Record	10	_____	
Citrus Knowledge	25	_____	
Project Story Tells about your tree	10	_____	
Pictures	10	_____	
Overall Neatness	10	_____	
Total Possible Score	100		

90 - 100 blue ribbon, 80 - 89 red ribbon, 0 - 79 white ribbon

Preparing Your Citrus Tree Record

Once you have completed as much as you can of your project, get the record book ready to be turned in. It should be put in a report folder that has brads or a clamp to hold in the pages. Please, do ***not*** put it in a 3 ring notebook. Have your name and project on the outside of the folder. Prepare the project record book yourself, with advice from your parents. PARENTS SHOULD NOT DO THE RECORD BOOK!

Check with your leader as to when Citrus Record Books and report forms are due.

Your completed Citrus Tree Record Book should have the following parts in this order:

1 - Your Picture - Mount a picture of yourself on a plain sheet of paper. Below the picture write your name, club, address, 4-H age and "Citrus Tree Project".

2 - 4-H or FFA Report Form - the report form is the last page of your 4-H Handbook. This form outlines your participation in 4-H for this year and previous years. Answer the questions.

3 - 4-H/FFA Story - Write a story about your membership in your club/chapter. Tell why you joined, what you have done as a member, any offices you have held, your participation in the club's community pride project, etc.

4 - Your Project Record Book - Include in your completed record book of your project. Do not add extras unless there was not enough room on a page to include all your information.

5 - Project Story - Write a story to tell about your citrus tree. Tell how you have taken care of it, problems you have had and how you solved them, etc.

6 - Story Pictures - Include at least 3 pictures of you working with your tree. Write captions for each picture.

How Record Books are scored:

4-H Report Form……5 points
4-H Story……..10 points
Project Record……..40 points
Project Story…….15 points
Pictures…….20 points
Overall neatness……...10 points

Total possible points: 100 points

90 to 100 points - blue ribbon
80 to 89 points - red ribbon
79 and below - white ribbon

Juniors – All parts except those marked for Seniors:

Intermediates – All parts except those marked for Seniors.

Seniors – All parts above plus:
Grapefruit Economic Cycle – p. 15
Reading a Fertilizer Label – p. 25