Name: ____________________________  Age: _____

County: __________  Club: ______________________

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Revised May 2006 by Vera Collins Lake County 4-H Secretary  Available on line at http://lake.ifas.ufl.edu/4-H/index.htm
Advanced Level 4-H Citrus Tree Project

Years 6 and up

This project book is designed for 4-H members who are in their sixth through tenth years of participation in the Central Florida Fair Citrus Tree Project. Having come this far, you have become quite knowledgeable regarding the care of citrus trees. Therefore, you are now ready to advance and explore new areas related to the citrus industry. There are seven major areas from which you can choose. You should select one of these areas each year. If you continue to enroll in the citrus project through your tenth year, you would complete five of the seven areas.

The advanced project book consists of three parts:
1) Citrus project activity described above (may include photographs).
2) Tree care records.
3) Project pictures.
4) Project story.

The primary resources for completing your project book will be those suggested within each of the seven project areas. Your County 4-H Horticulture and/or Agriculture Agents may be of help as well.

Your project book must be completed by the Central Florida Fair citrus tree pre-judging held prior to the contest and sale on 4-H Day. You will be expected to submit your completed project book for judging when you enter your tree for pre-judging. If you have any questions regarding your project tree or this book, you should ask your 4-H Agent or plant to ask your question(s) at one of the scheduled citrus project workshops.
Seven Citrus Industry Topic Areas to Study

1. Grove Management  
2. Health & Nutrition  
3. Marketing  
4. Processing and Packing  
5. Research & Development  
6. Rootstocks, Scions & Propagation  
7. Harvesting Methods

Area 1: Grove Management

INVESTIGATE: Determining a nutrition program: How much N-P-K to apply annually, when to apply, what analysis fertilizer to use, dry vs. liquid material, need to lime, need for minor elements (nutritional sprays or ground applied), what type of program for young trees, and anything else involved with a fertilizer program. Look at environmental concerns, what are the potential problems, what is being done to prevent damage, are there any laws or regulations in place, what can the industry do to prevent problems. Collect soil sample from grove/tree and have analysis done.

VISIT: Citrus production manager, fertilizer plant, fertilizer sales representative, Extension Agent, one or two growers, someone in Florida Department Agriculture UF/IFAS, or someone in county who is familiar with ground water issues.

SUMMARIZE: Procedure used to determine nutritional program for citrus (both mature and young grove/trees). How fertilizers are blended, materials used, cost, etc. Methods of application, dry and liquid, with pros and cons for each. Ground water issues and BMP for citrus. Role of soil test and how to use in determining nutrition program.

SOURCES of INFORMATION: Publication 169, “Interim BMP guidelines from FDACS, EDIS list of citrus tree nutrition publications. Personal contacts, library at Citrus Experiment Station for papers (Lake Alfred), and soil sampling sheet. Citrus Growing in Florida, Larry Jackson; Library at Citrus Research Station in Lake Alfred.
Area 2: Health & Nutrition

INVESTIGATE:

1) The role of citrus in a recommended diet. Determine what constitutes a “good” diet in terms of the amounts and categories of food groups that are recommended for daily consumption. Describe how citrus can be used in the recommended diet.

2) What are the main constituents found in citrus, both fresh and juice. What are the levels of these constituents?

3) Examine the role that the main constituents play in human health. For example, how important is Vitamin C in human health or Folic Acid for pregnant women.

4) How has citrus been used to prevent or reduce severe dietary problems. Look as this situation over history to determine why citrus has been an important part of the diet. What is scurvy?

5) What work is being done with citrus today with regard to its nutritional value.

6) Look at the situation with grapefruit and the update of medicine. What do we know about the role of grapefruit in particular and what is being done to find out more about the relationship between the citrus fruit and beneficial drugs.

VISIT: * A local hospital and talk to the dietician to learn how they use citrus. When is citrus excluded from a diet, what form of citrus do they use, fresh, juice, salad, and where do they obtain the citrus. Find out how they would improve the current use of citrus in the diets of the patients. EX. Are they happy with the citrus available, would they like more fresh fruit, is citrus easy to prepare, other comments they may have. * A doctor or someone familiar with human nutrition, Family and Consumer Science Extension Agent, to talk about the role of citrus in a person’s diet.

SUMMARIZE: The role citrus can play in a balanced diet and the many nutritional benefits obtained from citrus.

SOURCES OF INFORMATION: www.floridajuice.com

www.florida-agriculture.com

Area 3: Marketing

INVESTIGATE:

1) Ways growers sell citrus, directly to a consumer, to a packer or processor, to an intermediate handler, aka “bird dog” or through the future’s market.

2) Who buys fresh fruit and processed fruit and how they operate.

3) Who sells fresh fruit and processed fruit and how they operate.

4) The role of government in the marketing of citrus.

5) The amount of money growers get for their fruit.

VISIT: A packing house, processing plant, and a grocery store. Talk to those involved in selling and buying citrus, fresh and juice. Visit the Florida Agricultural Statistics Service to see how they collect and publish price information.

SUMMARIZE: The marketing options available to growers and the pros and cons to each method. Examine the prices growers get for their fruit, fresh and processed. How does that compare with what the consumer pays at the store for these products? Who seems to be making money in the citrus industry? How can a grower maximize the amount of money he/she can make selling fruit?

SOURCES OF INFORMATION: UF/IFAS publication FE196, Florida Agricultural Statistics Service publications; citrus summary, yield, etc.

Citrus Growing in Florida, Larry Jackson at Citrus Research Station in Lake Alfred.
Area 4: Processing and Packing

INVESTIGATE:

** Background on processing technique:
1) When did it start?
2) Who developed the method?
3) How much of Florida citrus is processed using this method?
4) What is the difference between FCOJ, NFC and fresh squeezed?
5) What are the regulations involving processed citrus juice.
6) What happens to the juice after it is squeezed from the fruit?

** Background on packing:
1) What happens to the fruit between arriving at the packing house and being loaded on a truck to be delivered to the grocery store?
2) How important is the appearance, color, size, and blemishes?
3) How do we keep fresh fruit from spoiling between Florida and the out-of-state consumer?
4) Who makes the regulations involving fresh fruit?
5) Where do the fresh fruit go, USA and foreign countries?
6) What are the main varieties shipped fresh and what time of the year are they harvested?

VISIT: Fresh fruit packing house and processing plant. If possible, go to the University of Florida Research and Education Center at Lake Alfred to visit with researchers and Extension Specialists that work in the area of processed fruit. Learn what “new” products they are working to develop.

SUMMARIZE: The importance of both processing and fresh fruit packing. Which varieties are involved with each? What are the returns from methods of handling citrus? Who are the main competitors for Florida growers?

SOURCES OF INFORMATION: Florida Agricultural Statistics Services; UF/IFAS at Lake Alfred and Gainesville; The Library Lake Alfred REC, UF/IFAS publications, Citrus Growing in Florida, Larry Jackson.
Area 5: Research and Development

INVESTIGATE:

1) The two primary public citrus research facilities in Florida; University of Florida and the USDA. Describe the structures of the two organizations.
2) The various types of research that are done by both agencies. How many scientists are involved for each project, who helps the scientists and what happens with the results of the research.
3) How both research agencies are funded. Who administers the dollars that are needed to conduct the research.
4) How scientists determine research needs.
5) Follow a specific project from lab to field. Define the problem, what the research team is doing to solve the problem and how are the results being passed on to those that use the solution.

VISIT: * The USDA lab in Fort Pierce or the UF/IFAS Citrus Experiment Station in Lake Alfred. Speak to the Center Director about the general operation of the experiment station. Visit one or more scientists to learn about a specific project that interests you. * A citrus grower to find out how important research is to them. How do they find out about research results, and how do they use the results to make more money or to protect the environment. * A member of the Florida Research Advisory Council about the importance of citrus research work and how the council supports research.

SUMMARIZE: The research process and the importance of research to the Florida citrus industry.

University of Florida
Institute of Food and Agricultural Sciences
Citrus Research & Education Center
700 Experiment Station Road
Lake Alfred, FL 33850

http://www.crec.ifas.ufl.edu/library/index.html

SOURCES OF INFORMATION: UF/IFAS Citrus Experiment Station Lake Alfred, Indian River REC and Immokalee REC. USDA Horticultural Lab, Agricultural Research Service, FT Pierce, Citrus Growing in Florida, Larry Jackson at Citrus Research Station in Lake Alfred.
Area 6: Roots, Scions, and Propagation

INVESTIGATE:
1) Why citrus growers have “budded” trees, ones with a variety grafted to a rootstock.
2) The most popular rootstocks used in Florida, and pros/cons of the top five.
3) The methods of propagating and growing trees in Florida.
4) The Citrus Budwood Registration program in Florida. What is its purpose and how does it function?
5) Describe the most popular juice - orange, grapefruit or tangerine cultivars used in Florida. When the fruit matures, how many boxes are grown each year, how the fruit is used, fresh or processed, and any unusual characteristics.

VISIT:
* A citrus nursery to see how trees are grown from seed to budding to finishing.
* A citrus grower to discuss scion and rootstock selection and observe several combinations in the field.
* The Citrus Arboretum and Budwood office in Winter Haven to see hundreds of citrus cultivars and obtain information on the registration program.

SUMMARIZE: The value and rationale of using budded citrus trees. The most popular rootstocks used in Florida and the role of the Budwood Registration Program.

SOURCES OF INFORMATION: SP 42 Rootstocks for Florida Citrus; SP102 Florida Citrus Varieties; Citrus Growing in Florida, Larry Jackson; Library at Citrus Research Station in Lake Alfred.

Area 7: Harvesting Methods

INVESTIGATE:
1) How most citrus harvested in Florida and what are the various sources for workers. How many people does it take to harvest fruit.
2) The economics of harvesting; about how much does it cost to harvest the fruit, how much does it cost to roadside, how much to haul the fruit to the plant. How much does the picker get for each box of fruit, how much does the crew leader get, how much to the grower. How does the harvesting company get paid.
3) Mechanical harvesting; can we pick citrus fruit with a machine? What methods are used to mechanically harvest fruit?
4) Abscission chemicals; what are these materials and what role can they play in harvesting.
5) A harvesting crew; visit a crew in the field and learn as much as possible about the workers. How hard is the work, how many hours a week do they work, what is the hardest part of their job, what do they like about their job. Can children be used to help harvest citrus fruit?
VISIT:

1) A harvesting crew at work in a grove. Talk to the pickers, the loader operator, and the crew leader.
2) With a harvesting manager to learn how they manage to get all the fruit harvested and delivered to a packing house or processing plant.
3) The owner or manager of a harvesting company. They can help with the economics of harvesting and give you a “big picture” with regards to harvesting citrus.
4) Someone involved with mechanical harvesting. There are several commercial companies and a number of University of Florida researchers/extension specialists familiar with mechanical harvesting.

Summarize: The current harvesting situation in Florida; be sure to provide information on the harvesting crew you visited. Also summarize the mechanical harvesting situation in Florida including the impact abscission chemicals.

SOURCES OF INFORMATION: University of Florida, Institute of Food and Agricultural Sciences - Citrus Experiment Station, Lake Alfred, Indian river REC and Immokalee REC - Ron Muraro, Economist, Citrus Research and Education Center, Lake Alfred Fritz Roka, Economist, Southwest Research and Education Center, Immokalee - Florida Agricultural Statistical Service, Orlando, FL UF/IFAS publication EDIS document FE435 Average Harvesting Charges for Florida Citrus, 200-2003

For update info, project books, dates, maps visit: http://lake.ifas.ufl.edu/4-H/index.htm
Scion or Varieties

As mentioned previously, a scion or variety is the portion of the citrus tree above the bud union. There are many different varieties of citrus grown in Florida. The main categories are:

- Oranges
- Grapefruit
- Mandarins (tangerines)
- Limes

The various varieties of oranges mature at different times of the year and vary in the average number of seeds per fruit. Grapefruit varieties are determined by the internal color of the fruit and by the average number of seeds per fruit. Mandarins or specialty fruit cover a wide range of varieties. Most of them are easy to peel and are consumed fresh. Most of the mandarins mature in the fall and early winter, although a couple of them are not ready until late winter or early spring.

Name ten different citrus varieties along with the fruit type, average number of seeds, color of flesh and time of maturity.

<table>
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<th>Variety</th>
<th>Type</th>
<th>Seeds</th>
<th>Color</th>
<th>Maturity</th>
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<tbody>
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<td>Orange</td>
<td>Seedless</td>
<td>Light orange</td>
<td>Very early</td>
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Care and Maintenance

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<td>Pruning</td>
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