DOCUMENT RESUME

ED 098 369 95 CE 002 458

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TITLE Agriculture and Related Businesses. Revised Summary Report: Technical Employment in Northeast Florida.
INSTITUTION Duval County School Board, Jacksonville, Fla.
SPONS AGENCY Bureau of Elementary and Secondary Education (DHEW/OE), Washington, D.C.
PUB DATE Jun 72
NOTE 140p.; For related documents, see CE 002 457-461

EDRS PRICE MF-$0.75 HC-$6.60 PLUS POSTAGE
DESCRIPTORS Agribusiness; Agricultural Machinery Occupations; *Agricultural Occupations; Agricultural Production; Employment Opportunities; Employment Qualifications; Forestry Occupations; Job Market; Landscaping; *Occupational Information; Occupational Surveys; *Off Farm Agricultural Occupations; Relevance (Education); Secondary Education; Skill Analysis; *Task Analysis; *Technical Occupations; Vocational Agriculture
IDENTIFIERS Elementary Secondary Education Act Title III; ESEA Title III; Florida; *Pretechnical Education

ABSTRACT

The document is one of five summary reports, all part of a Pre-Technical Curriculum Planning Project for secondary students who aspire to technical employment or post secondary technical education. This report represents the results of an assessment of the northeast Florida area's technical occupations in agriculture and related businesses. A three phase approach was utilized: (1) the identification of four broad career clusters in agribusiness: landscaping, animal/food production, forestry and natural resources, and agricultural mechanics; (2) development of a survey instrument; and (3) a review of data collected. The following occupations are some of those analyzed according to tasks and corresponding skills/knowledges: florist shop technology, floral design, greenhouse technology, landscape technology, dairy and poultry plant managing, poultry service, logging, forestry research technology, game and fish management, aquatic weed control, wild life officer, ranger, agricultural mechanics, service and sales, and truck driving. Employment statistics and projections, conclusions and recommendations complete the document. (MW)

SUMMARY REPORT

TECHNICAL EMPLOYMENT IN NORTHEAST FLORIDA

AGRICULTURE AND RELATED BUSINESSES

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INTRODUCTION

In 1971, the Duval County School Board took a major step forward in providing relevant curriculum for students when they adopted the concept of a three-program curriculum for senior high schools. The three programs decided upon by the Board were:

1. Vocational
2. College Preparatory
3. Pre-Technical

The differences between this high school curriculum and most others were that:

> The pre-technical program filled the gap between the vocational and the professional level preparation.
>
> Each of the three programs was directly related to the student's post high school plans.

The traditional programs and curriculum had made available programs that would provide the skills and knowledges for pupils desiring to enter a vocation or college, but only a few technical, and no pre-technical courses were offered.

This lack of a pre-technical curriculum was not a problem unique to Duval County Schools. Investigations by staff members of the Duval County School Board of existing programs at the local and state level, followed by consultations with state and national experts in technological education, revealed that no planned program of pre-technical education at the secondary level existed in

the state or in the nation. Only fragments of a pre-technical curriculum, and a few high school technical programs, could be found. The failure of education on a national scale to respond to the needs of certain students, industries, and businesses emphasized the requirement for a carefully prepared pre-technical curriculum at the secondary level.

Education's failure to meet the need for technical and pre-technical education provided the impetus for this project. The project's ultimate goal is to develop a pre-technical curriculum which provides secondary students, who aspire to technical employment or post secondary technical education, with the requisite skills, knowledges, and attributes to respond successfully to current and anticipated demands of local, state, and national job markets.

Before any curriculum could be developed, an assessment had to be made of the kinds of technical occupations that presently exist in the Northeast Florida area plus the associated skills, knowledges, and attributes needed for these occupations. This summary report presents the results of that assessment.

The study was limited to the Northeast Florida area and to selected agencies because of time and personnel constraints. However, there is no reason why the procedures used in this study would not be applicable for a wider geographic region.

DESIGN OF THE STUDY

This study was designed to meet the following objectives with respect to technical occupations in agriculture and its related businesses in Northeast Florida:

1. To identify the existing technical occupations and the number of present and anticipated employees in each;
2. To determine the requisite skills, knowledges, and attributes associated with successful participation in each occupation identified in (1);
3. To cluster the technical occupations.

The scope of the study required a three-phase approach.

Phase I was the identification of four broad career clusters in the Agri/Business Area. These were determined to be:

1. Landscaping
2. Animal/Food Production
3. Forestry and Natural Resources
4. Mechanics in Agriculture

Special Area Advisory and Review Committees were established in each of the clusters. Each committee was composed of:

1. Area specialists from the Duval County School Board;
2. Working technicians;
3. Key representatives from the Agri/Business in Duval County.

The first function of each committee was to prepare a rough draft survey form of tasks performed in each cluster area. A tentative list of skills, knowledges, and attributes was also identified at this time. The project staff was responsible for researching the literature and making resources available to assist the committee members in this endeavor. After preparing the survey instrument for each area, the committee members identified businesses in the Northeast Florida area which employed personnel in technical positions, and then identified key individuals within those agencies. These key individuals were contacted by staff personnel, met as an advisory committee, and completed a job task survey instrument for the technical occupations existing within the business.

Phase II consisted of developing a written survey instrument which was mailed to businesses not contacted in Phase I. This survey was used to supplement the information obtained in Phase I and to identify the number of present and anticipated employees in each occupation. Businesses identified in Phase II were determined from the following sources:

1. Yellow pages of the telephone directory;
2. Consolidated City of Jacksonville Records;
3. Project Agriculture, a survey by the University of Florida of all agricultural enterprises.

An attempt was made to contact all businesses from the sources listed where one or more workers were required to have competencies in job performance for Agriculture and its related businesses.

The primary method of determining the number of present and anticipated employees was a mailed questionnaire. This method was selected for the following reasons:

1. It allowed wider coverage and a larger number of contacts than a personal interview;
2. It was less expensive than a personal interview;
3. A mailed questionnaire allowed the agency representative to complete it at his leisure.

Follow-ups (personal visit or telephone) to the questionnaire were made by a project staff member in the following cases:

1. Business that did not return the questionnaire;
2. If the returned questionnaire indicated a new technical position existed in that business.

In Phase III, members of the Special Area Advisory Committees met to review the data collected. Task forces composed of consultants and members of each area advisory committee met individually, and in some cases jointly, to expand and compile the lists of tasks and skills in each of the four areas.

Based on these lists, a final review and modification was made by selected committee members. The results of that review are presented in Chapters 1-5 of this report.

ANALYSIS OF RESPONSE

In the Landscaping Area (16) sixteen golf courses, (35) thirty-five nurseries, (40) forty florists, (10) ten cemeteries, (21) twenty-one lawn maintenance, and (15) fifteen tree services were contacted in either Phase I or Phase II. The table below shows the results of these surveys.

	NUMBER	PERCENTAGE
Original Mail-Out	138	80%
Number Returned	26	18%
Telephone Follow-Up	52	47%
Number Successful Responses from Telephone Follow-Up	23	44%
Personal Visits	3	
Total Response	52	38%

In the Animal/Food Production area (10) ten dairy or milk producers, and (11) eleven egg and poultry producers were contacted in either Phase I or II. The table below shows the results of these surveys.

	NUMBER	PERCENTAGE
Original Mail-Out	20	90%
Number Returned	7	35%
Telephone Follow-Up	7	50%
Number Successful Responses from Telephone	2	28%
Personal Visits	3	
Total Response	5	71%

ANALYSIS OF RESPONSE

In Forestry, Parks and Recreation, Game and Fresh Water Fish Management (4) four agencies and (2) two forestry companies were contacted in either Phase I or II. The table below shows the results of these surveys.

	NUMBER	PERCENTAGE
Original Mail-Out	3	50%
Number Returned	2	66%
Telephone	1	100%
Number Successful Responses from Telephone Inquiry	1	100%
Personal Visits	3	50%
Total Response	6	100%

In Mechanics in Agriculture (9) nine tractor and farm equipment dealers were contacted in either Phase I or II. The table below shows the results of these surveys.

	NUMBER	PERCENTAGE
Original Mail-Out	3	33%
Number Returned	1	33%
Telephone Follow-Up	1	50%
Number Successful Responses from Telephone Follow-Up	1	100%
Personal Visits	6	66%
Total Response	8	88%

A supplementary report, not to be released publicly, gives the names of the agencies and their responses as part of the final project report.

CHAPTER I

Identification of Technical Occupations

Agriculture and Related Businesses

The majority of the occupations given in the Agri/Business Areas were identified by members of the specialized Advisory Committee. Personal visits to selected businesses in each area completed the identification of occupational titles.

No attempt was made by the staff or committees to interpret what was meant by various job titles or occupations. The common titles currently in use by governmental agencies or businesses were used, as were the job titles listed in the Dictionary of Occupational Titles. The table below summarizes the number of occupations identified in each major area.

Area	Number of Occupations Identified
I. Landscaping Technology	15
II. Food Processing and Service	8
III. Forestry and Natural Resources	
A. Forestry	10
B. Game and Fresh Water Fish Management	4
C. Parks and Recreation	3
IV. Mechanics in Agriculture	7

CHAPTER II

TASK ANALYSIS OF SELECTED OCCUPATIONS IN AGRICULTURE AND RELATED BUSINESSES

In this chapter, a task analysis for each technical occupation is given. Section I presents the task analyses for occupations in Landscaping, Section II the analyses for occupations in Animal/Food Production, Section III the task analyses for occupations in (A) Forestry, (B) Game and Fresh Water Fish Management (C) Parks and Recreation, and Section IV presents the task analyses for Mechanics in Agriculture. Each section lists the occupation and its identifying code title. An (X) appearing in the column opposite the task row for a particular occupation indicates that that task is performed in the occupation.

These task lists were compiled from information and surveys conducted in Phases I and II. The original task lists were developed by task forces composed of members of the various advisory committees from job descriptions and publications available on competencies found in Agri/Business careers. From the original task lists, a written survey instrument was developed which could easily be completed by anyone familiar with the occupation. Selected businesses were identified who employed individuals in technical positions. They were contacted by a staff member, and at least one of the following methods was used to complete the survey instrument:

1. Completed by technicians supervisor.
2. Completed by personnel office staff.
3. Completed by project staff member from available job description information.

An attempt was made to obtain at least three completed surveys on each occupation. A consensus of individuals who completed the survey provided the basis for listing that task as being performed in that occupation.

CHAPTER II

TASK ANALYSIS

LANDSCAPING TECHNOLOGY

I. Job Occupations in Landscaping Technology and Identifying Code Titles (Entry level and specialized positions)

Title:	Code
Retail Florist Shop Technologist.	1
Floral Designer	2
Greenhouse Technologist.	3
Floriculture Technologist	4
Landscape Nursery Technologist	5
Garden Center Technologist.	6
Landscape Contractor and Design Technologist.	7
Landscape Maintenance Technologist	8
Tree Surgeon Technologist	9
Lawn and Landscape Pest Control Technologist.	10
Golf Course Maintenance Technologist . . .	11
Park Maintenance Technologist	12
Cemetery Maintenance Technologist	13
Industrial and Institutional Technologist. .	14
Landscape Product Sales Technologist . . .	15

LANDSCAPING TECHNOLOGY

A. NURSERY AND LANDSCAPE OPERATIONS

JOB ENTRY TASKS	CODE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Select and identify plant materials.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2. Fertilize plant materials.			X	X	X	X	X	X	X	X	X	X	X	X	X
3. Irrigate plant materials from hand waterers to automatic systems.	X		X	X	X	X	X	X	X	X	X	X	X	X	X
4. Prune plant materials, both tops and roots.			X	X	X	X	X	X	X	X	X	X	X	X	X
5. Cultive plant media.			X	X	X	X	X	X	X	X	X	X	X	X	X
6. Ball and wrap plants.			X	X	X	X	X	X	X	X	X	X	X	X	X
7. Grade plants according to size and quality.					X	X	X	X	X		X	X	X	X	
8. Package and load plant materials.	X	X	X	X	X	X	X	X	X						
9. Direct labor.	X														X
10. Operate nursery equipment.			X	X	X	X	X	X	X	X	X	X	X	X	X
11. Perform routine maintenance, repair, and adjustments to nursery equipment.	X														X
12. Mix growing media.			X	X	X	X	X	X	X	X	X	X	X	X	X
13. Place plants in containers			X	X	X	X	X	X	X		X	X	X	X	
14. Calibrate sprayer			X	X	X	X	X	X	X	X	X	X	X	X	X
15. Construct and repair growing structures: plumbing, electrical, carpentry, concrete.			X	X	X	X	X	X	X	X	X	X	X	X	X
16. Adjust heating and ventilating equipment.															

B. LAWN AND LANDSCAPE PEST CONTROL CODE

JOB ENTRY TASKS	1	2	3	4	5	6	7	8	9	10	11	12	13	14
17. Prepare truck: reviewing orders, select chemicals, check equipment, load chemicals and equipment, determine and mix appropriate sprays to be used on jobs.					X		X	X	X	X	X	X	X	
18. Operate spray truck.									X	X				
19. Operate and maintain spray equipment and pumps (routine maintenance).			X	X	X	X	X	X	X	X	X	X	X	X
20. Spray plants according to (1) plant characteristics; (2) pest characteristics; (3) spray material conditions.			X	X	X	X	X	X	X	X	X	X	X	X
21. Spray and kill brush.			X	X	X	X	X	X	X	X	X	X	X	X
22. Diagnose common pest problems and relay information to superior, if there is one.			X	X	X	X	X	X	X	X	X	X	X	X
23. Determine drift hazards; recognize weather's influence and conditions.			X	X	X	X	X	X	X	X	X	X	X	X
24. Keep records: time, materials, conditions.	X	X	X	X	X	X	X	X	X	X	X	X	X	X
25. Estimate cost of jobs.	X	X	X	X	X	X	X	X	X	X	X	X	X	X
26. Meet the public.	X	X	X	X	X	X	X	X	X	X	X	X	X	X

C. GOLF COURSE MAINTENANCE

JOB ENTRY TASKS	CODE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
27. Operate gang mowers or tractor drawn mowers in mowing areas.								X			X	X	X	X	X
28. Operate sweepers and rollers in maintaining grounds.								X			X	X	X	X	X
29. Perform routine maintenance: cleaning, lubricating, adjusting, on sweepers, rollers, and mowers.													X	X	X
30. Water and fertilize greens, fairways, and large turf areas.							X	X		X	X	X	X	X	
31. Grade and prepare base, laying sod and seeding.							X	X			X	X	X	X	
32. Maintain water hazards and sand traps.											X				
33. Repair and replace pipe on sprinkle systems.			X	X	X	X	X	X	X	X	X	X	X	X	X
34. Install forms and lay walks, using gravel and asphalt mixes.							X	X							
35. Operate dump trucks or pick-up in hauling materials and removing debris.			X	X	X	X	X	X	X	X	X	X	X	X	
36. Cultivating shrubs and flowers.			X	X	X	X	X	X			X	X	X	X	
37. Recognize problems arising from insects, fungi, and player abuse to turf.	X		X	X	X	X	X	X	X	X	X	X	X	X	X
38. Use and maintain hand and garden tools.			X	X	X	X	X	X	X	X	X	X	X	X	X

LANDSCAPING TECHNOLOGY

C. GOLF COURSE MANAGEMENT

JOB ENTRY TASKS	CODE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
39. Assist in planting and removing trees, shrubs, flowers, and turf.			X	X	X	X	X	X	X	X	X	X	X	X	
40. Control rodents, moles.			X	X	X	X	X	X	X	X	X	X	X	X	X

LANDSCAPING TECHNOLOGY

D. FLORICULTURE

JOB ENTRY TASKS	CODE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
41. Design floral pieces and arrangements.	X	X													
42. Cut and recondition flowers.	X	X													
43. Design florist window displays.	X	X				X									
44. Arrange and sell artificial flowers.	X	X					X								
45. Advise customers on plant identification and care.	X	X				X									
46. Sell plants, making business transactions.	X	X				X									
47. Take orders, transferring orders to phone or wire service.	X	X				X									
48. Estimate types of plants and flowers to be used for special occasions according to records.	X	X				X									
49. Rotate stock.	X	X				X									
50. Contact other flower growers.	X	X				X									
51. Deliver merchandise by motor vehicle.	X	X				X									
52. Retail diversified stock, ceramics.	X	X				X									

E. LANDSCAPE CONTRACTING AND DESIGN

JOB ENTRY TASKS	CODE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
53. Plan landscape according to design principles.							X	X							
54. Plan according to accepted drawing techniques.							X								
55. Use plant symbols.							X								
56. Develop landscape plot plans							X								
57. Landscape certain areas: (a) public areas; (b) service areas; (c) private areas; (d) recreational areas.							X	X			X	X	X	X	
58. Survey the landscape.							X								
59. Level and grade land with equipment and by hand.					X		X	X			X	X	X	X	
60. Condition soil; applying bark dust, peat moss, sand, loamite, etc.			X	X	X		X	X			X	X	X	X	
61. Apply fertilizer to individual plants.			X	X	X	X	X	X	X	X	X	X	X	X	
62. Maintain planting grade around buildings and walkways.							X	X			X	X	X	X	
63. Install aggregate, river rock, large rocks, and gravel by plan.					X		X	X			X	X	X	X	
64. Install edging materials to contain soil, aggregate, turf.					X		X	X			X	X	X	X	
65. Operate, maintain, adjust making minor repairs of truck, pick-up, tractor with blade, rake, sod cutter.					X		X	X			X	X	X	X	

LANDSCAPING TECHNOLOGY

F. GREENHOUSE OPERATION — CODE

JOB ENTRY TASKS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
66. Identify and select plants based on market demand.			X	X											
67. Prepare soil mix for each type of flower to be grown.			X	X											
68. Start plants from seeds, bulbs, tubers.			X	X											
69. Propagate plants from cuttings, layerage.			X	X											
70. Maintain parent stock.			X	X											
71. Water plants (flowers) based on need.			X	X											
72. Fertilize plants (flowers) based on needs determined by soil tests.			X	X											
73. Perform simple soil tests.			X	X											
74. Regulate temperature, humidity, and light in greenhouse.			X	X											
75. Apply sprays, smokes, fogs to control pests.			X	X											
76. Pot, transplant, disbud, cut, grade flowers.			X	X											
77. Regulate growth through use of chemicals.			X	X											
78. Maintain boiler, making minor repairs.			X	X											

CHAPTER II

TASK ANALYSIS

FOOD PROCESSING AND SERVICE

II. Job Occupations in Food Processing and Service: Animal Food Production, and Identifying Code Titles (Entry level and specialized positions)

Title:	Code:
Milker.	1
Supervisor	2
Foreman	3
Dairyman	4
Poultry Plant Manager.	5
Poultry Farm Owner.	6
Poultry Service Technician A. Health B. Breeding	7
Feed Technician	8

ANIMAL/FOOD PRODUCTION

JOB ENTRY TASKS	CODE 1	2	3	4	5	6	7	8
1. Identify in the field the important breeds of livestock in the community.	X	X	X	X	X	X		
2. Identify the various body parts of animals.	X	X	X	X			X	X
3. Select livestock, dairy, and poultry in accordance with breeding and marketing standards.		X	X	X	X	X		
4. Keep accurate production records.	X	X	X	X	X	X		X
5. Determine the nutrient requirements of various types of livestock, dairy, and poultry found in the community.			X	X	X	X		X
6. Determine the nutritional values of feeds.			X	X	X	X		X
7. Design a balanced ration for a simple-stomached farm animal using local feeds and prices.				X	X	X		X
8. Design a balanced ration for a plural-stomached farm animal using local feeds and prices.			X	X				
9. Recognize signs for determining gestation and heat periods for farm animals.	X	X	X	X				
10. Perform artificial insemination.		X	X	X				
11. Plan a livestock improvement program for a type of livestock in the community; specify breed, schedules for breeding, sire-dam ratio, culling program indicating standards.			X	X	X	X	X	
12. Analyze progeny records for such things as: A. Pounds of gain per pound of feed B. Carcass yield and quality C. Cost per pound of gain			X	X	X	X		X

ANIMAL/FOOD PRODUCTION

JOB ENTRY TASKS	CODE 1	2	3	4	5	6	7	8
13. Design a program to promote good health and safety of farm animals.	X	X	X	X	X	X	X	X
14. Give simple injections (inoculations, etc.) according to approved practices.			X	X	X	X	X	
15. Treat parasite infection.			X	X	X	X	X	
16. Perform debeaking, castrating, docking, foot trimming, dehorning, clipping eye teeth, and shearing operations, etc.			X	X	X	X	X	
17. Keep accurate production and financial records on a particular livestock enterprise.	X	X	X	X	X	X	X	X
18. Analyze the records to determine if his management practices were profitable.			X	X	X	X		X
19. Interpret market reports in newspaper and official reporting services.				X	X	X		
20. Recognize and treat mastitis.		X	X	X				
21. Operate automatic feed equipment.		X	X	X		X		X
22. Operate refrigeration equipment.		X	X					
23. Repair minor broken machinery and equipment.		X	X	X	X	X	X	X
24. Use, maintain hand tools and non-powered equipment.	X	X	X	X	X	X	X	X
25. Milk dairy cows.	X							
26. Run butter fat samples.		X	X	X				
27. Purchase good dairy stock.			X	X				
28. Apply fertilizer to a crop using acceptable methods, recommended rates, at the proper time.			X	X				

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JOB ENTRY TASKS	1	2	3	4	5	6	7	8
29. Recognize the workings of insects, pests, and diseases, and perform the recommended control measures.	X	X	X	X	X	X	X	X
30. Identify the common weeds of the community, recognize their methods of reproduction, and relate possible control measures.			X	X	X	X		
31. Promote good human relations and communicate effectively with people.	X	X	X	X	X	X	X	X
32. Handle money, checks, credit.			X	X	X	X		
33. Order, buy equipment or supplies.			A	A	A	A		
34. Construct, maintain and repair buildings and structures.			X	X	X	X		
35. Construct, assemble machinery or equipment.			X	X	X	X		

CHAPTER II

TASK ANALYSIS

FORESTRY AND NATURAL RESOURCES

III. Job Occupations in Forestry and Natural Resources and Identifying Code Titles (Entry level and specialized positions)

A. Forestry

Title:	Code:
Cruiser	1
Research Technician	2
Woodsman	3
Senior Woodsman	4
Equipment Operator	5
Logging Technician	6
Ranger	7
Towerman	8
Dispatcher	9
Mechanic	10

B. Game and Fresh Water Fish Commission

Title:	Code:
Game Management Specialist	1
Fish Management Specialist	2
Aquatic Weed Control Specialist I	3
Wildlife Officer	4

C. Parks and Recreation

Title:	Code:
Ranger, Non-Resident.	.1
Ranger, Resident	.2
Museum Guide	.3

FORESTRY AND NATURAL RESOURCES

JOB ENTRY TASKS	CODE 1	2	3	4	5	6	7	8	9	10
1. Use the results of a soil test from a soil testing lab and make necessary fertilizer applications for profitable crop production.		X	X	X						
2. Read labels and analyze fertilizers on the market.				X						
3. Compute the cost of fertilizing crops using various materials purchased from local sources.				X						
4. Apply fertilizer to a crop using acceptable methods, recommended rates, and at the proper time.				X						
5. Plan ways of draining a swampy area.				X	X					
6. Operate farm level and surveying equipment.			X	X						
7. Irrigate and determine the frequency of irrigation for profitable crop production.		X								
8. Properly prepare and join a scion and rootstock for a cleft, bud, and whipgraft.		X		X						
9. Select plants for nursery stock.		X	X	X						
10. Conduct a germination test on a sample of seeds and analyze the results from both the producer and consumer viewpoint.		X								
11. Recognize the workings of insects, pests, and diseases, and perform the recommended control measures.	X	X	X	X		X	X			
12. Prepare, treat with rooting hormone, plant in a properly prepared rooting bed, and care for a variety of plant cuttings.		X	X	X						

FORESTRY AND NATURAI RESOURCES

JOB ENTRY TASKS	CODE 1	2	3	4	5	6	7	8	9	10
13. Identify common weeds of the community, recognize their methods of reproduction, and select possible control measures.			X	X						
14. Plan a cropping program for a specific crop commensurate with recommended community practices from seed bed preparation to harvesting.			X	X						
15. Reproduce plants using methods of sexual and vegetative reproduction.		X								
16. Estimate how many acres of forest land there are in a particular woodland and calculate the volume of wood.	X		X	X						
17. Prepare a simple and concise farm woodland management plan that will most profitably use the farm's resources-land, labor, and equipment.			X	X						
18. Given the proper tools and equipment, select, adjust, calibrate, service, and safely operate three or more farm implements.					X	X	X			X
19. Trouble shoot and service an internal combustion engine adjusting basic parts of the ignition, lubrication, fuel, cooling, and hydraulic systems of a farm tractor.					X	X	X			X
20. Perform basic metal working processes (arc welding, oxy-acetylene cutting, welding, soldering, etc.) in a safe and workmanlike manner.					X					X
21. Select, use, and maintain tractor hydraulic system.					X	X	X			X
22. Promote good human relations and communicate effectively with people	X	X	X	X	X	X	X	X	X	X

FORESTRY AND NATURAL RESOURCES

JOB ENTRY TASKS	CODE 1	2	3	4	5	6	7	8	9	10
23. Keep appropriate records.	X	X	X	X	X	X				
24. Use, maintain, hand tools and non-power equipment.	X	X	X	X	X	X			X	X
25. Operate, maintain, adjust small power equipment.	X	X	X	X	X	X	X			X
26. Operate, maintain, adjust large power equipment.			X	X	X		X			X
27. Maintain irrigation system.		X								
28. Order, buy equipment, supplies.			X	X						X
29. Install, operate automatic equipment			X	X						X
30. Construct, maintain, repair buildings and structures.			X	X			X			
31. Construct, assemble machinery or equipment.		X			X	X				X
32. Plant, transplant plant materials.		X					X			
33. Harvest crops.					X	X				
34. Survey, map land.	X		X	X						
35. Control fires.	X	X	X	X	X	X	X	X	X	X
36. Cruise, appraise timber.	X		X	X						
37. Identify forest plants and seeds.	X	X	X	X						
38. Identify forest problems.	X	X	X	X	X	X	X	X		
39. Plan, oversee construction of campsites, and recreational facilities.			X	X			X			
40. Enforce recreation laws.	X	X	X	X	X	X	X		X	

GAME AND FRESH WATER FISH MANAGEMENT

JOB ENTRY TASKS	CODE 1	2	3	4
1. Patrol lakes, streams, rivers and hunting areas; checks hunters and fishermen for licenses and illegal fishing and hunting activities.	X			X
2. Assist in conducting wildlife population studies including the recording and tabulation of results.	X		X	
3. Trap, transport and relocate wild animals such as deer, turkeys, and hogs.	X			
4. Plant, fertilize, and maintain wildlife food plots on game management areas.	X			
5. Direct controlled hunts on management areas including the collection of permit money from hunters.	X			
6. Prepare weekly game management activity reports.	X			
7. Advise hunters and sportsmen of rules and regulations of the various management areas.	X	X	X	X
8. Assist game biologists in conducting research projects.	X		X	
9. Accumulate and record data of animal telemetry projects.	X		X	
10. Gather and report basic environmental data in the field such as temperature, humidity, and water quality samples.		X	X	
11. Maintain and repair boats, electro-fishing devices, motors and related equipment used in conducting surveys in collecting samples.		X	X	
12. Assist fishery biologists in planning and constructing specialized equipment for research investigations.		X	X	

GAME AND FRESH WATER FISH MANAGEMENT

JOB ENTRY TASKS	CODE 1	2	3	4
13. Conduct investigations, secure evidence and issue warrants, summons, and citations to violators.				X
14. Prepare reports and maintain records of law enforcement activities, including citations, arrests and disposition of cases.				X
15. Assist local law enforcement agencies during civil disturbances and natural disasters.				X
16. Inspect commercial fish houses, hunting camps, wildlife exhibits and fur houses for evidence of violations of State Game and Fish Laws.	X	X	X	X
17. Operate trucks, airboats and halftracks in patrolling assigned land and water areas; perform minor preventive maintenance and repair of equipment.	X	X		X
18. Present talks to sportsmen and civic and community organizations concerning wildlife restoration and conservation.				X
19. Spray or mechanically remove hyacinths, weeds, and related water vegetation in an assigned area.			X	
20. Maintain and repair equipment used in conducting aquatic weed control activities.			X	
21. Maintain rivers and waterways in a navigable condition by removing log jams, windfalls, and related debris.			X	
22. Contact property owners and sportsmen in reference to spraying and treating of noxious aquatic plant life.			X	
23. Prepare weekly activity reports on weed control activities and vegetation growth.			X	

DEPARTMENT OF NATURAL RESOURCES
(PARKS AND RECREATION)

JOB ENTRY TASKS	1	2	3
1. Possession of, or the ability to secure a valid Florida Operator's or Chauffeur's License for the type of vehicle assigned.	X	X	X
2. Meet the public, and speak clearly and understandably.	X	X	X
3. Provide security measures to protect park property and visitors against vandalism.	X	X	
4. Enforce rules and regulations regarding the operation of the particular park to which assigned.	X	X	X
5. Enforce hunting and fishing regulations.	X	X	X
6. Patrol the park/parks and protect the game against poachers and illegal hunters.	X	X	
7. Give lectures on park flora, fauna, facilities, and park and local history.	X	X	X
8. Work with people and assist them in understanding and enjoying the facilities of the area.	X	X	X
9. Collect fees, assign camp areas and distribute park literature.	X	X	
10. Conduct tours through museums or other park attractions.	X	X	X
11. Operate boat or jeep while conducting tour.			X
12. Sell, stamp tickets, collect fees for museum tours.			X
13. Assist in maintaining museum or memorial security with conducting tours.			X
14. Assist with general clerical work such as preparing attendance and revenue reports, taking inventory and maintaining other clerical records	X	X	

DEPARTMENT OF NATURAL RESOURCES
(PARKS AND RECREATION)

JOB ENTRY TASKS	1	2	3
15. Build simple structures such as picnic shelters and tables.	X	X	
16. Perform minor electrical and plumbing work.	X	X	
17. Make minor repairs on machinery.	X	X	
18. Construct foundations and pour sidewalks, curbing, and steps.	X	X	
19. Plant trees, and shrubs, in landscaping, reforestation, and erosion programs.	X	X	
20. Perform maintenance and repair work on buildings, tables, fireplaces, water lines, docks, boats, and grounds.	X	X	
21. Clean restrooms, operate tractors and mowers.	X	X	

CHAPTER II

TASK ANALYSIS

MECHANICS IN AGRICULTURE

IV. Job Occupations in Mechanics in Agriculture and Identifying Code Titles (Entry level and specialized positions)

Title:	Code:
Service Technician (Mechanic)	.1
Service Manager	.2
Parts Manager	.3
Assemblyman (Equipment)	.4
Salesman	.5
Operational Instruction Technician (Field)	.6
Truck Driver (All Equipment Operator)	.7

MECHANICS IN AGRICULTURE

JOB ENTRY TASKS	CODE 1	2	3	4	5	6	7
1. Communicate satisfactorily using proper grammar, composition and vocabulary, oral and written.	X	X	X		X	X	X
2. Measure parts and figure wear factors and tolerance factors.		X	X		X		
3. Operate the following mechanical devices: A. Simple machines, pulleys, planes, screws, levers.	X	X		X	X	X	X
B. Two-stroke internal combustion engine.	X	X		X	X	X	X
C. Four-stroke internal combustion engine.	X	X		X	X	X	X
D. Diesel engine.	X	X		X	X	X	X
E. Rotary engine.	X	X		X	X	X	X
F. Hydraulic lift.	X	X		X	X	X	X
G. Pneumatic lift.				X			
4. Operate agricultural machinery.	X	X			X	X	X
5. Use, maintain hand tools and non-powered equipment.	X	X		X		X	X
6. Operate, maintain, adjust tool power equipment.	X	X		X		X	X
7. Perform basic arc welding processes.	X	X		X			
8. Perform basic gas welding, cutting, and brazing processes.	X	X		X			
9. For an internal combustion engine, small and/or automotive: A. Service the fuel system.	X	X		X		X	X
B. Service the starting system.	X	X		X		X	X
C. Service the electrical system.	X	X		X		X	X
D. Service the lubrication system.	X	X		X		X	X
E. Service the cooling system.	X	X		X		X	X
F. Service the exhaust system.	X	X		X		X	X
G. Service the drive system.	X	X		X		X	X
H. Service the braking system.	X	X		X		X	X
I. Service the suspension and alignment system	X	X		X		X	

JOB ENTRY TASKS	CODE 1	2	3	4	5	6	7
J. Service the steering system.	X	X		X		X	
10. For a diesel engine:							
A. Service the fuel system.	X	X					X
B. Service the starting system.	X	X					X
C. Service the lubricating system.	X	X		X		X	X
11. Perform equipment maintenance, routine and repair.	X	X					X
12. Conduct routine in-service inspections and keep records of data obtained.	X	X	X	X		X	X
13. Use test equipment for determining mechanical, electrical, or hydraulic problems and recommend preventive measures	X	X					
14. Follow prescribed procedures regarding stock control, warranties, etc.		X	X		X		
15. Service hydraulic systems as they pertain to lifts, controls, etc.	X	X		X		X	
16. Observe safety practices.	X	X	X	X	X	X	X
17. Read, understand and interpret technical publications.	X	X		X	X	X	X
18. Plan work procedures.		X		X	X	X	X
19. Organize and direct activities of mechanics.		X		X	X		

MECHANICS IN AGRICULTURE
(BUSINESS PROCEDURES)

CODE

JOB ENTRY TASKS	1	2	3	4	5	6	7
1. Conduct general business procedures such as:							
A. Ordering		X	X		X	X	
B. Billing		X	X		X		
C. Inventory Procedures		X	X				
D. Maintaining warranty procedures		X	X				
2. Promotes good human relations.	X	X	X	X	X	X	

CHAPTER III

TASK - SKILLS/KNOWLEDGE ANALYSIS IN AGRI/BUSINESS

This chapter presents the skills and/or knowledges for each task listed in Chapter II. The identification of these skills and knowledges was made utilizing the following resources:

1. Consultants with expertise in the appropriate area.
2. Area specialists from the Duval County School Board.
3. Job description information from various governmental agencies and businesses.
4. Publications on agriculture careers.

A review of the skills and knowledges was made by members of the advisory committee before final approval. However, the skills and knowledges listed should not be considered as final. Each listing will be updated and revised as curriculum is developed in the second year of the project.

I. LANDSCAPING
A. NURSERY AND LANDSCAPE OPERATION

TASKS	SKILLS/KNOWLEDGES
1. Select and identify plant materials.	1.1 Identify plants by life cycle; annual, biennial, perennial. 1.2 Identify plants by their use; field crops, vegetables, fruits, nuts, ornamentals, forage, grain, and forestry. 1.3 Identify plants taxonomically.
2. Fertilize plant materials.	2.1 Identify the types of fertilizer. A. Commercial 1. Organic 2. Inorganic B. Natural 1. Organic 2. Inorganic 2.2 Explain the correct time for applications: A. Spring B. Fall C. Summer 2.3 Describe the methods for best application of fertilizer. A. Dry 1. Broad cast 2. Spreader B. Liquid 1. Sprayer 2. Irrigation system 2.4 Determine the correct amount of fertilizer to apply.

I. LANDSCAPING
A. NURSERY AND LANDSCAPE OPERATION

TASKS	SKILLS/KNOWLEDGES
3. Irrigate plant materials from hand waterers to automatic systems.	3.1 Analyze the correct time for watering. 3.2 Solve for the correct amount of water to apply. A. Once a week B. One inch per application 3.3 Identify the types of watering systems in general use: A. Portable 1. Hoses 2. Sprinklers B. Underground 1. Pipe systems 2. Sprinkler systems 3. Control valves 4. Types of systems
4. Prune plant materials.	4.1 Describe the purpose for pruning and trimming: A. Remove injured parts B. Stimulate old plants C. Improve shape D. Disease control 4.2 Choose the correct time for pruning. A. Early bloom B. Late bloom 4.3 Demonstrate the correct methods of pruning. A. Thinning B. Increasing foliage C. Hidden cut

I. LANDSCAPING

A. NURSERY AND LANDSCAPE OPERATION

TASKS	SKILLS/KNOWLEDGES
5. Cultivate plant media.	5.1 Identify weeds and remove weeds from plant beds. 5.2 Determine soil characteristics for plants being grown. 5.3 Fertilize plants according to type of soil they need. 5.4 Support plants as needed with stakes, string, etc.
6. Ball and wrap plants.	6.1 Describe methods and carry out correct procedures in balling and wrapping plants. 6.2 Explain factors to be considered when balling and wrapping plants such as: A. Temporary storage B. Shock to plant life C. Reviving weakened plants
7. Grade plants according to size and quality.	7.1 Grade plants according to size and discard defective or substandard plants. 7.2 Wrap shrubs and trees using ball and burlap technique. 7.3 Remove plants from beds and transplant into pots or fields.
8. Package and load plant materials.	8.1 Pack plants for shipment. 8.2 Treat plants for shipment to avoid shock to plant life.

I. LANDSCAPING

A. NURSERY AND LANDSCAPE OPERATION

TASKS	SKILLS/KNOWLEDGES
9. Direct labor.	9.1 Compare the methods of building positive attitudes, exercising leadership, and developing good relations with others. 9.2 Describe the purposes of the major laws concerning business and labor. 9.3 Recognize the importance of receiving directions and carrying out instructions intelligently. 9.4 Recognize the importance of giving directions and instructions intelligently.
10. Operate nursery equipment.	10.1 Identify and be able to use all common nursery equipment. 10.2 Formulate and execute schedules for: A. Watering plants B. Fertilizing plants C. Determine lighting and shading schedules D. Vary temperature and humidity
11. Perform routine maintenance, repair and adjustments to nursery equipment.	11.1 Perform schedules maintenance on electric motors, gasoline engines, pumps, injector equipment, etc. 11.2 Keep plumbing in operating condition.

I. LANDSCAPING
A. NURSERY AND LANDSCAPE OPERATION

TASKS	SKILLS/KNOWLEDGES
12. Mix growing media.	12.1 Diagnose soil for mineral and vitamin deficiency. 12.2 Mix soil with sand, peat, minerals, and fertilizer to meet plant requirements.
13. Place plants in containers.	13.1 Place soil mixture in pots or containers to proper depth. 13.2 Place plants so that growth is assured. 13.3 Water and fertilize as needed.
14. Calibrate sprayer.	14.1 Measure materials to be sprayed accurately. 14.2 Run test to determine accurate proportions. 14.3 Set sprayer mechanism to deliver required amount of mix.
15. Construct and repair growing structures: plumbing, electrical, carpentry, concrete.	15.1 Identify common building materials, including lumber, nails, hardware items, concrete. 15.2 Figure a bill of materials and compute its cost for a simple farm outbuilding (e.g. potting shed). 15.3 Properly select and use both hand and power wood-working tools to erect a small nursery or greenhouse shelter.

TASKS	SKILLS/KNOWLEDGES
	15.4 Lay out and build forms for pouring concrete foundations, floors, etc.
	15.5 Select a paint or preservative, prepare the surface and paint a home/farm building.
	15.6 Perform simple plumbing (e.g., pipes for watering seedlings).
	15.7 Perform simple electrical wiring (e.g. convenience outlet).
	15.8 Select materials and build various benches - work, plant, etc.
16. Adjust heating and ventilation systems.	16.1 Determine heat loss factor for various materials used in greenhouse and nursery construction such as plastic, glass, etc.
	16.2 Know heating requirements (BTU's) of the various plants being grown.
	16.3 Follow operator's manual for operating: A. Heating systems B. Ventilation systems

I. LANDSCAPING

B. LAWN AND LANDSCAPE PEST CONTROL

TASKS	SKILLS/KNOWLEDGES
17. Prepare truck: review orders, select chemicals, check equipment, load chemicals and equipment, determine and mix appropriate sprays to be used on the job.	17.1 Select chemicals according to plants or insects to be sprayed. 17.2 Observe safety rules and regulations at all times. Sprays are often quite poisonous. 17.3 Follow manufacturer's recommendations for operation of spraying equipment. 17.4 Flush or inspect spray tanks before filling with any chemicals.
18. Operate spray truck.	18.1 Observe all safety regulations when dealing with spray and spray truck. 18.2 Follow prescribed spraying techniques.
19. Operate and maintain spray equipment and pumps (routine maintenance).	19.1 Clean and flush all spray equipment and pumps after each use. 19.2 Prepare and store equipment when not in use. 19.3 Maintain all pressure lines and gauges in excellent condition. Repair all leaks promptly. 19.4 Keep all moving parts lubricated as per manufacturer's manual.

I. LANDSCAPING
B. LAWN AND LANDSCAPE PEST CONTROL

TASKS	SKILLS/KNOWLEDGES
20. Spray plants according to: a. Plant characteristics b. Pest characteristics c. Spray material conditions	20.1 Select spray equipment according to type that is best suited for the job. 20.2 Select and mix spray materials as needed. 20.3 Exercise appropriate safety precautions for spraying. 20.4 Spray plants in approved manner.
21. Spray and kill brush.	21.1 Select appropriate spray equipment. 21.2 Take appropriate safety steps to avoid killing desirable plant life. 21.3 Choose chemicals to kill desired brush. Use extreme care and practice correct safety handling procedures.
22. Diagnose common pest problems and relay information to superior, if there is one.	22.1 Recognize all common pests in the community by sight. 22.2 Describe the physical conditions of plant, tree, or turf area suffering from each of the common pest problems.
23. Determine drift hazards; need to recognize weather's influence and conditions.	23.1 State the best time of the day for spraying and treating with chemicals.

TASKS	SKILLS/KNOWLEDGES
	23.2 Recognize the economic factors of spraying with reference to weather conditions.
	23.3 Recognize liability of damage suits - due to drift hazard into private property.
24. Keep records: time, materials, conditions.	24.1 Keep accurate records of: A. Time (labor) B. Materials C. Growing conditions D. Financial transactions
25. Estimate cost of jobs.	25.1 Draw and/or design a plot plan to scale.
	25.2 Locate desired drives, walks, shade trees, enclosures, and other garden features on the plan.
	25.3 Estimate cost of materials for the job.
	25.4 Estimate cost of labor for the job.
26. Meet the public.	26.1 Communicate with the public using proper grammar, composition and vocabulary, oral and written.
	26.2 Present pleasing and clean personal appearance to the public.

TASKS	SKILLS/KNOWLEDGES
27. Operate gang mowers or tractor drawn mowers in mowing areas.	27.1 Identify various types and makes of lawn mowers by mower type and engine type. 27.2 Demonstrate care and maintenance of turf area with regards to: A. Frequency of mowing B. Height of mowing C. Method of mowing 27.3 Explain "scalping" as done by mowers and how to avoid future damage.
28. Operate sweepers and rollers in maintaining grounds.	28.1 Interpret operator's manual so that equipment is operated safely and correctly. 28.2 Explain why sweeping is necessary for maintaining grounds. 28.3 Explain why rollers are necessary for maintaining grounds. 28.4 State conditions and times for sweeping and rolling.
29. Perform routine maintenance, cleaning, lubricating, adjusting, on sweepers, rollers, and mowers.	29.1 Demonstrate height of cut adjustment procedures for available makes of mowers. 29.2 Perform routine sharpening and balancing of rotary blades. 29.3 Perform basic lubrication maintenance on various types of mowers.

TASKS	SKILLS/KNOWLEDGES
	29.4 Describe safety practices which should be observed when working with sweepers, rollers, and mowers.
30. Water and fertilize greens, fairways, and large turf areas.	30.1 Describe the best conditions and time for watering greens, fairways, etc. 30.2 Describe the best conditions and time for fertilizing greens, fairways, etc. 30.3 State the conditions which govern the amount of water/fertilizer which is applied and how often.
31. Grade and prepare base, lay sod and seeding.	31.1 Establish a turf area, paying attention to such details as: A. Grading of site B. Soil preparation C. Drainage D. Irrigation and watering E. Management and care until established 31.2 Establish a turf/turfs by one or more of the following methods: A. Sodding B. Seeding C. Sprigging 31.3 Roll turf areas as needed.

TASKS	SKILLS/KNOWLEDGES
32. Maintain water hazards and sand traps.	32.1 Maintain banks of lakes and streams. 32.2 Maintain bank vegetation and keep under control by mowing or spraying. 32.3 Maintain proper aquatic weed control. 32.4 Construct and repair bridges as needed.
33. Repair and replace pipe on sprinkler systems.	33.1 Distinguish between the types of pipe used in sprinkling systems. 33.2 Identify tools used in repairing, removing, and threading pipe. 33.3 Make temporary patch or repair on pipe. 33.4 Make removal of old and installation of new pipe in system.
34. Install forms and lay walks, using gravel and asphalt mixes.	34.1 Analyze and lay out plot plans. 34.2 Prepare and grade terrain. 34.3 Install forms as required. 34.4 Apply gravel or asphalt mixes. Roll or finish as required.

I. LANDSCAPING
C. GOLF COURSE MAINTENANCE

TASKS	SKILLS/KNOWLEDGES
35. Operate dump truck or pick-up in hauling materials and removing debris.	35.1 Have valid Florida Driver or Chauffeur's License. 35.2 Recognize restricted area when driving around golf courses, landscape areas.
36. Cultivate shrubs and flowers.	36.1 Identify weeds and remove weeds from plant beds. 36.2 Fumigate plants to kill unwanted insects. 36.3 Establish and follow watering and fertiliz plans. 36.4 Prune and trim shrubs.
37. Recognize problems arising from insects, fungi, and player abuse to turf.	37.1 Describe characteristics of disease and insect damage. 37.2 Recognize diseases and insects affecting turf damage. 37.3 Recognize player abuse.
38. Use and maintain hand and garden tools.	38.1 Identify the common hand and garden tools and be able to use each effectively and correctly. 38.2 Develop proper maintenance and care schedule for hand tools.

TASKS	SKILLS/KNOWLEDGES
39. Assist in planting and removing trees, shrubs, flowers, and turf.	39.1 Prepare and grade terrain as needed. 39.2 Dig holes and trenches where required. 39.3 Select and have available for use the proper equipment and material needed for planting and/or removing plants, trees. 39.4 Prepare removed shrubs, flowers, plants, for transplanting and replanting. 39.5 Prepare and plant new shrubs as required.
40. Control rodents, moles.	40.1 Identify types of rodents, moles. 40.2 Recognize rodent infestation by conditions of grounds and plants. 40.3 Plan and carry out rodent control using appropriate bait and poison methods without endangering other forms of life.

TASKS	SKILLS/KNOWLEDGES
41. Design floral pieces and arrangements.	41.1 Identify and use the various common materials needed for floral arrangements. 41.2 Create floral arrangements from previously made plans and designs. 41.3 Create original arrangements. 41.4 Prepare flowers for cutting, preserving, and treating. 41.5 Store floral pieces in selected storage areas having appropriate light, temperature, and humidity conditions.
42. Cut and recondition flowers.	42.1 Identify the various types of flowers and cut flowers and plants on specific points on stems and stalks. 42.2 Bleach and dye flowers. 42.3 Treat water in storage vases with correct preservative for preserving flowers. 42.4 Store flowers in vases in appropriate selected storage areas.
43. Design floral window displays.	43.1 Use color wheel on comparison charts to determine harmony of different plants. 43.2 Design displays using principles of basic line arrangements (unity, rhythm, balance, scale, accent or harmony).

TASKS	SKILLS/KNOWLEDGES
	43.3 Create floral arrangements from previously made plans and designs.
	43.4 Create original arrangements.
44. Arrange and sell aritifical flowers.	44.1 Identify and be able to use material needed to create artificial arrangements.
	44.2 Use color wheel or comparison charts to determine harmony of different flowers.
	44.3 Use principles of basic line arrangements in design.
	44.4 Plan future demands for various plant and flower according to season of year.
45. Advise customers on plant identification and care.	45.1 Identify various flowers and plants which can be grown in surrounding area.
	45.2 Advise customers on growing characteristics, life expectancy, bloom, etc. of individual plants/flowers.
	45.3 Advise customers on insect treatment, plant disease, fertilization and watering requirements.

I. LANDSCAPING
D. FLORICULTURE

TASKS	SKILLS/KNOWLEDGES
46. Sell plants, making business transactions.	46.1 Communicate effectively with customers, exhibiting good sales technique, pleasant and pleasing manners, clean appearance.
	46.2 Exhibit accurate skill in mathematical computation.
	46.3 Display ability to make change and fill out receipts.
	46.4 Display knowledge of merchandise, and its location.
47. Take orders, transfer orders to phone or wire service.	47.1 Demonstrate correct phone answering and ordering procedures.
	47.2 Consult directories and newspapers to verify time and place of funerals, weddings, etc.
	47.3 Suggest arrangement designs and compositions consistent with customer desires and social tradition.
	47.4 Order flowers/plants by telegraph.
48. Estimate types of plants and flowers to be used for special occasions according to records.	48.1 Establish an inventory system to keep record of existing stock.
	48.2 Analyze past seasonal sales records to establish selling patterns.
	48.3 Estimate types of plants and flowers needed according to selling patterns.

TASKS	SKILLS/KNOWLEDGES
49. Rotate stock.	49.1 Keep an inventory of existing stock.
	49.2 Establish procedures for keeping older stock moving to the front of the shelves.
50. Contact other flower growers.	50.1 Establish file for growers specializing in certain merchandise.
51. Deliver merchandise by motor vehicle.	51.1 Hold valid state driver's license.
	51.2 Store plants/flowers properly to avoid spillage or damage to merchandise while in transit.
52. Retail diversified stock, ceramics.	52.1 Analyze factors (seasonal trends, etc.) that affect choice of merchandise to be typed.
	52.2 Keep a running inventory of merchandise.
	52.3 Keep cost control records.
	52.4 Establish percentage of stock to be carried in hand.
	52.5 Practice communication skills.
	52.6 Display salesmanship.

I. LANDSCAPING
E. LANDSCAPE CONTRACTING AND DESIGN

TASKS	SKILLS/KNOWLEDGES
53. Plan landscape according to design principles.	53.1 Utilize basic design principles such as: A. Axial relationship B. Harmony C. Balance D. Unity 53.2 Plan landscaping design to fit requirements: A. Public B. Service C. Private D. Recreation 53.3 Choose and use appropriate materials and developments for items such as: A. Retaining walls B. Walls and fences C. Gates D. Garden statuary E. Hedges F. Other garden features
54. Plan according to accepted drawing techniques.	54.1 Utilize scales and measuring. 54.2 Estimate materials needed. 54.3 Use easily readable lettering techniques. 54.4 Follow established drafting form.
55. Use plant symbols.	55.1 Identify and be able to draw plant symbols for: A. Evergreens B. Deciduous

TASKS	SKILLS/KNOWLEDGES
	55.2 Identify and be able to draw construction features for walls, fences, walks, etc.
56. Develop landscape plot plans.	56.1 Interpret and describe the features illustrated on a plot plan. 56.2 Lay out a plot plan. 56.3 Locate features such as walks, drives, shade trees, enclosures, etc. as you develop the plot plan.
57. Landscape certain areas: (a) public areas; (b) service areas; (c) private areas; (d) recreational areas.	57.1 Analyze public area to provide for: A. Walks, drives, etc. B. Lawn and flower areas C. Recreation areas D. Appropriate shrubs and trees 57.2 Analyze service areas to provide for: A. Practical use B. Play areas C. Screening D. Plant materials 57.3 Analyze private areas to provide for: A. Practical use B. Beauty C. Shading D. Patios, terraces, and secluded areas E. Selected plant materials

TASKS	SKILLS/KNOWLEDGES
	57.4 Analyze recreational areas to provide for: A. Play areas B. Play equipment C. Picnic and barbeque areas D. Pool or swimming facilities E. Game areas
58. Survey the landscape.	58.1 Demonstrate use of level and transit. 58.2 Interpret landscaping drawings and transmit measurements to ground measurements.
59. Level and grade land with equipment and by hand.	59.1 Identify and demonstrate proper use of equipment used. 59.2 Interpret landscaping plans.
60. Condition soil: applying bark dust, peat moss, sand, loamite, etc.	60.1 Analyze soil to determine acidity or alkalinity. 60.2 Give purposes for conditioning soil. 60.3 Compare and evaluate the effect upon specific plants by the addition to the soil of: A. Leaves B. Grass clippings C. Bark dust D. Peat moss E. Wood shavings F. Others

TASKS	SKILLS/KNOWLEDGES
61. Apply fertilizer to individual plants.	61.1 Compare types of fertilizer to determine type needed for specific plant. 61.2 Select proper growing cycle to make application. 61.3 Choose correct method for application. 61.4 Analyze the effects and use of different kinds of fertilizer.
62. Maintain planting grade around buildings and walkways.	62.1 Select equipment and materials needed. 62.2 Select plant materials which help hold soil and water.
63. Install aggregate, river rock, large rock, and gravel by plan.	63.1 Read and interpret plot plans. 63.2 Operate appropriate equipment needed to haul and spread materials.
64. Install edging materials to contain soil, aggregate, turf.	64.1 Identify and describe where best used: A. Temporary edging B. Permanent edging 64.2 Build and design forms for making permanent edging. 64.3 Identify and choose edging material which fits the decor of the surrounding area.

TASKS	SKILLS/KNOWLEDGES
65. Operate, maintain, adjust, make minor repairs of truck, pick-up, tractor with blade, rake, sod cutter.	65.1 Use and care for small hand tools needed to make minor repairs. 65.2 Read, interpret and use operator's manual for: A. Lubrication service B. Operation instructions 65.3 Provide and exercise proper storage of equipment when not in use. 65.4 Follow correct safety procedures when operating equipment.

TASKS	SKILLS/KNOWLEDGES
66. Identify and select plants based on market demand.	66.1 Analyze past seasonal sales records to establish selling patterns. 66.2 Estimate types of plants and flowers needed according to selling patterns. 66.3 Establish an inventory system to keep record of existing stock.
67. Prepare soil mix for each type of flower to be grown.	67.1 Test soil to determine acidity or alkalinity. 67.2 Mix soil with sand, peat minerals and fertilizer. 67.3 Use appropriate equipment for mixing soils.
68. Start plants from seeds, bulbs, tubers.	68.1 Select seeds, bulbs, or tubers for proper growth during peak selling periods. 68.2 Select appropriate soil mix media. 68.3 Select proper types of containers. 68.4 Plant according to plant type. 68.5 Provide proper plant nutrients - water, and light control.

I. LANDSCAPING

F. GREENHOUSE OPERATION AND MAINTENANCE

TASKS	SKILLS/KNOWLEDGES
69. Propagate plants from cuttings, layerage, grafting.	69.1 Choose kinds of cutting materials. 69.2 Distinguish and be able to make various types of cuttings. 69.3 Identify the kinds of hormones needed to treat plant. 69.4 Select proper soil mix media. 69.5 Determine proper heat, light, and moisture control. 69.6 Identify types of plants which will propagate by layerage. 69.7 Identify types of layerage. 69.8 Prepare plants for layerage. 69.9 Obtain needed materials to do layerage. 69.10 Identify kinds of plants which are compatible for grafting. 69.11 Identify kinds and advantages of different kinds of grafts. 69.12 Describe materials used in grafting. 69.13 Select and use different types of after care treatment.

I. LANDSCAPING
F. GREENHOUSE OPERATION AND MAINTENANCE

TASKS	SKILLS/KNOWLEDGES
70. Maintain parent stock.	70.1 Identify and choose proper after care treatment for specific plants. 70.2 Obtain proper materials needed for after care treatment.
71. Water plants (flowers) based on needs.	71.1 Determine the best time for watering plants/flowers. 71.2 Determine the conditions which govern how frequently plants/flowers should be watered. 71.3 Determine the quantity of water needed for each specific plant/flower.
72. Fertilize plants/flowers based on needs determined by soil test.	72.1 Determine soil condition whether acid, alkaline or neutral. 72.2 Determine soil needs of specific plant/flower. 72.3 Analyze types of fertilizer to meet plant/flower requirements. 72.4 Select method of fertilizer application to prevent damage to plant and to encourage growth.
73. Perform simple soil test.	73.1 Analyze soil for acid or alkali conditions.

TASKS	SKILLS/KNOWLEDGES
	73.2 Describe the chemical conditions which affect plant response to fertilizer.
	73.3 Evaluate the methods of handling acid or alkaline soils.
	73.4 Determine presence of organic matter in the soil.
74. Regulate temperature, humidity, and light in greenhouses.	74.1 Analyze plant environment to determine growing condition with regards to temperature, humidity, and light.
	74.2 If automatic equipment, set thermostats for proper control.
	74.3 If manual, read thermometers, light sensing meters, operate equipment as required.
	74.4 Keep accurate log adjusting equipment as needed.
75. Apply sprays, smokes, fogs to control pests.	75.1 Analyze the importance of insect pests to crop production.
	75.2 Recognize and identify the life cycles of insects.
	75.3 Evaluate factors essential to correct application of pesticides and herbicides including safety.

TASKS	SKILLS/KNOWLEDGES
	75.4 Select appropriate equipment (spray, smoke, fog) which effectively controls pests.
	75.5 Practice first aid treatment in case of accidental poisoning.
	75.6 Know and have posted poison control center phone number.
76. Pot, transplant, disbud, cut and grade flowers.	76.1 Mix soil with sand, peat, minerals and fertilizer as required by flowers to be grown.
	76.2 Place soil mixture in appropriate pots or flats.
	76.3 Plant seeds, bulbs, etc. at specified depths.
	76.4 Transplant to individual pots when plants reach correct height.
	76.5 Analyze reasons for disbudding and perform at proper time.
	76.6 Choose correct method of cutting specific flowers.
	76.7 Cut flowers at specified points on stems and stalks.
	76.8 Grade flowers according to size, color, form.

TASKS	SKILLS/KNOWLEDGES
77. Regulate growth through use of chemicals.	77.1 Evaluate chemicals which will control growth of flowers. 77.2 Formulate and execute schedule for adding minerals and chemicals.
78. Maintain boiler, making minor repairs.	78.1 Observe and inspect daily pressure system and check all gauges. 78.2 Observe and inspect system for steam leakage. Repair leaks immediately. 78.3 Select and use proper types of required fuels. 78.4 Maintain cleaning schedule. 78.5 Check water daily and make necessary water treatments as required.

II. ANIMAL FOOD SCIENCE

TASKS	SKILLS/KNOWLEDGES
1. Identify in the field the important breeds of livestock in the community.	1.1 Identify the various breeds of livestock in the community. A. Cattle (e.g. beef, milk) B. Horses (e.g. riding, quarter) C. Fowl (e.g. laying, broilers) D. Swine
2. Identify the various body parts of animals.	2.1 Name the various body parts and life systems of the following animals: A. Cattle B. Horses C. Fowl D. Swine
3. Select livestock, dairy, and poultry in accordance with breeding and marketing standards.	3.1 Evaluate the choice of livestock or poultry according to the following factors: A. Availability of feed B. Demand C. Capital available
4. Keep accurate production records.	4.1 Analyze production records for the following systems of operation: A. Pure bred B. Commercial

TASKS	SKILLS/KNOWLEDGES
	4.2 Establish and compare performance and production records to include: A. Rate of gain B. Economy of gain C. Litter size D. Breeding and herd records E. Percent calf crop F. Birth weight G. Progeny records
5. Determine the nutrient requirements of various types of livestock, dairy, and poultry found in the community.	5.1 State the common terminology for nutrient needs of animals. 5.2 Explain the importance of correct feeding. 5.3 Describe various animal nutrition in terms of: A. Food nutrients required B. Average daily ration
6. Determine the nutritional value of feeds.	6.1 State common terminology for nutrient values of feeds. 6.2 State common sources of feed nutrients. 6.3 Describe the function and purposes of feed nutrients. 6.4 State the classification and composition of feeds according to the following: A. Roughage, kinds of B. Concentrates

TASKS	SKILLS/KNOWLEDGES
	6.5 Analyze the values of different feeds. 6.6 Explain the basic economics of feeding. 6.7 Describe the need or lack of need for feed additives.
7. Design a balanced ration for a simple-stomached farm animal using local feeds and prices.	7.1 Demonstrate how to formulate and balance a ration: A. Kinds of rations B. Computing rations 7.2 Describe use of forage. 7.3 Describe the use of pasture.
8. Design a balanced ration for a plural-stomached farm animal using local feeds and prices.	8.1 Demonstrate how to formulate and balance a ration: A. Kinds of rations B. Computing rations 8.2 Describe the use of forage. 8.3 Describe the use of pasture.
9. Recognize signs for determining gestation and heat periods for farm animals.	9.1 State common terms and definition for reproduction. 9.2 Describe the reproductive systems for A. Male 1. Bull 2. Stallion 3. Boar

TASKS	SKILLS/KNOWLEDGES
	B. Female 1. Cow 2. Mare 3. Sow
10. Perform artificial insemination.	10.1 Explain the physiology of livestock breeding including basic genetic principles.
	10.2 Explain reproductive processes.
	10.3 Explain reproductive cycles.
	10.4 Describe why crossbreed animals receive hybrid vigor.
11. Plan a livestock improvement program for a type of livestock in the community, specify breed, schedules for breeding, sire-dam ratio, culling program indicating standards.	11.1 Describe the methods of breeding. A. Natural breeding B. Artificial breeding
	11.2 Explain the different systems of breeding.
	11.3 Describe the type of breeding production.
	11.4 Explain a livestock basic genetics program.
	11.5 Describe selection processes based on: A. Personal appearance B. Heredity and production records
	11.6 Describe culling processes based on: A. Undesirable quality B. Age C. Heredity

II. ANIMAL FOOD SCIENCE

TASKS	SKILLS/KNOWLEDGES
12. Analyze progeny records for such things as: A. Pounds of gain per pound of feed B. Carcass yield and quality C. Cost per pound of gain	12.1 Establish and maintain proper managerial records to include: A. Rate of gain B. Economy of gain C. Inherited traits
13. Design a program to promote good health and safety of farm animals.	13.1 Describe how to use antibiotics as feed additive. 13.2 Distinguish good animal health by recognizing the proper signs according to: A. Contentment B. Alertness C. Good appetite D. Bloom and good hair coat E. Bright eyes F. Normal feces and urine G. Other signs 13.3 Describe how to provide for proper animal sanitation: A. In housing B. In ventilation C. Manure disposal D. Disinfectants 13.4 Recognize the most common and serious animal diseases indegenous to the area, and describe their economic importance.

TASKS	SKILLS/KNOWLEDGES
14. Give simple injections (inoculations, etc.) according to approved practices.	14.1 Describe how to achieve immunizations. 14.2 Explain the purpose and type of vaccinations. 14.3 Identify the various drugs and other artificial mechanisms used in giving injections and inoculations. 14.4 Demonstrate proper procedure in giving injections.
15. Treat parasite infection.	15.1 Identify parasites of livestock according to types: A. Internal parasites B. External parasites 15.2 Describe the treatment and control of parasites.
16. Perform debeaking, castrating, docking, foot trimming, dehorning, clipping eye teeth, shearing operations, etc.	16.1 Identify the types of equipment used for the following processes: A. Holding and restraining B. Weighing C. Dehorning and castrating 16.2 Demonstrate proper procedures to perform A. Debeaking B. Castrating C. Foot trimming D. Dehorning E. Clipping eye teeth F. Shearing

TASKS	SKILLS/KNOWLEDGES
17. Keep accurate production and financial records on a particular livestock enterprise.	17.1 Establish and maintain proper managerial records to include the following financial records: A. Expense and income B. Inventories C. Projected budgets D. Debts and mortgages E. Income tax records F. Insurance records G. Others
18. Analyze the records to determine if his management practices were profitable.	18.1 Analyze performance and pro records to determine if management practices were profitable.
19. Interpret market reports in newspaper and official reporting services.	19.1 Describe the following types of markets: A. Livestock auction markets B. Terminal markets C. Private treaty sales D. Agency buying E. Direct slaughter house market 19.2 Interpret marketing cycles for livestock with regards to: A. Breeding for profitable marketing B. Seasonal markets 19.3 Recognize the market classes and grades of livestock (beef) according to the following criteria: A. Market classes of beef cattle B. Market sex classes of beef C. Market age classes of beef D. Market grades of beef cattle

TASKS	SKILLS/KNOWLEDGES
	19.4 Recognize market classes and grades of swine according to the following criteria: A. Market classes of hogs B. Market sex classes of hogs C. Market grades of swine
	19.5 Recognize market classes of horses: A. Market classes B. Sex classes
20. Recognize and treat mastitis.	20.1 Know when to call veterinarian and give injection for mastitis when necessary.
21. Operate automatic feed equipment.	21.1 Describe or demonstrate how to operate various feeding equipment.
	21.2 Select the necessary equipment for feeding based on: A. Type of operation B. Size of operation C. Cost involved
22. Operate refrigeration equipment.	22.1 Explain the environmental factors which affect feed storage and feed handling.
	22.2 Describe the basic types of refrigeration equipment used in dairy operation.
23. Repair minor broken machinery and equipment.	23.1 Read and recall from the operator's manual how to adjust or repair broken or inoperative equipment.

TASKS	SKILLS/KNOWLEDGES
	23.2 Identify nomenclature pertaining to servicing and operating farm machinery and equipment.
	23.3 Describe safety precautions in care and maintenance of tractors and equipment.
	23.4 State the economics involved in the reconditioning of farm machinery and equipment.
	23.5 Describe and/or demonstrate how to adjust farm machinery under operating field conditions.
	23.6 Explain the importance of lubrication to the life of equipment.
24. Use, maintain hand tools and non-powered equipment.	24.1 Identify hand tools and non-powered equipment used in farming.
	24.2 Demonstrate how to maintain hand tools.
	24.3 Demonstrate how to use hand tools and non-powered equipment in a safe manner.
25. Milk dairy cows.	25.1 Explain sanitation and procedures prior to milking.
	25.2 Describe or demonstrate how to set up and attach a milking machine.

TASKS	SKILLS/KNOWLEDGES
26. Run butter fat samples.	26.1 Draw butter fat samples. 26.2 Describe operation of equipment to establish butter fat content.
27. Purchase good dairy stock.	27.1 Select dairy stock in accordance with breeding and marketing standards. 27.2 Evaluate production records that affect animal selection. 27.3 Explain economical and ecological factors that affect the selection of livestock
28. Apply fertilizer to a crop using acceptable methods, recommended rates at the proper time.	28.1 Describe physical conditions which affect the use of fertilizers. 28.2 Describe the importance and use of soil conditioners. 28.3 Analyze and compare the nature of acid and alkali soils. 28.4 Evaluate the proper nutrients needed for plant growth. 28.5 Describe and/or demonstrate the methods of applying fertilizer.

II. ANIMAL CROP SCIENCE

TASKS	SKILLS/KNOWLEDGES
29. Recognize the workings of insects, pests, and diseases, and perform the recommended control measures.	29.1 Demonstrate how to perform rodent control without endangering livestock or other valuable farm animals. 29.2 Demonstrate how to mix chemicals for spraying of insects and pests. 29.3 Demonstrate how to operate spray equipment for effective coverage and control of pests. 29.4 Demonstrate proper safety precautions to be used in handling chemicals.
30. Identify common weeds of the community, recognize their methods of reproduction, and relate possible control measures.	30.1 Identify common weeds and describe their characteristics. 30.. Describe the best time for weed control. 30.3 Describe methods of weed control according to the following criteria: A. Soil sterilants B. Soil herbicides C. Cultural practice control
31. Promote good human relations and communicate effectively with people.	31.1 Demonstrate basic communication skills. 31.2 Demonstrate knowledge of business and importance of business activities in our personal, social, and national welfare.

TASKS	SKILLS/KNOWLEDGES
	31.3 Explain the essential characteristics of private enterprise. 31.4 Describe the methods of building positive attitudes, exercising leadership, and developing good relations with others. 31.5 Demonstrates ability to receive or give directions and to carry out instructions intelligently.
32. Handle money, checks, credit.	32.1 Explain the methods of handling money and checks through: A. Operating capital B. Fixed capital 32.2 Explain the methods of financing the operation by: A. Types of credit B. Sources of credit
33. Order, buy equipment or supplies.	33.1 Surveys and analyze needs (type of operation to be conducted). 33.2 Evaluate and determine the size and scope of operation. 33.3 Evaluate and determine the cost and economics involved.

TASKS	SKILLS/KNOWLEDGES
34. Construct, maintain, repair buildings and structures.	34.1 Identify common building materials, including lumber, nails, hardware items, and fencing materials.
	34.2 Figure a bill of materials and compute its cost for a simple farm building.
	34.3 Properly select and use both hand and power wood-working tools to erect a small farm building.
	34.4 Lay out and erect a woven wire or a barbed wire fence complete with anchor posts.
	34.5 Select a paint or preservative, prepare the surface and paint a home/farm building.
35. Construct, assemble machinery or equipment.	35.1 Read and explain nomenclature pertaining to servicing and operating farm machinery and equipment.
	35.2 Demonstrate working knowledge of hand and non-powered hand tools.
	35.3 Demonstrates how to use operator's manual in constructing and assembling machinery or equipment.

III. NATURAL RESOURCES
A. FORESTRY

TASKS	SKILLS/KNOWLEDGES
1. Use the results of a soil test from a soil testing lab and make necessary fertilizer applications for profitable crop production.	1.1 Analyze reports from soil testing laboratory to determine degree of acidity or alkalinity. 1.2 Determine type of fertilizer to meet plant requirements. 1.3 Evaluate from past records most desirable time and conditions under which fertilizer is to be applied.
2. Read labels and analyze fertilizers on the market.	2.1 Analyze fertilizers (commercial) to determine chemical analysis.
3. Compute the cost of fertilizing a crop using various materials purchased from local sources.	3.1 Compute area to be fertilized. 3.2 Compute or determine amount of poundage of fertilizer to be spread. 3.3 Determine amount of fertilizer needed and total cost.
4. Apply fertilizer to a crop using acceptable methods, recommended rates, and at the proper time.	4.1 Identify the proper time and conditions for applying fertilizer: A. Spring B. Fall C. Summer 4.2 Determine and utilize the best method for application of fertilizer: A. Dry 1. Broad cast 2. Spreader B. Liquid 1. Sprayer

III. NATURAL RESOURCES
A. FORESTRY

TASKS	SKILLS/KNOWLEDGES
5. Plan ways of draining a swampy area.	5.1 Read and explain plot maps. 5.2 Understand plane surveying. 5.3 Measure distances and determine gradients. 5.4 Understand and interpret laws regarding digging of drainage canals and releasing of entrapped water. 5.5 Determine equipment needed to perform drainage and determine order of usage.
6. Operate farm level and surveying equipment.	6.1 Use level and transit. 6.2 Make field notes so that they may be interpreted later.
7. Irrigate and determine the frequency of irrigation for profitable crop production.	7.1 Analyze the correct time for watering. 7.2 Determine the correct amount of water to apply. A. Once a week B. One inch per application C. Other amounts 7.3 Identify and determine types of irrigation systems in general use: A. Portable 1. Hoses 2. Sprinklers B. Underground 1. Pipe systems 2. Sprinkler system 3. Control valves

III. NATURAL RESOURCES
A. FORESTRY

TASKS	SKILLS/KNOWLEDGES
8. Properly prepare and join a scion and rootstock for a cleft, bud, and whipgraft.	8.1 Select parent stock for desirable qualities. 8.2 Distinguish and be able to make proper cutting on trees. 8.3 Identify kinds of hormones and best type to use for specific cuttings. 8.4 Choose or select proper planting medias. 8.5 Identify kinds of plants which are compatible for grafting. 8.6 Illustrate the kinds and advantages of different kinds of grafts. 8.7 Select materials to be used in grafting. 8.8 Select types of after care treatment.
9. Select plants for nursery stock.	9.1 Identify plants by life cycle. 9.2 Identify plants taxonomically. 9.3 Identify and describe plant characteristics: A. Flower B. Leaves C. Stems or trunks
10. Conduct a germination test on a sample of seeds and analyze the results from both the producer and consumer view point.	10.1 Understand conditions necessary for seed and vegetative propagation. 10.2 Analyze germination tire from sample plantings.

TASKS	SKILLS/KNOWLEDGES
	10.3 Evaluate growing qualities, advantages and disadvantages of the various seed types.
11. Recognize the workings of insects, pests, and diseases, and perform the recommended control measures.	11.1 Identify insects and pests which are common to the community and area. 11.2 Identify types of diseases and times of year when a particular disease is prevalent. 11.3 Identify the physical characteristics of the plant, tree, which is affected with insect or disease. 11.4 Determine the proper method of controlling: A. Insecticides or herbicides B. Removal of diseased plant C. Cultural practice control
12. Prepare, treat with rooting hormone, plant in a properly prepared rooting bed, and care for a variety of plant cuttings.	12.1 Analyze soil mix and prepare rooting media adding proper rooting hormone. 12.2 Prepare rooting bed. 12.3 Methods of selection used in plant breeding. 12.4 Provide proper plant nutrients - water and light.
13. Identify common weeds of the community, recognize their methods of reproduction, and select possible control measures.	13.1 Recognize common weeds of the community and their characteristics. 13.2 Select best time for weed control.

TASKS	SKILLS/KNOWLEDGES
	13.3 Select best method for weed control.
	13.4 Select types of material for weed control: A. Soil sterilants B. Soil herbicides
	13.5 Cultural practice control.
	13.6 Factors considered essential to correct application of pesticides and herbicides including safety.
14. Plan a cropping program for a specific crop commensurate with recommended community practices from seed bed preparation to harvesting.	14.1 Common wood crops and horticulture crops in the community.
	14.2 Basic economics involved in production of crops at the local level.
	14.3 Relationship of good production to good soil conservation practices.
	14.4 Factors to consider when harvesting crops.
	14.5 Common market outlets for crop production.
	14.6 Factor to consider when marketing crops: A. Wood specifications B. Prices
	14.7 Harvesting systems: A. Partially mechanized B. Full mechanization C. Partially mechanized short wood

III. NATURAL RESOURCES
A. FORESTRY

TASKS	SKILLS/KNOWLEDGES
15. Reproduce plants using methods of sexual and vegetative reproduction.	15.1 Factors and methods of propagation of plants: A. Seeds B. Division C. Layering D. Cutting E. Grafting F. Budding 15.2 Utilize essential equipment in propagation of plants.
16. Estimate how many acres of forest land there are in a particular woodland and calculate the volume of wood.	16.1 Determine timber volumes using Abney Level Clinometer, Biltmore Stick and Diameter Tape. 16.2 Determine board feet in logs and deduct for defects.
17. Prepare a simple and concise farm woodland management plan that will most profitably use the farm's resources - land, labor, and equipment.	17.1 Identify important forest trees of the community. 17.2 Recognize importance of good watershed, grazing, wildlife, and recreational management. 17.3 Understand and utilize proper procedure for planting trees. 17.4 Plan for procedures in thinning and pruning. 17.5 Know how to operate basic forestry tools and instruments. 17.6 Know vocabulary pertaining to farm woodland management.

TASKS	SKILLS/KNOWLEDGES
18. Given the proper tools and equipment, select, adjust calibrate, service, and safely operate three or more farm implements.	18.1 Use and understand operator's manual. 18.2 Factors involved in proper selection of machinery and equipment for a particular job. 18.3 Nomenclature pertaining to servicing and operating farm machinery and equipment. 18.4 Know proper storage procedures for tractors and farm equipment. 18.5 Observe all safety precautions pertaining to the equipment being operated. 18.6 Correctly calibrate and adjust chosen farm equipment and machinery.
19. Trouble shoot and service an internal combustion engine, adjusting basic parts of the ignition, lubrication, fuel, cooling, and hydraulic systems.	19.1 Know nomenclature and vocabulary of a gasoline engine with reference to: A. Operation B. Service C. Maintenance 19.2 Identify the function of the various systems of a gasoline engine and the major parts of each system. 19.3 Know and practice safety precautions in handling fuel and engines. 19.4 Explain the operation of a two-cycle and a four-cycle engine.

TASKS	SKILLS/KNOWLEDGES
	19.5 Know importance of proper lubrication.
	19.6 Trouble shoot the ignition system of a gasoline engine.
	19.7 Trouble shoot the fuel system of a gasoline engine.
20. Perform basic metal working processes (arc welding, oxy-acetylene cutting, welding, soldering, etc.) in a safe and workmanlike manner.	20.1 Understand and use nomenclature pertaining to welding, gas and arc, and to cutting.
	20.2 Proper adjustment of equipment for maximum efficient use.
	20.3 Knowledge of appropriate safety precautions in handling welding equipment.
	20.4 Identify metals normally used which are fastened by welding.
	20.5 Select and care for welding rods and electrodes as dictated by the type of metal to be welded and the type of equipment being used.
	20.6 Illustrate basic welding and cutting techniques.
21. Select, use, and maintain tractor hydraulic system.	21.1 Identify different types of hydraulic systems and the advantages of each.
	21.2 Identify and locate components of a hydraulic system.

TASKS	SKILLS/KNOWLEDGES
	21.3 Understand and explain the principles of hydraulics used in tractors and other implements.
	21.4 State how hydraulic systems function.
	21.5 Interpret operator's manual for proper maintenance and service.
22. Promote good human relationships and communicate effectively with others.	22.1 Practice and have knowledge of good citizenship.
	22.2 Recognize influence of group dynamics and how people work together in our society.
	22.3 Recognize the importance of accepting personal responsibility and respecting the rights of others.
	22.4 Acknowledge the rights and responsibilities of members in an organization.
	22.5 Know acceptable conduct with relationship to one's self, others, school, work, personal and public property.
	22.6 Practice using good personal habits in speech, manners, work.
23. Keep appropriate records.	23.1 Recognize and use basic bookkeeping procedures.
	23.2 Understand and have knowledge of income and taxation laws.

III. NATURAL RESOURCES
A. FORESTRY

TASKS	SKILLS/KNOWLEDGES
24. Use, maintain hand tools and non-powered equipment.	24.1 Identify common hand tools and non-powered equipment and be able to use correctly. 24.2 Establish proper maintenance and care schedule for tools and equipment. 24.3 Provide for storage of tools and equipment.
25. Operate, maintain, adjust small power equipment.	25.1 Have knowledge of and practice safety whenever entering shop or using equipment. 25.2 Have knowledge of proper dress when operating equipment. 25.3 Demonstrate correct use of: A. Grinder B. Drill press C. Chain saw D. Others 25.4 Follow operator's manual for recommended schedules for: A. Lubrication servicing B. Maintenance C. Repairing
26. Operate, maintain, adjust large power equipment.	26.1 Have knowledge of and practice safety whenever entering shop or using equipment. 26.2 Have knowledge of proper dress when operating equipment.

TASKS	SKILLS/KNOWLEDGES
	26.3 Demonstrate correct use of: A. Skidders B. Loaders C. Hauling Equipment D. Tree shear
	26.4 Know state regulations on vehicle safety.
	26.5 Obtain and know of special permits governing hauling equipment.
27. Maintain irrigation system.	27.1 Identify types of irrigation systems: A. Portable B. Underground
	27.2 Explain types of control valves
	27.3 Evaluate difference between types of systems using different materials: A. Plastic pipe B. Aluminum pipe C. Galvanized pipe
28. Order, buy equipment, supplies.	28.1 List or describe various prices of equipment used in timber harvesting.
	28.2 Compare and evaluate makes and models of equipment.
	28.3 Evaluate efficiency of machine on the job.
	28.4 Determine dealer services available.
	28.5 Determine conditions under which equipment is to be operated.

III. NATURAL RESOURCES
A. FORESTRY

TASKS	SKILLS/KNOWLEDGES
29. Install, operate automatic equipment.	29.1 Follow operator's manual for operation of equipment. 29.2 Knowledge of hand tools and their usage. 29.3 Knowledge of safety factors involved with installation of equipment.
30. Construct, maintain, repair buildings, and structures.	30.1 Identify common building materials, including lumber, nails, hardware items, concrete. 30.2 Figure a bill of materials and compute its cost for a farm building. 30.3 Properly select and use both hand and power wood-working tools to erect a small nursery or greenhouse. 30.4 Lay out and build forms for pouring concrete foundations, floors, etc. 30.5 Select a paint or preservative, prepare the surface and paint a home/farm building. 30.6 Perform simple plumbing. 30.7 Perform simple electrical wiring.
31. Construct, assemble, machinery or equipment.	31.1 Analyze needs of equipment to do the required job/jobs. 31.2 Analyze material requirements needed, i.e. type of material, low carbon or high carbon steel, heat treatment processes needed, forging processes needed.

TASKS	SKILLS/KNOWLEDGES
	31.3 Design new parts or repair old parts. 31.4 Select proper type of welding to facilitate construction and provide for safety in use of equipment. 31.5 Use hand tools.
32. Plant, transplant plant materials.	32.1 Analyze soil mix and prepare rooting media by adding proper rooting hormone. 32.2 Select method of planting: A. Seeds B. Cuttings C. Layerage 32.3 Transplant according to conditions and age of plant. 32.4 Post transplant care to insure life of plant.
33. Harvest crops (timber).	33.1 Analyze the different harvesting methods used in the southeast United States and select the type suitable for different harvesting operations. 33.2 Analyze full mechanized harvesting system with reference to these operations: A. Tush combine B. Shears-skidder-loader C. Shears-preloader-loader

III. NATURAL RESOURCES
A. FORESTRY

TASKS	SKILLS/KNOWLEDGES
	33.3 State advantages and disadvantages of fully mechanized long wood operation. 33.4 Analyze partially mechanized harvesting system with reference to these operations: A. Equipment used 1. Chain saws or shears 2. Bob tail trucks B. Stumpage consideration C. Terrain consideration D. Machine selection 33.5 Evaluate the types of operational layout needed: A. Skidder trails B. Truck trails C. Haul roads
34. Survey, map land.	34.1 Read and interpret maps and aerial photographs. 34.2 Read a compass and orient a map to a compass reading. 34.3 Read aerial photographs with reference to: A. Overlays B. Identification of woods 34.4 Operate a transit.
35. Control fires.	35.1 Classes of fires, A, B, C. 35.2 Types of fire extinguishers and codes.

III. NATURAL RESOURCES
A. FORESTRY

TASKS	SKILLS/KNOWLEDGES
	35.3 Types of equipment for controlling forest fires.
	35.4 Methods of fighting forest fires.
	35.5 Elements and conditions which start or begin woods fires.
	36.1 Be able to read map and aerial photographs.
. Scale, appraise timber.	36.2 Identify and recognize various types of plants and trees native to the area.
	36.3 Be capable of making accurate timber measurements: A. Cords B. Board feet
	36.4 Know various methods for making timber measurements: A. Standing timber B. Filled wood
	36.5 Effective communication with others: A. Ownership of woods B. Stumpage sellers C. Locating stumpage
	36.6 Know legal aspects of agreements and contracts.
37. Identify forest plants and seeds.	37.1 Identify plants by life cycle; annual, biennial, perennial.

TASKS	SKILLS/KNOWLEDGES
	37.2 Identify plants by their use: field crops, vegetables, fruits, nuts, ornamentals, forage, grain, and forestry.
	37.3 Identify plants taxonomically.
38. Identify forest problems.	38.1 Recognize and identify pest and insects.
	38.2 Recognize and be alert to diseases which will afflict woods.
	38.3 Understand and treat problems created by nature: A. Drought B. Flooding C. Fire
	38.4 Controlling vandals and fire bugs.
39. Plan, oversee construction of campsites, and recreational facilities.	39.1 Read and interpret maps.
	39.2 Lay out and design road into recreational facilities.
	39.3 Plan facilities so that movement of people is conducted with ease.
	39.4 Analyze recreational areas to provide for: A. Play areas B. Play equipment C. Picnic and barbeque areas D. Pool or swimming facilities E. Game areas

TASKS	SKILLS/KNOWLEDGES
	39.5 Construct and repair buildings, swimming facilities, boat launching facilities as needed.
40. Enforces recreation laws.	40.1 Know hunting and fishing regulations. 40.2 Assist wildlife officers when required.

III. NATURAL RESOURCES
B. SALT AND FRESH WATER FISH MANAGEMENT

TASKS	SKILLS/KNOWLEDGES
1. Patrol lakes, streams, rivers and hunting areas; checks hunters and fishermen for licenses and illegal fishing and hunting activities.	1.1 Secure valid state driver's license. 1.2 Have skill in launching, operating, and beaching outboard motor boats. 1.3 Have ability to operate air boat. 1.4 Know Florida Hunting and Fishing Regulations. 1.5 Read compass and map and plot way through uncharted woods or waterways. 1.6 Enforce federal, state, and local game laws.
2. Assist in conducting wildlife population studies including the recording and tabulation of results.	2.1 Has knowledge of feeding and breeding habits of wildlife. 2.2 Knows the distribution, abundance, and economic values of birds, mammals, and other wildlife. 2.3 Can recognize the signs of an over-fished or over-hunted area and can recommend corrective procedures. 2.4 Knows wildlife native to the area. 2.5 Can collect records and interpret same, of wildlife native to the area.
3. Trap, transport, and relocate wild animals such as deer, turkeys, and hogs.	3.1 Has knowledge of feeding and breeding habits of wildlife.

III. NATURAL RESOURCES
B. GAME AND FRESH WATER FISH MANAGEMENT

TASKS	SKILLS/KNOWLEDGES
	3.2 Knows the distribution, abundance, and economic values of birds, mammals, and other wildlife.
	3.3 Can recognize the signs of an over-fished or over-hunted area and can recommend corrective procedures.
	3.4 Can develop a restocking policy for wildlife.
	3.5 Can recognize and recommend corrective procedures for reducing damage from predatory animals or injurious rodents.
4. Plant, fertilize and maintain wildlife food plots on game management areas.	4.1 Has knowledge of land/water pollution and can recognize its signs before it becomes too damaging to the environment.
	4.2 Removing brush or planting game cover or forage plants.
	4.3 Has knowledge of feeding and breeding habits of wildlife.
	4.4 Has knowledge of natural habitat of wildlife and can develop an environment which is favorable to their growth and expansion.
	4.5 Can recognize the signs of an over-hunted area and can recommend corrective procedures.
5. Direct controlled hunts on management areas including the collection of permit money from hunters.	5.1 Knowledge of simple bookkeeping, [illegible] and accounting.

TASKS	SKILLS/KNOWLEDGES
	5.2 Prepare weekly game management activity reports.
	5.3 Advise hunters and sportsmen of rules and regulations of the various management areas.
	5.4 Enforce federal, state, and local game laws.
	5.5 Knows the distribution, abundance, and economic values of birds, mammals, and other wildlife.
6. Prepare weekly game management activity reports.	6.1 Keep accurate and up to date records.
7. Advise hunters and sportsmen of rules and regulations of the various management areas.	7.1 Know Florida Hunting and Fishing Regulations.
	7.2 Know rules and regulations regarding the operation of the particular park to which assigned.
	7.3 Have knowledge of security measures to take to protect the area and visitors from vandalism and/or physical danger.
8. Assist game biologists in conducting research projects.	8.1 Has knowledge of feeding and breeding habits of wildlife.
	8.2 Knows the distribution, abundance, and economic values of birds, mammals, and other wildlife.
	8.3 Knows wildlife native to the area.
	8.4 Can collect records and interpret same, of wildlife native to the area.

III. NATURAL RESOURCES
B. GAME AND FRESH WATER FISH MANAGEMENT

TASKS	SKILLS/KNOWLEDGES
9. Accumulate and record data of animal telemetry projects.	9.1 Has knowledge of feeding and breeding habits of wildlife. 9.2 Knows distribution, abundance, and economic values of birds, mammals, and other wildlife. 9.3 Can recognize the signs of an over-fished or over-hunted area and can recommend corrective procedures. 9.4 Knows wildlife native to the area. 9.5 Can collect records and interpret same, of wildlife native to the area. 9.6 Develops charts, graphs and tables of research data.
10. Gather and report basic environmental data in the field such as temperature, humidity, and water quality samples.	10.1 Know methods of measuring temperature and means of converting between the two methods. 10.2 Know methods of measuring humidity. 10.3 Take water samples. 10.4 Field testing for water quality. 10.5 Record data for evaluation.
11. Maintain and repair boats, electro-fishing devices, motors and related equipment in connection with surveys in collecting samples.	11.1 Identify and use common hand tools. 11.2 Practice safety when repairing or working around motors.

III. NATURAL RESOURCES
A. GAME AND FRESH WATER FISH MANAGEMENT

TASKS	SKILLS/KNOWLEDGES
	11.3 Repair and/or patch fiberglass or metal skinned boats. 11.4 Repair and/or maintain outboard motors. 11.5 Repair and/or maintain steering linkage mechanism on boats.
12. Assist fishery biologists in planning and constructing specialized equipment for research investigations.	12.1 Prepare charts, graphs and tables of research results. 12.2 Has knowledge of habitat of fresh water fish and can develop an environment which is favorable to their growth and expansion. 12.3 Has knowledge of feeding and breeding habits of fresh water fish. 12.4 Has knowledge of land/water pollution and can recognize its signs before it becomes too damaging to the environment. 12.5 Can perform such duties as: A. Cleaning fish and game enclosures. B. Trapping, tagging, or marking fish and game. C. Releasing hatchery grown fish. D. Gathering fish and game samples.
13. Conduct investigations, secure evidence and issue warrants, summons, and citations to violators.	13.1 Can communicate orally effectively and pleasantly. 13.2 Can communicate effectively through writing skills.

III. NATURAL RESOURCES
B. GAME AND FRESH WATER FISH MANAGEMENT

TASKS	SKILLS/KNOWLEDGES
	13.3 Can keep accurate records of all types. 13.4 Enforce federal, state, and local game laws. 13.5 Knows state laws, city and county ordinances: A. Law of arrest, search and seizure B. Law of evidence C. Criminal procedure D. Philosophy of law enforcement E. Civil rights F. Self defense G. Fire arms 13.6 Investigates citizens' complaints and makes preliminary investigations: A. Collection and preservation of physical evidence B. Crime laboratory services C. Scientific investigation techniques D. Knows techniques for interviewing and interrogation
14. Prepare reports and maintain records of law enforcement activities, including citations, arrests and disposition of cases.	14.1 Knows organization and function of Game and Fresh Water Fish Management Records Division. 14.2 Knows departmental rules and regulations. 14.3 Knows departmental reports, records, and forms. 14.4 Knows basic records procedure.

III. NATURAL RESOURCES
2. GAME AND FRESH WATER FISH MANAGEMENT

TASKS	SKILLS/KNOWLEDGES
15. Assist local law enforcement agencies during civil disturbances and natural disasters.	15.1 Departmental procedure in handling catastrophes, disasters, and fires. 15.2 Know state laws, city and county ordinances: A. Law of arrest, search and seizure B. Law of evidence C. Criminal procedure D. Philosophy of law enforcement E. Civil rights F. Self defense G. Fire arms 15.3 Investigates citizens' complaints and makes preliminary investigations. A. Collection and preservation of physical evidence B. Crime laboratory services C. Scientific investigation techniques D. Knows techniques for interviewing and interrogation 15.4 Geography of local region to which assigned. 15.5 Location and use of emergency health and medical facilities. 15.6 First aid.
16. Inspect commercial fish houses, hunting camps, wildlife exhibits and fur houses for evidence of violations of state game and fish laws.	16.1 Enforce federal, state, and local game laws.

TASKS	SKILLS/KNOWLEDGES
	16.2 Knows state laws, city and county ordinances: A. Law of arrest B. Law of evidence C. Criminal procedure D. Philosophy of law enforcement E. Civil rights F. Self defense G. Fire arms 16.3 Investigates citizens' complaints and makes preliminary investigations. A. Collection and preservation of physical evidence B. Crime laboratory services C. Scientific investigation techniques D. Knows techniques for interviewing and interrogation.
17. Operate trucks, air boats, and halftracks in patrolling assigned land and water areas; performs minor preventive maintenance and repair of equipment.	17.1 Hold valid Florida Driver's License. 17.2 Hold other valid licenses needed to operate such equipment as air boats, halftracks, etc. 17.3 Knows geography, land and water of regional area to which assigned. 17.4 Knows how to perform routine maintenance and minor repairs to equipment for which he is responsible.
18. Present talks to sportsmen and civic and community organizations concerning wildlife restoration and conservation.	18.1 Can communicate orally effectively and pleasantly. 18.2 Knows fishing and hunting regulations.

TASKS	SKILLS/KNOWLEDGES
	18.3 Has knowledge of feeding and breeding habits of wildlife.
	18.4 Knows the endangered species of birds, mammals, and other wildlife.
	18.5 Has knowledge of natural habitat of wildlife and the development of an environment which is favorable to their growth and expansion.
	18.6 Has knowledge of habitat of fresh water fish and the development of an environment which is favorable to their growth and expansion.
	18.7 Has knowledge of feeding and breeding habits of fresh water fish.
	18.8 Has knowledge of land/water pollution.
	18.9 Knows the distribution, abundance, and economic values of birds, mammals, and other wildlife.
	18.10 Can recognize and recommend corrective procedures for reducing damage from predatory animals or injurious rodents.
	18.11 Can recognize the signs of an over-fished or over-hunted area and can recommend corrective measures.
	18.12 Knows wildlife native to the region.

III. NATURAL RESOURCES
B. GULF AND FRESH WATER FISH MANAGEMENT

TASKS	SKILLS/KNOWLEDGES
19. Spray or mechanically remove hyacinths, weeds, and related water vegetation in an assigned area.	19.1 Demonstrate knowledge and skill in boat handling operations. 19.2 Demonstrate knowledge and skill in handling spray pumps and related equipment. 19.3 Demonstrates knowledge and skill in handling poisons and sprays used in aquatic weed control. 19.4 Knowledge of safety in event of accidents - mechanical. 19.5 Knowledge of first aid. 19.6 Knowledge of safety in event of accidental poisoning from use of sprays or chemicals.
20. Maintain and repair equipment used in conducting aquatic weed control activities.	20.1 Identify and use common hand tools. 20.2 Practice safety when repairing or working around motors. 20.3 Repair and/or patch fiberglass or metal skinned boats. 20.4 Repair and/or maintain outboard motors. 20.5 Repair and/or maintain steering linkage mechanism on boats. 20.6 Can perform routine maintenance and minor repairs of spray equipment.

TASKS	SKILLS/KNOWLEDGES
	20.7 Can perform routine maintenance and minor repairs on hyacinth harvesters, and underwater mowers and other equipment.
21. Maintain rivers and waterways in a navigable condition by removing log jams, windfalls, and related debris.	21.1 Demonstrates knowledge and skill in boat handling operations. 21.2 Knowledge of safety in event of accidents - mechanical. 21.3 Knows processes and demonstrates correct procedures for removing hyacinths, weeds or other vegetation from clogged areas. 21.4 Select proper method of removing log jam and windfall from river or waterway.
22. Contact property owners and sportsmen in reference to spraying of noxious aquatic plant life.	22.1 Have knowledge of liability laws in the event of damage to private property. 22.2 Can advise, direct, and give information to the general public with reference to spraying. 22.3 Demonstrates knowledge of business and the importance of business activities in our personal, social, and national welfare. 22.4 Explain the essential characteristics of private enterprise.

TASKS	SKILLS/KNOWLEDGES
	22.4 Explain the essential characteristics of private enterprise.
	22.5 Describe the methods of building positive attitudes, exercising leadership, and developing good relations with others.
	22.6 Demonstrates ability to receive or give directions and to carry out instructions intelligently.
	22.7 Recognize influence of group dynamics and how people work together in our society.
23. Prepare weekly activity reports on weed control activities and vegetation growth.	23.1 Develop charts, graphs, and tables illustrating weekly activity reports.
	23.2 Know departmental reports, records and forms.
	23.3 Know basic records procedures.

III. NATURAL RESOURCES
C. PARKS AND RECREATION

TASKS	SKILLS/KNOWLEDGES
1. Possession of, or the ability to secure a valid Florida Operator's or Chauffeur's License for the type of vehicle assigned.	1.1 Secure valid state driver's license.
2. Meet the public, and speak clearly and understandably.	2.1 Practice using good personal habits in speech, manners, work. 2.2 Know acceptable conduct with relationship to one's self, others, school, work, personal and public property. 2.3 Practice and have knowledge of good citizenship. 2.4 Recognize the importance of accepting personal responsibility and respecting the rights of others.
3. Provide security measures to protect park property and visitors against vandalism.	3.1 Know of potential trouble spots and patrol areas using unscheduled visits. 3.2 Secure entrance and exit gates at night to discourage prowlers. 3.3 Encourage patron to help police themselves.
4. Enforce rules and regulations regarding the operation of the particular park to which assigned.	4.1 Know and enforce regulations and rules regarding the operation of the park, i.e. A. Swimming B. Boating C. Hunting D. Fishing E. Camp fires F. Cutting or destroying of trees or flowers

TASKS	SKILLS/KNOWLEDGES
	4.1 C. Special attractions
5. Enforce hunting and fishing regulations.	5.1 Study and observe Florida Hunting and Fishing Regulations.
6. Patrol the park/parks and protect game against poachers and illegal hunters.	6.1 Have ability to operate such equipment as: A. Jeep B. Boat and outboard C. Airboat 6.2 Read a compass and map and plot way through woods. 6.3 Know game preserve and animal habits so as to protect them from poachers and illegal hunters.
7. Give lectures on park flora, fauna, facilities, and park and local history.	7.1 Can recognize and identify plants, flowers, and trees found within the park boundaries and the local area. 7.2 Knows life style and identity of wildlife native to the area. 7.3 Can describe park and local history guiding patrons to full use of park facilities for the enjoyment of all.
8. Work with people and assist them in understanding and enjoying the facilities of the park.	8.1 Know acceptable conduct with relationship to one's self, others, school, work, and personal and public property.

TASKS	SKILLS/KNOWLEDGES
	8.2 Recognize the importance of accepting personal responsibility and respecting the rights of others. 8.3 Can describe park and local history guiding patrons to full use of park facilities for the enjoyment of all.
9. Collect fees, assign camp areas, and distribute park literature.	9.1 Knowledge of simple bookkeeping. A. Record of ticket sales B. Making change 9.2 Keep accurate campsite map knowing location of campers, length of visit, arrival and departure time. 9.3 Replenish camp literature explaining points of interest to visitors as well as rules and regulations of park.
10. Conduct tours through museum or other park attractions.	10.1 Ability to speak clearly. 10.2 Practice using good personal habits in speech, manners, work. 10.3 Know acceptable conduct with relationship to one's self, others, school, work, personal and public property. 10.4 Through study and research find unusual events about the park or area to make attraction more interesting.

TASKS	SKILLS/KNOWLEDGES
11. Operate boat or jeep while conducting tours.	11.1 Hold valid state chauffeur's license. 11.2 Hold valid license for operating boat carrying passengers. 11.3 Be aware of safety factors in operating equipment and knowledgeable of safety pertaining to patrons.
12. Sell, stamp tickets, collect fees for museum tours.	12.1 Knowledge of simple bookkeeping: A. Record of ticket sales B. Making change
13. Assist in maintaining museum or historial security with conducting tours.	13.1 Study personality traits of patrons so that you may spot potential vandals or troublemakers. 13.2 Have knowledge of tour so that group may be observed at all times. 13.3 Avoid allowing stragglers or drifters from the group. 13.4 Have ability of placing yourself so that anyone in group can see you at all times.
14. Assist with general clerical work such as preparing attendance and revenue reports, taking inventory, and maintaining other clerical records.	14.1 Have knowledge of bookkeeping and clerical procedures: A. Attendance reports B. Revenue reports C. Inventories D. Maintenance reports

TASKS	SKILLS/KNOWLEDGES
	14.2 Evaluate various reports to determine if operation was profitable.
	14.3 Make recommendations for improving facilities based on reports.
15. Build simple structures such as picnic shelters and tables.	15.1 Identify common building materials including lumber, nails, concrete, fencing materials.
	15.2 Read a blueprint or set of plans describing how to build a shelter or tables.
	15.3 Figure a bill of materials and compute its cost.
	15.4 Properly select and use hand tools and power tools to erect a building.
	15.5 Select a paint or preservative, prepare the surface and paint a building or structure.
16. Perform minor electrical and plumbing work.	16.1 Properly select and use hand tools and power tools.
	16.2 Know and practice safety in dealing with electrical power.
	16.3 Understand principles and do simple wiring.
	16.4 Know and practice safety when installing and repairing plumbing.

TASKS	SKILLS/KNOWLEDGES
	16.5 Recognize and use various plumbing now in use: A. Pipe 1. Galvanized 2. Plastic 3. Cast iron B. Tubing C. Control valves
17. Make minor repairs to machinery.	17.1 Use appropriate hand tools. 17.2 Interpret operator's manual so that equipment is operated safely and correctly. 17.3 Perform routine maintenance and servicing as required. 17.4 Follow manufacturer's instructions when repairing machinery.
18. Construct foundations and pour sidewalks, curbing, and steps.	18.1 Analyze traffic patterns and lay out design plan. 18.2 Use hand tools and equipment as needed. 18.3 Have knowledge of form and foundation construction. 18.4 Prepare concrete mix as needed for specific job. 18.5 Finish off masonry work - edge, polish, curing time.

III. NATURAL RESOURCES
C. PARKS AND RECREATION

TASKS	SKILLS/KNOWLEDGES
19. Plant trees and shrubs in landscaping, reforestation and erosion programs.	19.1 Prepare and grade terrain as needed. 19.2 Identify and select plants and trees which will meet requirements for: A. Landscaping B. Reforestation C. Erosion control 19.3 Prepare and plant new shrubs/trees as required. 19.4 Provide for after care transplanting treatment to insure plant growth.
20. Perform maintenance and repair work on buildings, tables, fireplaces, waterlines, docks, boats, and grounds.	20.1 Establish maintenance inspection tours to insure routine maintenance is provided for all structures and facilities. 20.2 Identify common building materials including lumber, nails, concrete, fencing materials. 20.3 Figure a bill of materials and compute its cost. 20.4 Where possible, obtain blueprint of project being repaired-otherwise, develop ability to sketch needed repairs. 20.5 Select and use hand tools/power equipment to effect repairs.
21. Clean restrooms, operate concessions and stores.	21.1 Select proper cleansing materials for [illegible] stores.

TASKS	SKILLS/KNOWLEDGES
	21.2 Set up maintenance schedule to follow to keep restrooms clean.
	21.3 Develop skill in driving small tractor. A. Utilize tractor for hauling of trash and debris. B. Hook up tractor for mowing grass area

IV. MECHANICS IN AGRICULTURE

TASKS	SKILLS/KNOWLEDGES
1. Communicate satisfactorily using proper grammar, composition and vocabulary, oral and written.	1.1 Practice using good personal habits in speech, manners, work. 1.2 Possess ability to write reports or to give accurate descriptions of events or to write a repair statement legibly. 1.3 Possess ability to speak clearly and to describe an action or activity so that others may understand.
2. Measure parts and figure wear factors and tolerance factors.	2.1 Add, subtract, four digit numbers. 2.2 Multiply, divide four digit numbers. 2.3 Add, subtract four point decimals. 2.4 Convert fractional values to decimal values.
3. Designate the following mechanical devices: a. Simple machines, planes, screws, levers, pulleys b. Two-stroke internal combustion engine c. Four-stroke internal combustion engine d. Diesel engine e. Rotary engine f. Hydraulic lift g. Pneumatic lift	3.1 Demonstrate and understand the mechanical advantage of the following mechanical theories: A. Inclined plane B. Screw C. Lever D. Pulley 3.2 Describe operation of a two-stroke internal combustion engine. 3.3 Designate where and how two-stroke engines are best used.

TASKS	SKILLS/KNOWLEDGES
	3.4 Describe operation of a four-stroke internal combustion engine.
	3.5 How does it differ from a two-stroke engine.
	3.6 Designate where and how four-stroke engines are best used.
	3.7 Describe the operation of a diesel engine.
	3.8 Compare major differences between a gasoline engine and a diesel engine.
	3.9 State the advantages/disadvantages of a diesel engine.
	3.10 Describe operation of a rotary engine.
	3.11 Describe operation of a hydraulic system.
	3.12 Describe operation of a pneumatic system.
4. Operate agricultural machinery.	4.1 Understand factors involved in choice of power transmission.
	4.2 Factors involved in choosing proper machinery and equipment for a particular job.
	4.3 Economics involved in buying or reconditioning of farm machinery or equipment.
	4.4 Value of being able to adjust farm machinery under operating field conditions.
	4.5 The effects of field size, pattern and shape on field efficiency.

TASKS	SKILLS/KNOWLEDGES
5. Use and maintain hand tools and non-powered equipment.	5.1 Identify hand tools and non-powered tools used for machinery assembly and repair. 5.2 Demonstrate how to use hand tools and non-powered equipment in a safe manner. 5.3 Demonstrate how to maintain and care for hand tools.
6. Operate, maintain, adjust tool power equipment.	6.1 Identify and describe how to use the common tools requiring power. 6.2 Demonstrate safety in using power tools. 6.3 Demonstrate maintenance and care for power tools. 6.4 Demonstrate knowledge of electrical connections and secure electrical fittings. 6.5 Care and use of special tools: A. Jacks and lifts B. Impact wrenches C. Torque wrenches D. Bench grinder E. Wheel cylinder hone F. Tire changing and repair equipment G. Wheel balancing machine H. Battery charger I. Winches

TASKS	SKILLS/KNOWLEDGES
7. Perform basic arc welding processes.	7.1 Understand terminology of arc welding. 7.2 Select correct welding supplies A. Equipment, A.C. or D.C. B. Electrodes, size, type, classification C. Safety equipment 7.3 Arc welding the following materials A. Steels 1. Low carbon 2. High carbon B. Cast iron C. Dissimilar metals
8. Perform basic gas welding, cutting, and brazing processes.	8.1 Terminology used with gas welding. 8.2 Advantages and disadvantages of oxy-acetylene welding. 8.3 Identify and demonstrate safe use of welding equipment. 8.4 Properly hook up and dismantle equipment. 8.5 Control backfires and flashbacks.
9. For an internal combustion gas engine, small and/or automotive: A. Service the fuel system B. Service the starting system C. Service the electrical system	9.1 Servicing the fuel system: A. Understand fuel-air system B. Check, repair or replace carburetors and linkage systems C. Check, service and replace fuel injection systems and scavengers.

TASKS	SKILLS/KNOWLEDGES
9. D. Service the lubrication system E. Service the cooling systems F. Service the exhause systems G. Service the drive system H. Service the braking system I. Service the suspension and alignment system J. Service the steering system	9.1 D. Check, service and replace superchargers E. Check, remove and replace intake manifold and gaskets. F. Service or replace air filters G. Clean and replace fuel pump, filter lines and fittings 9.2 Service the starting system. A. Check and repair or replace starter switch B. Check and install solenoids C. Service auxiliary engine starting systems 9.3 Service the electrical system. A. Read and use circuit diagrams B. Check circuit continuity with test equipment. C. Install and repair wiring, connections, switches, relays, fuses, etc. D. Check, service or replace battery E. Ignition system: 1. Check, remove and replace distributor cap, rotor and points 2. Check and replace condensor 3. Check and set vacuum and mechanical advance 4. Check, adjust or replace voltage regulators 5. Set timing 6. Test and replace coil 7. Clean and gap or replace spark plugs

TASKS	SKILLS/KNOWLEDGES
	9.4 Service the lubrication system. A. Add and change lubricant, change filters. B. Remove and replace oil pump C. Pressure test lubrication system D. Remove and replace oil pressure indicators 9.5 Service the cooling system. A. Clean and flush cooling system B. Remove, check and replace hoses and connections. C. Add coolant and antifreeze D. Remove, check and replace water pump E. Remove, check and replace thermostat 9.6 Service the exhaust system. A. Remove and replace exhaust manifold and gaskets. B. Remove and replace muffler, exhaust pipe and tail pipes 9.7 Service the drive system. A. Transmission 1. Service transmission and torque converters. B. Inspect, remove and replace driveshafts, universal joints, bearings and hangers. C. Adjust, inspect and replace differential gears, bearings and oil seals. D. Adjust, remove and replace final drives, axles, gears, bearings and oil seals. E. Adjust, repair or replace wheel bearings and track rollers. F. Repair or replace tires and wheels

TASKS	SKILLS/KNOWLEDGES
	9.8 Service the brake system. A. Inspect and adjust brake shoes B. Replace brake linings C. Bleed brake lines and fill fluid reservoirs D. Turn brake drums E. Adjust air, hydraulic and mechanical braking system F. Repair and replace wheel cylinders G. Repair and replace master cylinders H. Inspect, test and repair air compressors and lines I. Remove and replace pressure gauges
	9.9 Service the suspension, and alignment systems. A. Inspect, service or replace suspension components B. Replace shock absorbers C. Replace springs
	9.10 Inspect, service or replace steering components.
10. For a diesel engine: A. Service the fuel system B. Service the starting system C. Service the lubricating system	10.1 Servicing the fuel system: A. Understand fuel air mixture B. Check service and replace fuel injection systems and scavengers. C. Service or replace air filters D. Clean and replace fuel pump, filter lines and fittings.
	10.2 Service the starting system: A. Check and repair or replace starter switch B. Check and install solenoid

TASKS	SKILLS/KNOWLEDGES
	10.3 Service the lubrication system: A. Add and change lubricant, change filters. B. Remove and replace oil pump. C. Pressure test lubrication system. D. Remove and replace oil pressure indicators.
11. Perform equipment maintenance, routine and repair.	11.1 Make visual examination of parts for wear recognizing abnormal wear signs, leakage around parts, etc. 11.2 Use measuring tools and equipment to check wear against manufacturer's specified limits.
12. Conduct routine in-service inspections and keep records of data obtained.	12.1 Utilize operation manual for establishing frequency and degree of inspection to perform. 12.2 Establish file to keep records of each inspection noting work performed.
13. Use test equipment to determine mechanical, electrical, or hydraulic problems and recommend preventive measures.	13.1 Understand and be able to use test and measuring equipment such as: A. Feeler and spark plug gauges B. Micrometers and calipers C. Compression gauges and vacuum gauges D. Dial indicators E. Timing lights F. Dwell meters G. Hydrometers (battery and coolant) H. Battery cell testers I. Headlight aiming machines
14. Follow prescribed procedures regarding stock control, warranties, etc.	14.1 Replace or order spare parts for equipment subject to excessive wear.

TASKS	SKILLS/KNOWLEDGES
	14.2 Follow manufacturer's instructions in returning and completing warranties. 14.3 Perform test and/or inspections at prescribed times to insure warranty continuance.
15. Service hydraulic systems as they pertain to lifts, controls, etc.	15.1 Service auxiliary hydraulic systems: A. Inspect, adjust or service hydraulic pumps, lines, pistons and reservoirs B. Check, remove and replace hitches, yokes, etc. C. Service attachments (blades, power take-offs, etc.) D. Service and adjust power take-off units and transfer units. E. Adjust controls and control linkages.
16. Observe safety practices.	16.1 Keep a clean house and practice storage of tools and equipment. 16.2 Use proper safety precautions in use of lifts, blades, hoists and other power equipment. 16.3 Use caution to handle combustable material and corrosive cleaning agents. 16.4 Use safety precautions in securing overheated cooling systems.
17. Read, understand, and interpret technical publications.	17.1 Read and use repair manuals.

TASKS	SKILLS/KNOWLEDGES
	17.2 Use correct engine and hardware terminology.
18. Plan work procedures.	18.1 Review and read repair manuals. 18.2 Obtain necessary tools, equipment. 18.3 Plan method of beginning, follow-through and ending of job. 18.4 Post test work to see that it is operating correctly.
19. Organize and direct activities of mechanics.	19.1 Acknowledges the rights and responsibilities of members in an organization. 19.2 Knows acceptable conduct with relationship to one's self, others, work, personal and public property. 19.3 Recognize influence of group dynamics and how people work together in our society. 19.4 Accept other people as they are with strengths and weaknesses. 19.5 The importance of receiving directions and carrying out instructions intelligently. 19.6 Methods of developing positive attitudes, exercising leadership.

TASKS	SKILLS/KNOWLEDGES
20. Conduct general business procedures such as: a. Ordering b. Billing c. Inventory d. Maintaining warranty procedures	20.1 Replace or order spare parts for equipment subject to excessive wear. 20.2 Follow manufacturer's instructions in returning and completing warranties. 20.3 Perform test and/or inspections at prescribed times to insure warranty continuance. 20.4 Maintain work order forms with regards to repair and stock items so that billing will be accurate.
21. Promote good human relations.	21.1 Acknowledge the rights and responsibilities of members in an organization. 21.2 Accept other people as they are with strengths and weaknesses. 21.3 Knows acceptable conduct with relationship to one's self, others, work, personal and public property. 21.4 Recognize influence of group dynamics and how people work together in our society.

CHAPTER IV

NUMBER OF PRESENT AND ANTICIPATED EMPLOYEES IN AGRI/BUSINESS

This chapter presents a breakdown of the number of present and anticipated employees for the selected occupations identified in Chapter II. The data from which these tables were developed was a continuing process of the staff throughout Phases I and II.

The majority of data was compiled through the use of a written survey. The survey was mailed to (164) one hundred sixty-four Agri/Businesses in Northeast Florida. The responses to that survey and the follow-up are given in the introductory section. A confidential supplementary report, not to be released publicly, gives the names of the businesses and their responses. This report will be part of the final project report.

NUMBER OF PRESENT AND ANTICIPATED EMPLOYEES

AGRICULTURE AND RELATED BUSINESSES

Position Identification	Number of Current Employees	New Employees Anticipated 12 Months
Landscaping		
1. Retail Florist Shop Technologist	6½	1
2. Floral Designer	31	15
3. Greenhouse Technologist	9	9
4. Floriculture Technologist	6½	0
5. Landscape Nursery Technologist	27	15
6. Garden Center Technologist	20	10
7. Landscape Contractor and Design Technologist	14	1
8. Landscape Maintenance Technologist	29	34
9. Tree Surgeon Technologist	20	2
10. Lawn and Landscape Pest Control Technologist	54	7
11. Golf Course Maintenance Technologist	45	8
12. Park Maintenance Technologist	1	0
13. Cemetery Maintenance Technologist	34	8
14. Industrial and Institutional Technologist	0	0
15. Landscape Product Sales Technologist	2	0
TOTALS	299	110

NUMBER OF PRESENT AND ANTICIPATED EMPLOYEES

AGRICULTURE AND RELATED BUSINESSES

Position Identification	Number of Current Employees	New Employees Anticipated 12 Months
Food Processing and Service		
Animal Food Production		
1. Milker	25	0
2. Supervisor	1	0
3. Foreman	6	0
4. Dairyman	5	0
5. Poultry Plant Manager	7	0
6. Poultry Farm Owner	203	20
7. Service Technician	39	3
8. Feed Mixer Technician	4	0
TOTALS	290	23

NUMBER OF PRESENT AND ANTICIPATED EMPLOYEES

AGRICULTURE AND RELATED BUSINESSES

Position Identification	Number of Current Employees	New Employees Anticipated 12 Months
Forestry and Natural Resources		
1. Cruiser	15	0
2. Research Technician	4	0
3. Woodsman	135	0
4. Senior Woodsman	73	0
5. Equipment Operator	62	0
6. Logging Technician	1	0
7. Ranger	470	0
8. Towerman	120	0
9. Dispatcher	62	0
10. Mechanic	55	0
TOTALS	997	0

Includes Regional Figures for Division of Forestry.

NUMBER OF PRESENT AND ANTICIPATED EMPLOYEES

AGRICULTURE AND RELATED BUSINESSES

Position Identification	Number of Current Employees	New Employees Anticipated 12 Months
Game and Fresh Water Fish Commission		
1. Game Management Specialist	8	0
2. Fish Management Specialist	4	0
3. Aquatic Weed Control Specialist I	5	0
4. Wildlife Officer	31	0
TOTALS	48	0
Parks and Recreation		
1. Ranger, Non-Resident	14	2
2. Ranger, Resident	20	3
3. Museum Guide	3	0
TOTALS	37	5

NUMBER OF PRESENT AND ANTICIPATED EMPLOYEES

AGRICULTURE AND RELATED BUSINESSES

Position Identification	Number of Current Employees	New Employees Anticipated 12 Months
Mechanics in Agriculture		
1. Service Technician (Mechanic)	157	46
2. Service Manager	6	0
3. Parts Manager	15	2
4. Equipment Assembly Technician	7	0
5. Salesman	21	2
6. Operational Instruction Technician (Field)	1	1
7. Truck Driver (All Equipment Operator)	2	1
TOTALS	209	52

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the conclusions and recommendations of the Project Staff as they relate to the Agriculture Area of technical education.

This chapter did not appear in the original summary report due to the fact that sufficient time was not available to review the findings with each of the Special Area Advisory Committee members. The staff also felt that feedback and recommendations from the Joint Planning Committee and the General Advisory Committee would be beneficial information to have before any summaries were written.

Therefore, the comments included in this section represent the opinions of individuals with expertise in the Agriculture Area who have reviewed all available data. Such opinions should not be considered final or mutually exclusive of other judgments in that they are only presented here as a summary of the Project Staff's findings.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Although Florida's northeastern region is not a heavily agricultural one, there are still a number of presently available jobs in agriculture, and the outlook for future jobs is strong enough to support development of pre-technical curriculum materials. For example, within the landscaping area alone, new jobs totalling nearly 25% of the current work force become available over the next twelve months.

In addition, increased interest in outdoor recreation, ecology, conservation, and our natural resources, in general, is likely to stimulate demand for technical workers with skills in areas related to "Agri/Business". The tremendous increase in the number of "recreational vehicles" and the consequent need for naturalistic camping facilities should, in itself, increase the job market. Too, increasing interests in "natural foods", organic farming methods, and related topics may very well bolster the market for agricultural workers in all parts of the country. With respect to "tastes in occupations", moreover, it is likely that more and more young people will exhibit interests in work which takes them out-of-doors and "back to nature".

Finally, as the general standard of living rises, there is a natural tendency to increase the proportion of discretionary income allocated to "aesthetic and recreational" expenditures. In a climate such as northeastern Florida, this would doubtless lead to more dollars being spent on both residential and commercial landscaping, as well as on pursuits, e.g. golfing, which requires rigorous maintenance of landscaped and specially prepared grounds.

In terms of curriculum design, this occupational area should prove quite cost effective in that modules will result which have potential utility in other areas, e.g. motor repair and maintenance. There is also the possibility of some transfer of training effects in communications, record keeping, and human relation skills. In all, placing a high priority on further design and development of concepts and educational materials appears supported by this needs assessment.