

# Mississippi Department of Education



## Title 7: Education K-12

Part 73: Agriculture, Secondary

**Custodian / Caretaker Services**

## 2007 Mississippi Curriculum Framework

### Secondary Custodian/Caretaker Services

(Program CIP: 19.0702 – Adult Development and Aging)

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Standards in this document are based on information from the following organizations:

<b>Proposed Standards for Mississippi Agriculture Education Programs</b>	Adapted from the publication, <i>Career Cluster Resources for Agriculture, Food, and Natural Resources</i> , National Association of State Directors of Career and Technical Education. The Career Clusters content used herein are copyrighted, proprietary information of the National Association of State Directors of Career Technical Education Consortium, States' Career Clusters Initiative. Referenced with permission.
<b>Academic Standards</b>	Mississippi Department of Education Subject Area Testing Program
<b>21<sup>st</sup> Century Skills</b>	Reproduced with permission of the Partnership for 21 <sup>st</sup> Century Skills. Further information may be found at <a href="http://www.21stcenturyskills.org">www.21stcenturyskills.org</a>

## Preface

### *Secondary Custodian/Caretaker Services Research Synopsis*

Articles, books, Web sites, and other materials listed at the end of each unit were considered during the revision process. Specific journals, electronic articles, and sources were especially useful in providing insight into trends and issues in the field. These references are suggested for use by instructors and students during the study of the topics outlined.

Industry advisory team members from the Mississippi School for the Deaf were asked to give input related to changes to be made to the curriculum framework. Specific comments related to soft skills needed in this program included honesty, punctuality, initiative, and work ethic. Occupation-specific skills stated included flower arranging and the ability to operate lawn mowing machinery and weed eaters. Safety practices emphasized included wearing steel-toed boots, gloves, safety goggles, sunscreen, and sun-protective hats.

Instructors from the Mississippi School for the Deaf were also asked to give input on changes to be made to the curriculum framework. Specific comments related to this program included statements from Advisory Committee members including the growing need for residential grounds keepers in Mississippi. Changes suggested for the curriculum included additions and deletions to the Recommended Tools and Equipment List. Other changes included the following: (1) year one, unit 1 title change; (2) year one, unit 3 moved to year two combined as unit 2; and (3) year two, unit 6 moved to year one, unit 3. New resources and teaching and assessment strategies were added to each unit, some specifically accommodating hearing-impaired students.

### **Curriculum**

The following state/national standards were referenced in each course of the curriculum:

- *Mississippi Department of Education Subject Area Testing Program Academic Standards*
- *21<sup>st</sup> Century Skills*
- *Career Cluster Resources for Agriculture, Food, and Natural Resources* as published by the National Association of State Directors of Career and Technical Education

Industry and instructor comments, along with current research, were considered by the curriculum revision team during the revision process; and changes were made as needed and appropriate. Many of the skills and topics noted in the research were already included in the curriculum framework. Specific changes made to the curriculum at the April 26, 2006, curriculum revision meeting included:

- All competencies and objectives were reviewed to ensure accuracy and appropriateness.
- The Recommended Tools and Equipment list was updated to reflect actually what capitalized and non-capitalized items are correctly. Duplicates were deleted.

### **Assessment**

Students will be assessed using teacher-made assessments. Students' grades will be used to determine mastery in this program.

## Professional Learning

It is suggested that instructors participate in professional learning related to the following concepts:

- Using the Internet as a tool for classroom instruction - To learn more about using the Internet as a classroom tool, please go to <https://cia.rcu.msstate.edu/OnlinePD/>.
- Using rubrics for classroom assessments - To learn more about using rubrics, please go to <https://cia.rcu.msstate.edu/OnlinePD/>.
- How to use the Mississippi Agriculture Education BRIDGE site on Blackboard®
- Differentiated instruction – To learn more about differentiated instruction, please go to [http://www.paec.org/teacher2teacher/additional\\_subjects.html](http://www.paec.org/teacher2teacher/additional_subjects.html) and click on Differentiated Instruction. Work through this online course and review the additional resources.

## Foreword

Secondary vocational-technical education programs in Mississippi are faced with many challenges resulting from sweeping educational reforms at the national and state levels. Schools and teachers are increasingly being held accountable for providing true learning activities to every student in the classroom. This accountability is measured through increased requirements for mastery and attainment of competency as documented through both formative and summative assessments.

The courses in this document reflect the statutory requirements as found in Section 37-3-49, Mississippi Code of 1972, as amended (Section 37-3-46). In addition, this curriculum reflects guidelines imposed by federal and state mandates (Laws, 1988, ch. 487, §14; Laws, 1991, ch. 423, §1; Laws, 1992, ch. 519, §4 eff. from and after July 1, 1992; Carl D. Perkins Vocational Education Act III, 1998; and No Child Left Behind Act of 2001).

Each secondary vocational-technical course consists of a series of instructional units which focus on a common theme. All units have been written using a common format which includes the following components:

- Unit Number and Title
- Suggested Time on Task - An estimated number of clock hours of instruction that should be required to teach the competencies and objectives of the unit. A minimum of 140 hours of instruction is required for each Carnegie unit credit. The curriculum framework should account for approximately 75-80 percent of the time in the course.
- Competencies and Suggested Objectives
  - A competency represents a general concept or performance that students are expected to master as a requirement for satisfactorily completing a unit. Students will be expected to receive instruction on all competencies.
  - The suggested objectives represent the enabling and supporting knowledge and performances that will indicate mastery of the competency at the course level.
- Suggested Teaching Strategies - This section of each unit indicates strategies that can be used to enable students to master each competency. Emphasis has been placed on strategies which reflect active learning methodologies. Teachers should feel free to modify or enhance these suggestions based on needs of their students and resources available in order to provide optimum learning experiences for their students.
- Suggested Assessment Strategies - This section indicates strategies that can be used to measure student mastery. Examples of suggested strategies could include rubrics, class participation, reflection, and journaling. Again, teachers should feel free to modify or enhance these suggested assessment strategies based on local needs and resources.

- Integrated Academic Topics, Workplace Skills, Technology Standards, and Occupational Standards - This section identifies related academic topics as required in the Subject Area Assessment Program (SATP) in Algebra I, Biology I, English II, and U. S. History from 1877, which are integrated into the content of the unit. It also identifies the 21<sup>st</sup> Century Skills, which were developed by the Partnership for 21<sup>st</sup> Century Skills, a group of business and education organizations concerned about the gap between the knowledge and skills learned in school and those needed in communities and the workplace. A portion of the 21<sup>st</sup> Century Skills addresses learning skills needed in the 21<sup>st</sup> century, including information and communication skills, thinking and problem-solving skills, and interpersonal and self-directional skills. The need for these types of skills has been recognized for some time and the 21<sup>st</sup> Century Skills are adapted in part from the 1991 report from the U.S. Secretary of Labor's Commission on Achieving Necessary Skills (SCANS). Another important aspect of learning and working in the 21<sup>st</sup> century involves technology skills, and the International Society for Technology in Education, developers of the National Educational Technology Standards (NETS), were strategic partners in the Partnership for 21<sup>st</sup> Century Skills.
- References - A list of suggested references is provided for each unit. The list includes some of the primary instructional resources that may be used to teach the competencies and suggested objectives. Again, these resources are suggested and the list may be modified or enhanced based on needs and abilities of students and on available resources.

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## Program Description

The secondary program in Custodian/Caretaker Services prepares individuals enrolled at the Mississippi School for the Deaf for entry-level employment or continuing education in a variety of fields in the horticulture and business maintenance industry. Students enrolled in the program participate in a variety of instructional activities including lectures, discussions, laboratory experiences at the school, and work-based learning activities in the field such as field trips and shadowing experiences according to his/her Individualized Education Program (IEP). Students also receive supplementary instruction and reinforcement of learning through activities in the Junior National Association of the Deaf (Jr. NAD). Content areas covered in the two-year program may require three years due to the nature of the IEP. Custodian/Caretaker Services I (Horticulture) topics include: plant structure and growth, plant propagation, pest management, residential/commercial care, floristry, greenhouse crops and management, vegetable production, and plantscaping. Custodian/Caretaker Services II (Landscape and Building Maintenance) topics include: nursery/landscape plants, landscape maintenance, plant identification, turfgrass installation and maintenance, building maintenance safety, floor and upholstery care, and bathroom care.

Industry standards referenced are adapted from the publication, *Career Cluster Resources for Agriculture, Food, and Natural Resources*.

**Course Outline**  
**Custodian/Caretaker Services I**  
 Course CIP Code: 20.0604

**Course Description:** Custodian/Caretaker Services I is the introductory course in the secondary Custodian/Caretaker Services program. Students in this course gain a foundation of competencies related to careers and leadership development; plant structure, growth, and classification; general residential/commercial care; growing media; propagation; chemical and pest management; and floristry and greenhouse operations. (2-2½ Carnegie units, depending upon time spent in the course)

Unit	Title	Hours
1	Custodian/Caretaker Services Orientation, Safety and Leadership Development	10.5
2	Plant Structure and Growth	25.5
3	General Residential/Commercial Care	30.0
4	Plant Growth Media and Nutrition	25.5
5	Horticulture Structures	10.5
6	Basic Plant Propagation	30.0
7	Principles of Pest Management	22.5
8	Basic Principles of Floristry and Interior Plantscaping	22.5
9	Greenhouse Crops	22.5
10	Olericulture (Vegetable) Production	18.0
11	Special Topics in Custodian/Caretaker Services I	22.5

**Custodian/Caretaker Services II**  
 Course CIP Code: 20.0694

**Course Description:** Custodian/Caretaker Services II is a continuation of the secondary Custodian/Caretaker Services program. Students enrolled in this course gain competencies related to landscape and building maintenance which include plant classification, nursery/landscape plants, landscape maintenance, turfgrass installation and maintenance, building maintenance safety, residential/commercial care, floor and upholstery care, and bathroom care. (2-2½ Carnegie units, depending upon time spent in the course)

Unit	Title	Hours
1	Leadership, Careers, and Safety	18.0
2	Plant Classification, Nursery and Landscape Plant Identification	25.5
3	Landscape Maintenance	15.0
4	Turfgrass Installation and Maintenance	15.0
5	Building Maintenance Safety	15.0
6	Hard Surface Floor Care	37.5
7	Carpet and Upholstery Care	30.0
8	Residential/Commercial Bathroom Care	37.5
9	Special Topics in Custodian/Caretaker Services II	22.5

## Custodian/Caretaker Services I

### Unit 1: Custodian/Caretaker Services Orientation, Safety, and Leadership Development

(10.5 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>1. Identify school and program policies and procedures related to the Custodian/Caretaker Services (CCS) program.</p> <ol style="list-style-type: none"> <li>Describe school policies related to the CCS program.</li> <li>Identify and describe policies specific to the CCS program, including policies and procedures associated with supervised experience.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Solicit responses from the students regarding their questions or uncertainties about CCS-related policies. Have students read and respond to the local school handbook. <sup>E2, E3, E4</sup></li> <li>Provide students with a written copy of policies and rules associated with the CCS program. Describe and discuss these policies and rules with the students. <sup>E2, E3, E4, E9</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Student sign-off sheet acknowledging discussion of school and program policies.</li> </ul>
<p>2. Demonstrate basic and fundamental safety practices related to CCS enterprises.</p> <ol style="list-style-type: none"> <li>Identify hazards that may be found in CCS operations and activities such as poisons and other chemicals, sunburn, ladders and scaffolds, electrical shock, fire, poisonous insects and snakes, equipment and tool hazards, spills and slipping, etc.</li> <li>Identify and demonstrate the use of personal protection devices including eye protection, hearing protection, foot protection, respiratory protection, clothing, body protection, etc.</li> <li>Identify and describe the use of general safety equipment in CCS operations including fire extinguishers, eyewash and shower stations, first-aid kits, etc.</li> <li>Identify and apply general safety rules that apply to the CCS classroom and laboratory.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Students will tour the CCS laboratory and identify hazards and hazardous materials present. Identify use of colors and signal words for recognizing hazards. Reflect on the awareness of hazards as a key element in the prevention of accidents and injuries. Write a reflective response on how this information may impact their life.</li> <li>Model the use of personal protection equipment (PPE) and when the use of such equipment is necessary. Role-play the use of PPE in different scenarios. <sup>E2, E3, E4, CS4</sup></li> <li>Watch videos on safety equipment and procedures. Students may complete a video guide (teacher-made) while watching.</li> <li>Provide students with a written copy of general safety rules; have them read and then discuss these rules as applied to the local CCS department. <sup>E2, E3, E4, E9</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Teacher observation of student participation in discussions, role-play, and activities.</li> <li>Teacher-constructed test on hazards, safety equipment, and safety rules.</li> </ul>

<p>3. Identify and describe the role of organizations that encourage leadership development.</p> <p>a. Identify and describe the role of student youth organizations that encourage leadership development.</p> <p>b. Identify and describe the role of trade organizations in CCS that encourage leadership development.</p>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Using a K-W-L-R chart, conduct a large group discussion about Jr. NAD/FFA prior to the speakers and use for closure afterwards.<sup>E2, CS4, E9</sup></li> <li>Student leaders from a local Jr. NAD/FFA chapter will present to the class the role of Jr. NAD/FFA in developing leadership skills through specific career development events and recognition programs. Demonstrate team-building/leadership interactive games.<sup>E4, CS3, CS6</sup></li> <li>Invite a representative of a CCS organization or government agency (Jr. NAD, Mississippi Nurseryman/Landscape Association, area extension horticulture specialist) to speak to the class on the role of trade organizations. Students will write a reflective paragraph/discuss what they learned on how the information may impact them.<sup>E2, E3, E9, CS1, CS2, CS6</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>KWLR Chart.</li> <li>Teacher-constructed test on student leadership development and organizations.</li> <li>Participation in game and written reflection.</li> </ul>
<p>4. Participate in leadership development activities.</p> <p>a. Identify and describe basic terms and principles associated with leadership.</p> <p>b. Identify and describe basic principles of teamwork and cooperation in small groups.</p> <p>c. Lead a small group in accomplishing a given task. (on-going throughout the year)</p>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Identify a leader (known or famous). Research and share attributes that make this person a leader using PowerPoint.<sup>E2, E3, E4, E9, CS4, CS5, CS6, T3, T5</sup></li> <li>Teacher-led discussion of basic terms and principles associated with leadership.<sup>E2, E9</sup></li> <li>Teacher-led discussion of basic principles of teamwork and cooperation.<sup>E2, E9, CS6</sup></li> <li>As the course progresses, each student will be assigned to lead a small group in accomplishing a given task.<sup>E4</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Presentation Rubric (see Appendix D).</li> <li>Checklist or rubric (see Appendix D) leading a small group.</li> <li>Teacher-constructed test on basic terms and principles of leadership and teamwork.</li> </ul>

## STANDARDS

### *Agriculture, Food, and Natural Resources (AFNR) Standards*

The following standards were adapted from the publication, *Career Cluster Resources for Agriculture, Food, and Natural Resources*. The complete text of this document can be found at <http://www.careerclusters.org/ClusterDocuments/agdocuments/AGFinal.pdf>.

- LEA 1 Use leadership skills in collaborating with others to accomplish organizational goals and objectives
- LEA 2 Use personal growth skills in collaborating with others to accomplish organizational goals and objectives
- ELR 1 Know and understand the importance of professional ethics and legal responsibilities.
- ELR 2 Demonstrate workplace ethics specific to Agriculture, Food, and Natural Resource occupations.

### *Academic Standards*

- E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
- E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.

### *21<sup>st</sup> Century Skills*

- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

## SUGGESTED REFERENCES

Kimbrell, B., & Chambers, D. (2002). *Developing safety skills for the shop and home*. Winterville, GA: American Association for Vocational Instructional Materials.

*National Ag Safety Database*. Retrieved October 11, 2004, from <http://www.cdc.gov/nasd/menu/topic/topic.html>

National Association for the Deaf. (2006). *Junior National Association of the Deaf*. Retrieved May 12, 2006, from <http://www.nad.org>

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National FFA Organization. (2004). *Student handbook*. Indianapolis, IN: Author.

**Custodian/Caretaker Services I**  
**Unit 2: Plant Structure and Growth**

(25.5 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>1. Identify parts of a plant and their functions.</p> <p>a. Identify the primary parts of a plant and describe the function of each part including roots, stems, leaves, and flowers.</p> <p>b. Identify the various types of each primary part, and discuss the differences in each type.</p>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>• Determine student prior knowledge by presenting a plant specimen to determine parts of the plant and functions.</li> <li>• Read and respond to Unit 3 in Reiley and Shr by completing self-evaluation activity. <sup>B2, B3, E2, E3, E4</sup></li> <li>• Students will bring a plant specimen to class to identify the different parts of the plant. <sup>B2, B3, E3, E4</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>• Observation.</li> <li>• Self-evaluation activity for Unit 3.</li> <li>• Checklist to identify parts of a plant.</li> <li>• Teacher-constructed test on parts of a plant and their functions.</li> </ul>
<p>2. Describe the growth process in plants.</p> <p>a. Describe processes by which plants grow including photosynthesis, respiration, transpiration, and translocation.</p> <p>b. Describe the relationship of environmental and cultural factors to plant growth (water, light, temperature, soil, climatic zones, etc.).</p>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>• Read and respond to Unit 4 in Reiley and Shry by completing the self-evaluation activity. <sup>B2, B3, B4, E2, E3, E4</sup></li> <li>• Using presentation media discuss the processes by which plants grow. Have students create a drawing to trace the movement of water and nutrients from the roots to the leaves. <sup>B2, B3, B4, E3, E4, T3</sup></li> <li>• Integrate instruction with the science teacher to reinforce instruction in growth processes through a lab demonstrating water movement using dye.</li> <li>• In cooperative groups, use the internet to explore weather and other environmental and cultural factors that may influence plant growth. Create a graphic organizer (like a semantic web or K-W-L-R chart) to present findings. <sup>B2, B3, B4, E3, E4, T3, T5</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>• Self-evaluation activity for Unit 4.</li> <li>• Completion of lab activity.</li> <li>• Teacher-constructed test on growth processes and environmental and cultural factors.</li> <li>• Cooperative Group participation and graphic organizer.</li> </ul>

## STANDARDS

### *Agriculture, Food, and Natural Resources (AFNR) Standards*

The following standards were adapted from the publication, *Career Cluster Resources for Agriculture, Food, and Natural Resources*. The complete text of this document can be found at <http://www.careerclusters.org/ClusterDocuments/agdocuments/AGFinal.pdf>

- PLT 1 Apply principles of anatomy and physiology to produce and manage plants in both a domesticated and a natural environment.
- PLT 2 Address taxonomic or other classifications to explain basic plant anatomy and physiology.
- PLT 3 Apply fundamentals of production and harvesting to produce plants.
- NRS 1 Recognize importance of resource and human interrelations to conduct management activities in natural habitats.

### *Academic Standards*

- B2 Investigate the biochemical basis of life.
- B3 Investigate cell structures, functions, and methods of reproduction.
- B4 Investigate the transfer of energy from the sun to living systems.
- E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.

### *21<sup>st</sup> Century Skills*

- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

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- Biondo, R. J., & Noland, D. A. (2000). *Floriculture: From greenhouse production to floral design*. Upper Saddle River, NJ: Pearson Prentice Hall.
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Jacks, L. P., & Hamilton, J. R. (1977). *Basic principles of soil science*. Mississippi State, MS: Research and Curriculum Unit.

Reiley, H. E., & Shry, C. L. (1997). *Introductory horticulture* (5<sup>th</sup> ed.). Clifton Park, NY: Delmar.

## Custodian/Caretaker Services I

## Unit 3: General Residential/Commercial Care

(30 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>1. Demonstrate general residential/commercial cleaning including use of tools/equipment and supplies.</p> <ol style="list-style-type: none"> <li>Identify tools and equipment needed for cleaning a selected area.</li> <li>Demonstrate the proper use of tools and equipment needed to clean a selected area.</li> <li>Identify supplies needed to clean a selected area.</li> <li>Demonstrate the use of supplies in cleaning a selected area.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Research the <i>Clean and Safe in the 21<sup>st</sup> Century</i> by the Soap and Detergent Association (<a href="http://www.cleaning101.com">www.cleaning101.com</a>). Each student will present a section of the information to the class using visual aids. T1, T5</li> <li>Watch the America's Career InfoNet video <i>Housekeeping Supervisors and Janitors and Cleaners</i> and/or <i>Cleaning Basics A to Z</i>. Write a journal response/discuss what was learned and feelings about this career. <a href="http://www.acinet.org/acinet/videos">http://www.acinet.org/acinet/videos</a>.<sup>E2</sup></li> <li>Complete a lab that includes selecting tools, equipment, supplies, and actual cleaning. CS5</li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Presentation rubric (see Appendix D).</li> <li>Journal response.</li> <li>Cleaning lab checklist.</li> <li>Unit test.</li> </ul>
<p>2. Demonstrate proper procedures for cleaning furniture and upholstery.</p> <ol style="list-style-type: none"> <li>Demonstrate the process to dust and polish wood and non-wood furniture.</li> <li>Demonstrate the process to clean upholstered furniture.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Review the Institute of Inspection Cleaning and Restoration® standards for upholstery cleaning to demonstrate understanding in graphic organizer.</li> <li>Demonstrate proper procedures for cleaning furniture.</li> <li>Complete a lab that includes selecting tools, equipment, supplies, and actual cleaning of upholstery. CS5</li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Graphic organizer of standard topics for upholstery cleaning.</li> <li>Upholstery cleaning lab checklist.</li> <li>Unit test.</li> </ul>
<p>3. Demonstrate proper procedures for cleaning windows, walls, woodwork, and ceilings/lights, etc.</p> <ol style="list-style-type: none"> <li>Demonstrate the procedure for cleaning windows.</li> <li>Demonstrate the procedure for</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Demonstrate procedures for cleaning windows, walls, woodwork, ceilings/lights, etc.</li> <li>Complete a lab that includes selecting tools, equipment, supplies, and actual</li> </ul>

<p>washing walls and woodwork.</p> <p>c. Demonstrate the procedures for cleaning ceilings, lights, etc.</p>	<p>cleaning of windows, walls, woodwork, ceilings/lights, etc. <sup>CS5</sup></p> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>• Demonstrate proper procedures for cleaning windows, walls, woodwork, and ceilings/lights, etc.</li> <li>• Lab checklist.</li> <li>• Unit test.</li> </ul>
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## STANDARDS

### *Academic Standards*

- A1 Recognize, classify, and use real numbers and their properties.
- A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
- A3 Simplify algebraic expressions, solve and graph equations, inequalities and systems in one and two variables.
- A4 Explore and communicate the characteristics and operations of polynomials.
- A5 Utilize various formulas in problem-solving situations.
- A6 Communicate using the language of algebra.
- A7 Interpret and apply slope as a rate of change.
- A8 Analyze data and apply concepts of probability.
- B1 Utilize critical thinking and scientific problem solving in designing and performing biological research and experimentation.
- B2 Investigate the biochemical basis of life.
- B3 Investigate cell structures, functions, and methods of reproduction.
- B4 Investigate the transfer of energy from the sun to living systems.
- B5 Investigate the principles, mechanisms, and methodology of classical and molecular genetics.
- B6 Investigate concepts of natural selection as they relate to diversity of life.
- B7 Investigate the interdependence and interactions that occur within an ecosystem.
- E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
- E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
- E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
- E6 Explore cultural contributions to the history of the English language and its literature.
- E7 Discover the power and effect of language by reading and listening to selections from various literary genres.

- E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
- E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
- E10 Use language and critical thinking strategies to serve as tools for learning.
- H1 Explain how geography, economics, and politics have influenced the historical development of the United States in the global community.
- H2 Describe the impact of science and technology on the historical development of the United States in the global community.
- H3 Describe the relationship of people, places, and environments through time.
- H4 Demonstrate the ability to use social studies tools (e.g., timelines, maps, globes, resources, graphs, a compass, technology, etc.).
- H5 Analyze the contributions of Americans to the ongoing democratic process to include civic responsibilities.

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### 21<sup>st</sup> Century Skills

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- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

### SUGGESTED REFERENCES

- America's Career InfoNet. (2006). *Housekeeping supervisors and janitors and cleaners*. Retrieved March 3, 2006, from <http://www.acinet.org/acinet/videos>
- Aslett, D. (1992). *Clean in a minute*. Pocatello, ID: Marsh Creek Press.
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**Custodian/Caretaker Services I**  
**Unit 4: Plant Growth Media and Nutrition**

(25.5 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>1. Describe and apply principles of plant growth media.</p> <ol style="list-style-type: none"> <li>Identify and compare the components of natural soil, and describe the characteristics each one imparts to the root medium.</li> <li>Describe the characteristics of an ideal growing medium.</li> <li>Differentiate between a soil and a soilless root medium, and list the common components of a soilless root medium and the characteristics they contribute to the medium.</li> <li>Prepare a growing media to specifications, or identify the components and proportions in a commercially prepared root medium and discuss/explain the advantages of a commercial root medium over media containing natural soil.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Read and respond to Unit 4 in Reiley and Shry by completing the self-evaluation. <sup>E2, E4, E10</sup></li> <li>Students collect soil samples from home to classify soil texture. <sup>A1, A2, CS5</sup></li> <li>Have students prepare a growing medium from components on hand or take a sample from a growing medium they are using and identify the components of the medium and the approximate/relative proportion of the components of the medium, identifying the characteristics imparted to the medium by each component. <sup>A1, A2, A5, A8, CS5</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Self-evaluation activity.</li> <li>Teacher observation and evaluation of soil texture assignment using a checklist.</li> <li>Teacher observation and evaluation of growing medium analysis using a checklist.</li> <li>Teacher-constructed test on soil and growing media.</li> </ul>
<p>2. Describe and apply basic principles of plant nutrition.</p> <ol style="list-style-type: none"> <li>Identify the major nutrients needed for plant growth and describe their effects on plant growth.</li> <li>Identify the minor nutrients needed for plant growth and describe their effects on plant growth.</li> <li>Describe the effect of soil pH on nutrient availability and plant growth.</li> <li>Demonstrate the procedure for obtaining a soil sample, from a container and a land-based environment, for a soil test.</li> <li>Perform a test to determine plant or soil nutrition and interpret the results to determine the amendments to be made to a given area of root medium</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Read and respond to Unit 4 in Reiley and Shry by completing the self-evaluation. <sup>E2, E4, E10</sup></li> <li>Identify the major plant nutrients and their effects on plant growth. Using a Venn Diagram, compare plant nutrients with the basic nutrients humans need to live. <sup>B2, E4, CS4, CS5</sup></li> <li>Describe and discuss the minor plant nutrients and their effects on plant growth. <sup>B2, E4</sup></li> <li>Research pH and its impact on plants. Present findings in a graphic organizer or illustration. <sup>CS4, CS5, CS6, T5</sup></li> <li>Draw a pH scale and indicate the following points: acid range, neutral, alkaline range, and range of best plant</li> </ul>

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>to facilitate/produce optimum plant response.</p> <p>f. Interpret fertilizer analysis in terms of major nutrient content.</p> <p>g. Investigate new and emerging technologies, practices, trends, and issues associated with fertilizers and plant nutrition.</p>	<p>growth. Have students explain and describe how and what amendments to apply to the soil to modify the acidity or alkalinity of a root medium. <sup>A1, A2, A5, B2, B7, E4, CS5, CS6</sup></p> <ul style="list-style-type: none"> <li>• Demonstrate how to, and have students collect a soil sample (or petiole sample) from a plant, a container, or a land-based lab area and perform a test. Have students interpret the test results and make suggestions on amendments and nutrients that need to be added to the root medium. <sup>A1, A2, A5, B2, E4, E10, CS5, CS6</sup></li> <li>• Identify the legal requirements for the three analysis numbers on a fertilizer container and correlate what each number represents. Have students complete an assignment to calculate the actual nutrient content (in pounds) in a given amount of fertilizer. Discuss the effect of pH on the availability of these nutrients. <sup>A1, A2, A5, B2, E4, E10, CS4, CS5, CS6, T3</sup></li> <li>• Using <a href="http://www.epa.gov/students/">http://www.epa.gov/students/</a>, create a web quest for students to discover the role of the EPA. Discuss the requirements of ground water and run-off water as they impact commercially applied fertilizers in agricultural applications. Explain the USDA applications of riparian strips in agricultural applications and their relation to the quality of water in streams and rivers. <sup>B2, T1, T4, T5</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>• Self-evaluation activity.</li> <li>• Graphic organizer/illustration rubric (see Appendix D).</li> <li>• Evaluation of student assignment to draw the pH scale using a checklist.</li> <li>• Evaluation of student assignment to collect a soil or petiole sample using a checklist.</li> <li>• Completion of webquest.</li> <li>• Teacher-constructed test on plant growth, media, and fertility.</li> </ul>

## STANDARDS

### *Agriculture, Food, and Natural Resources (AFNR) Standards*

The following standards were adapted from the publication, *Career Cluster Resources for Agriculture, Food, and Natural Resources*. The complete text of this document can be found at <http://www.careerclusters.org/ClusterDocuments/agdocuments/AGFinal.pdf>.

- LEA 1 Use leadership skills in collaborating with others to accomplish organizational goals and objectives
- LEA 2 Use personal growth skills in collaborating with others to accomplish organizational goals and objectives
- ELR 1 Know and understand the importance of professional ethics and legal responsibilities.
- ELR 2 Demonstrate workplace ethics specific to AFNR (Agriculture, Food, and Natural Resources) occupations.
- PLT 1 Apply principles of anatomy and physiology to produce and manage plants in both a domesticated and a natural environment.
- PLT 3 Apply fundamentals of production and harvesting to produce plants.
- TET 1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
- TEC 1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.
- NRS 1 Recognize importance of resource and human interrelations to conduct management activities in natural habitats.
- NRS 3 Apply scientific principles to natural resources management activities.
- NRS 4 Employ knowledge of natural resource industries to describe production practices and processing procedures.
- NRS 5 Practice responsible conduct to protect natural resources.
- ENV 1 Use analysis procedures to plan and evaluate environmental service impacts.
- ENV 2 Identify public policies and regulations impacting environmental services to determine their effect on facility operation.
- ENV 3 Apply scientific principles to environmental services.
- ENV 5 Use tools, equipment, machinery, and technology to accomplish tasks in environmental services.

### *Academic Standards*

- A1 Recognize, classify, and use real numbers and their properties.
- A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
- A5 Utilize various formulas in problem-solving situations.
- B2 Investigate the biochemical basis of life.
- B7 Investigate the interdependence and interactions that occur within an ecosystem.
- E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.

## Secondary Custodian Caretaker Services

- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
- E10 Use language and critical thinking strategies to serve as tools for learning.

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### 21<sup>st</sup> Century Skills

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- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

### SUGGESTED REFERENCES

*Agriculture research magazine*. Retrieved October 13, 2004, from  
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Biondo, R. J., & Noland, D. A. (2000). *Floriculture: From greenhouse production to floral design*. Upper Saddle River, NJ: Pearson Prentice Hall.

Jacks, L. P., & Hamilton, J. R. (1997). *Basic principles of soil science*. Mississippi State, MS: Research and Curriculum Unit.

*MAFES research highlights*. Mississippi State, MS: Mississippi Agricultural and Forestry Experiment Station. Retrieved October 13, 2004, from  
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<http://www.msucare.com>

Reiley, H. E., & Shry, C. L. (1997). *Introductory horticulture* (5<sup>th</sup> ed.). Clifton Park, NY: Delmar.

Stiegler, J. H. (n.d.). *Land judging in Oklahoma*. Stillwater, OK: Oklahoma Cooperative Extension Service.



**Custodian/Caretaker Services I**  
**Unit 5: Horticulture Structures**

**(10.5 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>1. Describe the characteristics and features of different types of greenhouses.</p> <ol style="list-style-type: none"> <li>Identify and compare the different styles of greenhouses (Quonset, Gothic, lean-to, A-frame, etc.).</li> <li>Identify and compare the different types of greenhouse frames (metal, wood, plastic/PVC, etc.) and coverings (fiberglass, glass, polyethylene, lexon, etc.).</li> <li>Identify and compare the different types of heating, cooling, and ventilation systems used in greenhouses.</li> <li>Identify and compare the types of irrigation and chemigation systems used in greenhouses.</li> <li>Identify and describe factors to consider in establishing a floor plan for a greenhouse including benching, flooring, and traffic patterns.</li> <li>Describe sanitation practices employed in greenhouse production.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Complete a K-W-L-R chart to determine prior knowledge and closure and reflection of what is learned about greenhouses.</li> <li>Read and respond to Chapter 19 in Ingels by completing the Achievement Review. <sup>E3, E4</sup></li> <li>Present the <i>Greenhouses</i> PowerPoint presentation. <sup>E3</sup></li> <li>Large group discussion on the different types of greenhouses and systems used in greenhouse plant production. <sup>A1, A2, B4, B7, E2, E4, E9, E10</sup></li> <li>Visit local greenhouses to observe systems in operation. Student groups will use digital cameras to document their trip and present them in an electronic portfolio demonstrating what they learned. <sup>T1, T3, T4, T6</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>KWLR chart.</li> <li>Achievement Review.</li> <li>Teacher observation of student participation in class discussion.</li> <li>Teacher-constructed test on greenhouse styles and systems.</li> </ul>
<p>2. Describe auxiliary structures associated with horticulture.</p> <ol style="list-style-type: none"> <li>Describe the functions of auxiliary structures associated with horticultural operations including lathe houses, cold frames, shade houses, hot beds, potting facilities, chemical and dry storage facilities, etc.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Assign each student or student group one of the auxiliary structures to research and teach the rest of the class using some type of media. <sup>E2, E4, CS4, CS5, CS6, T1, T3, T5</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Student/group presentation.</li> <li>Teacher-made test on auxiliary structures.</li> </ul>
<p>3. Investigate and explore new and emerging technologies associated with greenhouse and other horticultural systems and structures.</p>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Research new and emerging trends and issues related to greenhouse structures and systems. Present findings to the class using some type of media. <sup>E1, E2, E3, E4, E5, E9, E10, CS1, CS4, CS5, CS6, T1, T3, T5</sup></li> </ul>

	<b>Assessment:</b> <ul style="list-style-type: none"> <li>Evaluate class presentation for content, clarity, length, and eye contact.</li> </ul>
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## STANDARDS

### *Agriculture, Food, and Natural Resources (AFNR) Standards*

The following standards were adapted from the publication, *Career Cluster Resources for Agriculture, Food, and Natural Resources*. The complete text of this document can be found at <http://www.careerclusters.org/ClusterDocuments/agdocuments/AGFinal.pdf>.

- PLT 1 Apply principles of anatomy and physiology to produce and manage plants in both a domesticated and a natural environment.
- PLT 3 Apply fundamentals of production and harvesting to produce plants.
- PLT 4 Exercise elements of design to enhance an environment (e.g., floral, forest, landscape, and farm).
- TET 1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
- PWR 1 Apply physical science principles to engineering applications with mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
- PWR 3 Apply principles of service and repair to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
- STR 1 Exercise basic skills in blueprint and design development to create sketches, drawings, and plans.
- STR 2 Read and relate structural plans to specifications and building codes.
- STR 3 Examine structural requirements to estimate project costs.
- STR 4 Develop skills required to use construction/fabrication equipment and tools.
- STR 5 Plan implement manage, and/or provide support services for facility design and construction, equipment design, manufacture, repair, and service; and agricultural technology.
- TEC 1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.
- TEC 2 Use available power sources to plan and apply control systems.
- ENV 4 Operate environmental service systems (e.g., pollution control, water treatment, wastewater treatment, solid waste management, and energy) to manage a facility environment.
- ENV 5 Use tools, equipment, machinery, and technology to accomplish tasks in environmental services.

### *Academic Standards*

- A1 Recognize, classify, and use real numbers and their properties.
- A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.

## Secondary Custodian Caretaker Services

- B4 Investigate the transfer of energy from the sun to living systems.
- B7 Investigate the interdependence and interactions that occur within an ecosystem.
- E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
- E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
- E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
- E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
- E10 Use language and critical thinking strategies to serve as tools for learning.

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### 21<sup>st</sup> Century Skills

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- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

### SUGGESTED REFERENCES

Biondo, R. J. (2004). *Greenhouse production*. Englewood Cliffs, NJ: Prentice Hall.

Biondo, R. J., & Noland, D. A. (2000). *Floriculture: From greenhouse production to floral design*. Upper Saddle River, NJ: Prentice Hall.

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**Custodian/Caretaker Services I**  
**Unit 6: Basic Plant Propagation**

(30 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>1. Distinguish between sexual and asexual propagation.</p> <ol style="list-style-type: none"> <li>Describe the distinguishing characteristics of sexual and asexual propagation.</li> <li>Explain the advantages and disadvantages of each.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Use presentation media to describe and discuss with the students the characteristics, advantages, and disadvantages of sexual and asexual propagation. <sup>B2, B3, E2, E4, E9, E10</sup></li> </ul> <p><b>Assessment</b></p> <ul style="list-style-type: none"> <li>Teacher-constructed test on characteristics, advantages, and disadvantages of sexual and asexual propagation.</li> </ul>
<p>2. Apply principles of sexual reproduction.</p> <ol style="list-style-type: none"> <li>Describe the sexual reproductive process in plants.</li> <li>Identify the parts of a seed and describe their functions.</li> <li>Identify requirements for optimum seed germination of most seeds.</li> <li>Propagate plants from seed.</li> <li>Interpret information found on a seed tag.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Read and respond to Unit 6 in Reiley and Shry, by completing the self-evaluation activity. <sup>B2, B3, E3, E4</sup></li> <li>Discuss the process of sexual propagation. <sup>B3, E2, E4, E9</sup></li> <li>Dissect a monocot and dicot seed: separate, identify, and explain the function of the three main parts. <sup>B2, B3</sup></li> <li>Demonstrate the conditions required for optimum germination of most seeds. <sup>B2, B3, E2, E3, E4, E9</sup></li> <li>Have students make a germination chamber from a sandwich bag and paper towel and journal the progress of seed germination. <sup>A1, A2, B1, B2, B3, E1, E10, CS5, CS6</sup></li> <li>Provide the students with a seed tag or seed package (or copy of) and explain the various components of the tag/package. Explain the legal requirements of a seed tag, and identify the USDA as the governmental agency that requires the tag. Use <a href="http://www.usda.gov">www.usda.gov</a> as a reference. <sup>E3, E4, E10</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Self-evaluation activity.</li> <li>Dissection checklist/observation.</li> <li>Seed germination journal checklist or rubric (see Appendix D).</li> <li>Teacher-constructed test on plant sexual reproduction.</li> </ul>

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>3. Describe and apply principles of asexual reproduction.</p> <ol style="list-style-type: none"> <li>Identify the common types of asexual reproduction and discuss their applications in horticulture.</li> <li>Identify common tools and chemicals used in asexual reproduction and demonstrate their safe use and care.</li> <li>Propagate plants from root, stem, and leaf cuttings.</li> <li>Propagate plants by division/separation.</li> <li>Propagate plants by layering.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Read and respond to Units 7, 8, 9, and 12 in Reiley and Shry by completing the self-evaluations for each unit. <sup>B2, B3, E2, E3, E4, E10</sup></li> <li>Demonstrate the safe use of knives, hand pruning shears, and scalpels and their cleaning, disinfection, and maintenance; and have students use them according to direction. Demonstrate and discuss the variety, advantages, and safe use of rooting hormones. <sup>E2, E3, E4, E10</sup></li> <li>Demonstrate the components, use, and advantages of an intermittent mist system. <sup>E2, E3, E4, E10</sup></li> <li>In small groups/pairs produce a project which includes the reproduction of plants by each of the asexual methods. <sup>E2, E3, E4, E10, CS5, CS6</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Self-evaluation activity.</li> <li>Evaluation of student activity in using tools used in asexual reproduction (checklist).</li> <li>Evaluation of student activity to reproduce plants asexually.</li> <li>Teacher-constructed test on plant reproduction.</li> </ul>

## STANDARDS

### *Agriculture, Food, and Natural Resources (AFNR) Standards*

The following standards were adapted from the publication, Career Cluster Resources for Agriculture, Food, and Natural Resources. The complete text of this document can be found at <http://www.careerclusters.org/ClusterDocuments/agdocuments/AGFinal.pdf>.

- PLT 1 Apply principles of anatomy and physiology to produce and manage plants in both a domesticated and a natural environment.
- PLT 2 Address taxonomic or other classifications to explain basic plant anatomy and physiology.
- PLT 3 Apply fundamentals of production and harvesting to produce plants.
- TET 1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
- TEC 1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.

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*Academic Standards*


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- A1 Recognize, classify, and use real numbers and their properties.
- A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
- B1 Utilize critical thinking and scientific problem solving in designing and performing biological research and experimentation.
- B2 Investigate the biochemical basis of life.
- B3 Investigate cell structures, functions, and methods of reproduction.
- E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
- E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
- E10 Use language and critical thinking strategies to serve as tools for learning.

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*21<sup>st</sup> Century Skills*


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- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

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**SUGGESTED REFERENCES**


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Jacks, L. P. (n.d.). *Basic principles of plant science*. Mississippi State, MS: Research and Curriculum Unit.

Reiley, H. E., & Shry, C. L. (1997). *Introductory horticulture* (5<sup>th</sup> ed.). Clifton Park, NY: Delmar.

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**Custodian/Caretaker Services I**  
**Unit 7: Principles of Pest Management**

(22.5 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>1. Identify and describe factors common to pest management and control.</p> <ol style="list-style-type: none"> <li>Identify and describe the different types of plant pests.</li> <li>Identify and describe the different types of control and management practices for plant pests.</li> <li>Describe and discuss principles of integrated pest management.</li> <li>Describe requirements for pesticide applicator's certification/licensure.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Watch America's Career InfoNet videos <i>Pest Control Workers and Pesticide Handlers, Sprayers, and Applicators, Vegetation</i>  <a href="http://www.acinet.org/acinet/videos">http://www.acinet.org/acinet/videos</a></li> <li>Write a journal response/discuss what was learned and feelings about this career. <sup>E2, E9, CS1, CS2, CS6</sup></li> <li>Read and respond to Unit 16 in Reiley and Shry by completing the self-evaluation. <sup>E1, E3, E4, E9, E10</sup></li> <li>Using presentation media, identify and describe the different types of plant pests (insects, diseases, weeds, and small animals). <sup>B7</sup></li> <li>Using presentation media, identify and describe the different types of control and management practices for plant pests (cultural, mechanical, biological, and chemical). <sup>B7</sup></li> <li>In cooperative groups, chart how the different methods can be used together for optimum control and management of plant pests. <sup>B7, E4, E9, E10</sup></li> <li>Using a web quest, research the International Organization for Standardization Web site  <a href="http://www.iso.org/iso/en/aboutiso/introduction/index.html">http://www.iso.org/iso/en/aboutiso/introduction/index.html</a> to understand the concept of standards. Assign pairs with the pesticide applicator's licensure and certification standards to research and teach the class about their assigned standard(s). <sup>E1, E3, E4, E9, E10, T1, T5</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Journal response/discussion.</li> <li>Self-evaluation.</li> <li>Observation of group work and chart.</li> <li>Pair presentation of applicator certification and licensing standards.</li> <li>Teacher-constructed test on factors</li> </ul>



Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>2. Identify, describe, and apply pesticide safety procedures.</p> <ol style="list-style-type: none"> <li>Identify and describe the use of different types of pesticides.</li> <li>Interpret pesticide label information.</li> <li>Discuss and apply general precautions for working with pesticides.</li> <li>Describe first-aid procedures for exposure to pesticides.</li> </ol>	<p>common to pest management and control.</p> <p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Read and respond to Unit 17 in Reiley and Shry and complete the self-evaluation. <sup>E1, E3, E4, E9, E10</sup></li> <li>Using presentation media, identify the use of different types of pesticides (insecticides, herbicides, fungicides, etc.).</li> <li>Provide students with an example of a pesticide label and identify the 11 standard points that are required by law, including signal words. <sup>E3, E4</sup></li> <li>Discuss with the students the general precautions to follow in working with pesticides and their applications on the job. <sup>E2, E4, E9, E10</sup></li> <li>Use presentation media to describe different types of exposure and appropriate first-aid procedure. Students are assigned a scenario where they have been “exposed.” Students role-play the procedures to follow for accidental exposure. <sup>E1, E2, E4</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Self-evaluation activity.</li> <li>Role-play using a checklist to identify exposure methods and first-aid procedures.</li> <li>Teacher-constructed test on pesticide safety.</li> </ul>
<p>3. Identify common plant pests, and describe the ways in which they cause damage to horticultural crops.</p> <ol style="list-style-type: none"> <li>Identify common insect pests of horticultural crops and describe how each causes damage to the crop.</li> <li>Identify common diseases of horticultural crops and describe how each causes damage to the crop.</li> <li>Identify common weeds found in horticultural crops and describe how weeds cause damage to crops.</li> <li>Monitor greenhouse and nursery product for pest management and control. (On-going throughout the</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Read and respond to Units 18-20 in Reiley and Shry and complete the self-evaluation activity for each unit. <sup>E1, E3, E4, E9, E10</sup></li> <li>Explore the grounds and greenhouse and collect any pests, weeds, or diseased-looking plants to examine during class.</li> <li>Using presentation media, identify and discuss common insect pests and describe how these pests damage crops. <sup>B7</sup></li> <li>Using presentation media, identify and discuss weeds and describe how weeds damage crops through competition. <sup>B7, E4, E9, E10</sup></li> </ul>

Competencies and Suggested Objectives	Suggested Strategies for Competencies
year)	<ul style="list-style-type: none"> <li>• Using presentation media, identify and discuss common diseases of plants and describe the vectors that transmit disease. <small>B7, E4, E9, E10</small></li> <li>• In cooperative groups, monitor the school greenhouse and nursery area for pest control, management, records, and report their findings. <small>B7, E1, E4, E9</small></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>• Self-evaluation activities.</li> <li>• Evaluation of monitoring pest management and control practices (checklist).</li> <li>• Teacher-constructed test on plant pests, damage, and control.</li> </ul>

## STANDARDS

### *Agriculture, Food, and Natural Resources (AFNR) Standards*

The following standards were adapted from the publication, *Career Cluster Resources for Agriculture, Food, and Natural Resources*. The complete text of this document can be found at <http://www.careerclusters.org/ClusterDocuments/agdocuments/AGFinal.pdf>.

- PLT 1 Apply principles of anatomy and physiology to produce and manage plants in both a domesticated and a natural environment.
- PLT 2 Address taxonomic or other classifications to explain basic plant anatomy and physiology.
- PLT 3 Apply fundamentals of production and harvesting to produce plants.
- TET 1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
- PWR 1 Apply physical science principles to engineering applications with mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
- PWR 3 Apply principles of service and repair to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
- TEC 1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.
- ENV 1 Use analysis procedures to plan and evaluate environmental service impacts.
- ENV 2 Identify public policies and regulations impacting environmental services to determine their effect on facility operation.
- ENV 3 Apply scientific principles to environmental services.

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### Academic Standards

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- B3 Investigate cell structures, functions, and methods of reproduction.
- B7 Investigate the interdependence and interactions that occur within an ecosystem.
- E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
- E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
- E10 Use language and critical thinking strategies to serve as tools for learning.

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### 21<sup>st</sup> Century Skills

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- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

### SUGGESTED REFERENCES

- Biondo, R. J., & Noland, D. A. (2000). *Floriculture: From greenhouse production to floral design*. Upper Saddle River, NJ: Prentice Hall.
- Caffee, J. (n.d.). *Integrated pesticide management* [PowerPoint presentation]. Retrieved October 11, 2004, from the Glen Rose FFA Chapter Web site: <http://www.glenroseffa.org>
- International Organization for Standardization. Retrieved May 22, 2006, from <http://www.iso.org/iso/en/aboutiso/introduction/index.html>
- Oska, C. (n.d.). *Pesticide management* [PowerPoint presentation]. Retrieved October 11, 2004, from the Glen Rose FFA Chapter Web site: <http://www.glenroseffa.org>
- Pest control workers and pesticide handlers, sprayers, and applicators, vegetation*. Retrieved May 22, 2006, from <http://www.acinet.org/acinet/videos>
- Reiley, H. E., & Shry, C. L. (1997). *Introductory horticulture* (5<sup>th</sup> ed.). Clifton Park, NY: Delmar.

## Custodian/Caretaker Services I

## Unit 8: Basic Principles of Floristry and Interior Plantscaping

(22.5 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>1. Describe and apply basic principles of floristry.</p> <ol style="list-style-type: none"> <li>Identify tools and supplies used in floristry including shears, tape, foam, floral wire, etc.</li> <li>Demonstrate the safe and proper use of tools and supplies used in floristry including shears, tape, foam, floral wire, etc.</li> <li>Identify plant materials used in floristry including potted, flower, and foliage materials.</li> <li>Describe basic design principles including balance, transition, rhythm, focal point, proportion, scale, etc.</li> <li>Create basic floral design products such as a packaged single corsage, wreath, bud vase, round centerpiece, or a dressed (wrapped) potted plant.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Determine prior knowledge by setting up a floral lab with all tools and supplies labeled for identification. Students complete the lab by identifying the name and use of each. <sup>CS5</sup></li> <li>View the America's Career InfoNet video <i>Floral Designers</i>. Write a journal response about what has been learned about this career. <a href="http://www.acinet.org/acinet/videos">http://www.acinet.org/acinet/videos</a>.</li> <li>Based on prior learning of safety, students demonstrate the safe and proper use of floral design tools and supplies. <sup>CS5, CS6</sup></li> <li>Provide a lab of plant specimens used in floristry to identify plant materials.</li> <li>Invite a florist to demonstrate the basic floral design principles and creation of basic floral design products (packaged single corsage, bud vase, round centerpiece, and a dressed potted plant) and discuss aspects of the job. Divide students into small groups, to design and construct each of these products. <sup>E4, E10</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Assessment of student performance in the use of safety with floral design tools and supplies using a checklist.</li> <li>Journal entry.</li> <li>Assessment of student performance in designing and constructing floral designs using a checklist.</li> <li>Teacher-constructed test on tools, supplies and materials; and basic principles of floral design.</li> </ul>
<p>2. Describe and apply principles of interior plantscaping.</p> <ol style="list-style-type: none"> <li>Describe factors to consider in growing and maintaining plants for interior</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Take a virtual tour of interior plantscapes at <a href="http://www.plants-in-buildings.com/index.php">http://www.plants-in-buildings.com/index.php</a> and/or visit</li> </ul>

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>landscaping including plant environment, light sources, growing media, fertilization, etc.</p> <p>b. Identify foliage and potted plants used in interior plantscape.</p> <p>c. Describe and discuss procedures for planning, constructing, and maintaining an interior plantscape.</p> <p>d. Describe careers in interior landscaping.</p> <p>e. Identify plants for specific locations in landscaping.</p> <p>f. Describe cultural procedures for interior plantscapes including fertilization, watering, sanitation, and pest control.</p> <p>g. Maintain an interior plantscape.</p>	<p>local commercial properties to observe and consider growing and maintaining plants for interior landscaping. Sketch or use the digital camera to document their findings. Write captions to describe the plantscapes observed.<sup>E4, E9, E10, CS4, CS5, CS6, T1, T5</sup></p> <ul style="list-style-type: none"> <li>• Display specimens or use presentation media to identify foliage and potted plants used in interior landscaping.</li> <li>• Use an illustrated lecture or field trip to discuss the procedures for constructing and maintaining an interior plantscape. When possible, assign students to perform these tasks throughout the year.<sup>B4</sup></li> <li>• Describe and apply principles of interior landscaping.</li> <li>• Illustrated lecture and discussion and/or resource person.</li> <li>• Illustrated lecture and discussion using charts.</li> <li>• Illustrated lecture and discussion and/or field trip.</li> <li>• Laboratory demonstration and practice.</li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>• Evaluation of student performance in planning, constructing, and maintaining an interior plantscape.</li> <li>• Completion of tour activity checklist.</li> <li>• Teacher-constructed test on interior plantscape materials and on principles and procedures for planning, constructing, and maintaining an interior plantscape.</li> <li>• Describe and apply principles of interior landscaping.</li> <li>• Unit test.</li> <li>• Performance activity</li> </ul>

## STANDARDS

### *Agriculture, Food, and Natural Resources (AFNR) Standards*

The following standards were adapted from the publication, *Career Cluster Resources for Agriculture, Food, and Natural Resources*. The complete text of this document can be found at <http://www.careerclusters.org/ClusterDocuments/agdocuments/AGFinal.pdf>.

- LEA 1 Use leadership skills in collaborating with others to accomplish organizational goals and objectives
- LEA 2 Use personal growth skills in collaborating with others to accomplish organizational goals and objectives
- ELR 2 Demonstrate workplace ethics specific to AFNR (Agriculture, Food, and Natural Resources) occupations.
- PLT 4 Exercise elements of design to enhance an environment (e.g., floral, forest, landscape, and farm).
- TET 1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.

### *Academic Standards*

- B4 Investigate the transfer of energy from the sun to living systems.
- E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
- E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
- E10 Use language and critical thinking strategies to serve as tools for learning.

### *21<sup>st</sup> Century Skills*

- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

## SUGGESTED REFERENCES

Floral Designers. Retrieved May 22, 2006, from <http://www.acinet.org/acinet/videos>

- Griner, C. P. (2002). *Floriculture: Designing & merchandising*. Albany, NY: Delmar.
- Handbook of flowers, foliage and creative design*. (2002). Clifton Park, NY: Delmar Learning.
- Rankin, D. (2002). *Floral Design* [Computer software]. Clifton Park, NY: Delmar.
- Reiley, H. E., & Shry, C. L. (1997). *Introductory horticulture* (5<sup>th</sup> ed.). Clifton Park, NY: Delmar.
- Schroeder, C. B., Seagle, E. D., Felton, L. M., Ruter, J. M., Kelley, W. T., & Krewer, G. (2004). *Introduction to horticulture* (4<sup>th</sup> ed.). Upper Saddle River, NJ: Prentice Hall.
- Virtual tour*. Retrieved May 22, 2006, from <http://www.plants-in-buildings.com/index.php>

**Custodian/Caretaker Services I**  
**Unit 9: Greenhouse Crops**

(22.5 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>1. Describe and apply principles of greenhouse crop production.</p> <ol style="list-style-type: none"> <li>Identify different types of greenhouse crops (bedding plants, vegetables, flowering plants, foliage plants, etc.) and common species of each type.</li> <li>Describe cultural considerations for greenhouse crops including fertilizer, water, growing medium, pest control, temperature, natural and chemical growth control and stimulation, and light control for common crops.</li> <li>Produce a greenhouse crop following accepted commercial practices. (ongoing throughout the year)</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Read and respond to Units 13-15, 23, and 25 of Reiley and Shry and complete the self-evaluation activity for each unit. <sup>E3, E4, E10</sup></li> <li>Using presentation media and specimens, identify common types and species of greenhouse crops commonly grown in Mississippi. <sup>E3</sup></li> <li>Identify and discuss with the students cultural considerations for a specific bedding plant, flowering plant, and foliage plants. <sup>A1, A2, A5, B2, B3, B4, B7, E3, E4, CS1</sup></li> <li>Divide students into groups and assign specific tasks to each group in regards to growing out a commercial greenhouse crop. Rotate the groups over the growing period, so that each group completes all tasks in regards to the growing of the crop. <sup>B2, B3, B4, B7, E2, E4, CS6</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Self-evaluation activities.</li> <li>Evaluation of student performance on tasks associated with growing out specific greenhouse crops using a rubric (see Appendix D) or checklist.</li> <li>Teacher-constructed test on types of greenhouse crops and cultural considerations in raising these crops.</li> </ul>

## STANDARDS

### *Agriculture, Food, and Natural Resources (AFNR) Standards*

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LEA 1 Use leadership skills in collaborating with others to accomplish organizational goals and objectives



- LEA 2 Use personal growth skills in collaborating with others to accomplish organizational goals and objectives
- ELR 2 Demonstrate workplace ethics specific to AFNR (Agriculture, Food, and Natural Resources) occupations.
- PLT 1 Apply principles of anatomy and physiology to produce and manage plants in both a domesticated and a natural environment.
- PLT 2 Address taxonomic or other classifications to explain basic plant anatomy and physiology.
- PLT 3 Apply fundamentals of production and harvesting to produce plants.
- PLT 4 Exercise elements of design to enhance an environment (e.g., floral, forest, landscape, and farm).
- TET 1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
- PWR 1 Apply physical science principles to engineering applications with mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
- PWR 3 Apply principles of service and repair to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
- TEC 1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.
- TEC 2 Use available power sources to plan and apply control systems.
- NRS 1 Recognize importance of resource and human interrelations to conduct management activities in natural habitats.
- NRS 2 Use effective venues to communicate natural phenomena to the public.
- NRS 3 Apply scientific principles to natural resources management activities.
- NRS 4 Employ knowledge of natural resource industries to describe production practices and processing procedures.
- NRS 5 Practice responsible conduct to protect natural resources.
- ENV 1 Use analysis procedures to plan and evaluate environmental service impacts.
- ENV 2 Identify public policies and regulations impacting environmental services to determine their effect on facility operation.
- ENV 3 Apply scientific principles to environmental services.
- ENV 4 Operate environmental service systems (e.g., pollution control, water treatment, wastewater treatment, solid waste management, and energy) to manage a facility environment.
- ENV 5 Use tools, equipment, machinery, and technology to accomplish tasks in environmental services.
- ABS 1 Employ leadership skills to accomplish goals and objectives in the Agriculture, Food, and Natural Resources business environment.
- ABS 2 Practice good recordkeeping to accomplish AFNR business objectives.
- ABS 3 Apply generally accepted accounting principles and skills to manage budget, credit, and optimal application of AFNR business assets.
- ABS 4 Employ AFNR industry concepts and practices to manage inventory.

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### *Related Academic Standards*

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- A1 Recognize, classify, and use real numbers and their properties.

- A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
- A5 Utilize various formulas in problem-solving situations.
- B2 Investigate the biochemical basis of life.
- B3 Investigate cell structures, functions, and methods of reproduction.
- B4 Investigate the transfer of energy from the sun to living systems.
- B7 Investigate the interdependence and interactions that occur within an ecosystem.
- E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
- E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
- E10 Use language and critical thinking strategies to serve as tools for learning.

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### 21<sup>st</sup> Century Skills

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- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

### SUGGESTED REFERENCES

- Biondo, R. J., & Noland, D. A. (2000). *Floriculture: From greenhouse production to floral design*. Upper Saddle River, NJ: Pearson Prentice Hall.
- Biondo, R. J. (2004). *Greenhouse production*. Upper Saddle River, NJ: Pearson Prentice Hall.
- Grower product news*. Des Plaines, IL: Scranton Gillette. Retrieved October 12, 2004, from <http://www.gpnmag.com/>
- Reiley, H. E., & Shry, C. L. (1997). *Introductory horticulture* (5<sup>th</sup> ed.). Clifton Park, NY: Delmar.

**Custodian/Caretaker Services I**  
**Unit 10: Olericulture (Vegetable) Production**

**(18 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>1. Describe and apply principles of olericulture production.</p> <ol style="list-style-type: none"> <li>Describe characteristics of common vegetables grown for commercial production including cultural requirements, direct seeding versus transplanting, plant growth style, and growing season; and distinguish between warm season and cool season crops.</li> <li>Identify and demonstrate the use of common tools and equipment used in gardening including tillers, spreaders, sprayers, watering devices, rakes, hoes, shovels, etc.</li> <li>Identify and describe factors to consider in preparing a seedbed including soil class and texture, use of soil amendments, and characteristics of a properly prepared seedbed.</li> <li>Develop a plan for an intensive culture garden including crop and variety selection, location and spacing of different crops, scheduling of crops, crop rotation, and harvesting and marketing of crops.</li> <li>Identify common garden pests including insects, diseases, and weeds, and methods of control.</li> <li>Discuss new and emerging technologies, trends, and issues concerning the production and marketing of vegetables in Mississippi. Identify and discuss the roles of agencies and organizations that regulate the production and marketing of vegetables.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Students individually list vegetables they commonly eat or see in the grocery store. As a class, create a bar graph to present the results of the whole class. From the list, select those which are grown in Mississippi. Ask them to distinguish between those which are true vegetables (roots, stems, and leaves) and those which are fruits or flowers (arise from the reproductive phase of plant growth). Chart and compare the nominal methods of production and culture among the vegetables listed. <sup>E2, E3, E4, E10, CS2, CS5, CS6</sup></li> <li>Read and respond to Unit 9 in Reiley and Shry and complete the self-evaluation. <sup>E3, E4, E10</sup></li> <li>Identify common tools used in horticulture operations and describe their uses in olericulture—explaining the crossover uses of tools common in the industry. <sup>E2, E4</sup></li> <li>Develop and draw a plan for a small garden for their area, including cultural practices already described. <sup>A1, A2, E1, E4, E5, E10, CS5, CS6</sup></li> <li>Use presentation media and specimens to identify common garden pests and describe different control methods. <sup>B7, E2, E4, E10</sup></li> <li>Use lecture and discussion to explore the significance of new technologies and equipment such as GPS, mechanical versus hand harvesting, new organic standards, and bio-pesticides. Here is a good place to put the role of the EPA in recent banning of some chemical pest controls, and the other federal agencies which regulate the levels of pesticides allowable in processed foods, etc. Have students do research and prepare a PowerPoint presentation on a agency or</li> </ul>

Competencies and Suggested Objectives	Suggested Strategies for Competencies
	<p>new technology affecting vegetable production or marketing, such as standards for organic produce; the role of genetically modified organisms (GMO's) in olericulture and their dangers and benefits; and the impact of NAFTA or the WTO in the import/export of vegetable crops. <sup>B7, E1, E2, E3, E4, E10, CS1, CS2, CS3, CS5, T1, T3, T5</sup></p> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>• Self-evaluation activity.</li> <li>• Teacher-made test.</li> <li>• Assessment of student performance (using a rubric) in developing a garden plan.</li> <li>• PowerPoint and presentation on new and emerging practices (checklist).</li> </ul>

## STANDARDS

### *Agriculture, Food, and Natural Resources (AFNR) Standards*

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- PLT 1 Apply principles of anatomy and physiology to produce and manage plants in both a domesticated and a natural environment.
- PLT 2 Address taxonomic or other classifications to explain basic plant anatomy and physiology.
- PLT 3 Apply fundamentals of production and harvesting to produce plants.
- TET 1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
- TEC 1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.

### *Academic Standards*

- A1 Recognize, classify, and use real numbers and their properties.
- A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
- A5 Utilize various formulas in problem-solving situations.
- B7 Investigate the interdependence and interactions that occur within an ecosystem.
- E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.

- E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
- E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
- E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
- E10 Use language and critical thinking strategies to serve as tools for learning.

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### *21<sup>st</sup> Century Skills*

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- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

### **SUGGESTED REFERENCES**

- American vegetable grower*. Willoughby, OH: Meister Media Worldwide. Retrieved October 13, 2004, from <http://www.vegetablegrower.com>
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## Custodian/Caretaker Services I

## Unit 11: Special Topics in Custodian/Caretaker Services I

(22.5 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>1. Investigate new and emerging technologies, practices, trends, and issues associated with Custodian/Caretaker Services CCS.</p> <p>a. Prepare a report on a new and emerging technology associated with CCS.</p> <p>b. Prepare a report on a current trend or issue associated with CCS.</p>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Investigate new and emerging technologies, practices, trends, and issues associated with CCS. <sup>CS1, CS2, CS3, CS4, CS5, T1, T3, T5</sup></li> <li>Research and prepare a PowerPoint presentation on new or emerging technology, trend, or issue associated with CCS. <sup>CS4, CS5, T1, T3, T4, T5</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Investigate new and emerging technologies, practices, trends, and issues associated with CCS.</li> <li>PowerPoint presentation.</li> </ul>
<p>2. Complete school-to-careers activities related to CCS.</p> <p>a. Participate in a school-to-careers activity (shadowing, mentoring, career fair, etc.) related to CCS.</p> <p>b. Investigate educational opportunities related to CCS at the postsecondary level.</p> <p>c. Describe national standards and certification/licensing procedures related to CCS.</p> <p>d. Describe the role of trade organizations, associations, and unions as related to CCS.</p>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Complete school-to-careers activities related to CCS by participating in a shadowing or mentoring experience, or a career fair. <sup>CS1, CS2, CS5, CS6</sup></li> <li>Have students investigate postsecondary educational opportunities at the community/junior college, four-year college, and apprenticeship level and create a recruitment PowerPoint or poster. <sup>T1, T3, T4, T5</sup></li> <li>Research the Institute of Inspection Cleaning and Restoration<sup>®</sup>, or Cleaning Management Institute<sup>®</sup>, or other national standards that apply to custodial services. <sup>CS1, CS2, CS4, T1, T3, T4, T5</sup></li> <li>Research trade associations, professional organizations, and unions associated with CCS and describe how their role affects employees. Choose one to feature in a membership drive advertisement. <sup>CS1, CS2, CS4, T1, T3, T4, T5</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Written reflection on school-to-careers activity.</li> <li>Recruitment PowerPoint or poster for postsecondary educational opportunities.</li> <li>Group discussion of national</li> </ul>

	<p>certification/licensure agencies.</p> <ul style="list-style-type: none"> <li>• Presentation of membership drive advertisement rubric (see Appendix D).</li> </ul>
<p>3. Demonstrate related academic skills and workplace skills associated with CCS.</p> <ol style="list-style-type: none"> <li>Complete a cooperative project (paper, presentation, or demonstration) associated with an academic subject and CCS.</li> <li>Practice human relations skills (team participation, client/customer service, leadership, negotiation, working with culturally diverse groups, etc.) related to CCS.</li> <li>Research work ethics and employer expectations of employees in CCS.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>• For academic integration, set up a lab requiring students to measure and mix cleaners/chemicals based on accurate ratios.</li> <li>• Using assigned work scenarios, role-play human relations skills such as team participation, client/customer service, negotiation, etc. related to CCS. <sup>CS1, CS2, CS5, CS6</sup></li> <li>• Research acceptable work ethics and determine employer expectations for persons employed in CCS by interviewing employers, supervisors, and employees from all different settings. <sup>CS1, CS2, CS5, CS6</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>• Measure and mixing lab rubric (see Appendix D).</li> <li>• Role-play rubric (see Appendix D).</li> <li>• Completed interview checklist and oral presentation rubric (see Appendix D).</li> </ul>
<p>4. Investigate the concepts of quality assurance as related to (CCS).</p> <ol style="list-style-type: none"> <li>Describe quality concepts and methods for measuring quality related to (CCS).</li> <li>Apply quality concepts in the (CCS) laboratory</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>• Research concept of quality assurance as related to CCS. <sup>CS4, T1, T3, T5</sup></li> <li>• Group discussion on concepts of quality assurance and the methods that can be used to measure quality and gauge quality improvement as related to CCS. <sup>E2, E3, CS1, CS2</sup></li> <li>• Have students apply quality concepts in the CCS by measuring the quality of their work and charting the increase in quality over time. <sup>CS2</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>• Portfolio of findings on quality assurance.</li> <li>• Test on quality concepts and methods for measuring quality.</li> <li>• Chart of quality in school laboratory or work experience.</li> </ul>

**STANDARDS***Academic Standards*

- A1 Recognize, classify, and use real numbers and their properties.
- A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
- A3 Simplify algebraic expressions, solve and graph equations, inequalities and systems in one and two variables.
- A4 Explore and communicate the characteristics and operations of polynomials.
- A5 Utilize various formulas in problem-solving situations.
- A6 Communicate using the language of algebra.
- A7 Interpret and apply slope as a rate of change.
- A8 Analyze data and apply concepts of probability.
- B1 Utilize critical thinking and scientific problem solving in designing and performing biological research and experimentation.
- B2 Investigate the biochemical basis of life.
- B3 Investigate cell structures, functions, and methods of reproduction.
- B4 Investigate the transfer of energy from the sun to living systems.
- B5 Investigate the principles, mechanisms, and methodology of classical and molecular genetics.
- B6 Investigate concepts of natural selection as they relate to diversity of life.
- B7 Investigate the interdependence and interactions that occur within an ecosystem.
- E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
- E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
- E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
- E6 Explore cultural contributions to the history of the English language and its literature.
- E7 Discover the power and effect of language by reading and listening to selections from various literary genres.
- E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
- E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
- E10 Use language and critical thinking strategies to serve as tools for learning.
- H1 Explain how geography, economics, and politics have influenced the historical development of the United States in the global community.
- H2 Describe the impact of science and technology on the historical development of the United States in the global community.



- H3 Describe the relationship of people, places, and environments through time.
- H4 Demonstrate the ability to use social studies tools (e.g., timelines, maps, globes, resources, graphs, a compass, technology, etc.).
- H5 Analyze the contributions of Americans to the ongoing democratic process to include civic responsibilities.

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### *21<sup>st</sup> Century Skills*

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- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

### **SUGGESTED REFERENCES**

- Chemicals*. Retrieved May 22, 2006, from <http://www.globalcleaningassociation.com>
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- Clean peers*. Retrieved January 10, 2006, from <http://www.cleanpeers.com/>
- Cleaning Management Institute. (2003). *Advanced custodial training*. Latham, NY: Cleaning Management Institute NTP Media.
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- Custodial technician training program*. Retrieved February 23, 2006, from <http://www.cminstitute.net>
- Professional carpet and upholstery cleaners association*. Retrieved January 10, 2006, from <http://www.pcuca.org>
- Soap and Detergent Association*. Retrieved January 10, 2006, from <http://www.sdahq.org/>.

## Custodian/Caretaker Services II

### Unit 1: Leadership, Careers, and Safety

(18 hours)

(Review and Reinforcement-Ongoing)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>1. Review program policies and procedures.</p> <p>a. Review program operation policies and procedures, including general safety procedures.</p>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Solicit responses from the students regarding their questions or uncertainties about CCS-related policies. Read and respond to the local school handbook. <sup>E1, E2, E3, E4, E9, E10</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Student sign-off sheet acknowledging discussion of school and program policies.</li> <li>Teacher-constructed test on policies and procedures.</li> </ul>
<p>2. Practice leadership skills.</p> <p>a. Identify and discuss fundamental parliamentary procedures for participating in a public meeting.</p> <p>b. Identify and discuss basic principles of public speaking.</p>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Identify and discuss with the students the basic rules of parliamentary procedure (making, seconding, and disposing of a main motion and announcing the results). Role play procedures in a mock meeting, taking turns serving as chair and members of the house. <sup>E2, E4, E9, E10, CS1, CS3</sup></li> <li>Invite a guest speaker from the local Toastmasters Club/Jr. NAD to present basic principles of public speaking/signing with the students to include parts of a speech, organizing and outlining a speech, and delivery. <sup>E2, E3, E4, E9, E10, CS6</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Role-play rubric (see Appendix D) or checklist.</li> <li>Reflective writing on what was learned from the guest speaker.</li> </ul>
<p>3. Complete school-to-careers activities related to CCS.</p> <p>a. Identify employment and career opportunities in the CCS industry.</p> <p>b. Investigate educational opportunities related to CCS at the postsecondary level.</p> <p>c. Describe national standards and certification/licensing procedures related to CCS.</p> <p>d. Describe the role of trade</p>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Research career opportunities at the local, state, and regional level. Research reported in a graphic organizer of the student's choice should include educational requirements, working conditions and salaries, advancement opportunities, skills required for entry, etc. <sup>E1, E2, E3, E4, E5, E9, E10</sup></li> <li>Invite representatives of CCS departments to speak to the class concerning postsecondary programs in CCS. <sup>E2</sup></li> </ul>

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>organizations, associations, and unions as related to CCS.</p>	<ul style="list-style-type: none"> <li>• Invite a representative of the CCS industry or certifying agency to speak to the class concerning certification and licensure procedures in the industry to develop career action plan. <sup>E2</sup></li> <li>• Have students research and summarize in writing information on the role of trade organizations, associations, and unions in the CCS industry to choose one to promote to the rest of the class. <sup>E1, E2, E3, E4, E5, E9, E10, CS1, CS2, CS6, T1, T4, T5</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>• Graphic organizer (chart, mind map, etc.).</li> <li>• Student participation in guest speaker presentations using a checklist and written reflection of what was learned.</li> <li>• Career action plan for a job in this industry to include goals and strategies.</li> <li>• Membership promotion poster or presentation.</li> </ul>
<p>4. Review safety rules and procedures for CCS.</p>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>• Using scenarios, review the safety rules, practices, and personal protective equipment items that are used in the CCS industry. <sup>E2, E3, E4</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>• Role play and test on safety rules and procedures.</li> <li>• Ongoing evaluation of student performance in following all safety rules and procedures.</li> </ul>

## STANDARDS

### *Agriculture, Food, and Natural Resources (AFNR) Standards*

The following standards were adapted from the publication, *Career Cluster Resources for Agriculture, Food, and Natural Resources*. The complete text of this document can be found at <http://www.careerclusters.org/ClusterDocuments/agdocuments/AGFinal.pdf>.

- LEA 1 Use leadership skills in collaborating with others to accomplish organizational goals and objectives
- LEA 2 Use personal growth skills in collaborating with others to accomplish organizational goals and objectives
- ELR 1 Know and understand the importance of professional ethics and legal responsibilities.

## Secondary Custodian Caretaker Services

- ELR 2 Demonstrate workplace ethics specific to AFNR (Agriculture, Food, and Natural Resources) occupations.
- TET 1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
- TEC 1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.
- ABS 1 Employ leadership skills to accomplish goals and objectives in the Agriculture, Food, and Natural Resources business environment.

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### *Academic Standards*

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- E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
- E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
- E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
- E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
- E10 Use language and critical thinking strategies to serve as tools for learning.

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### *21<sup>st</sup> Century Skills*

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- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

### **SUGGESTED REFERENCES**

Guiler, G. S., & Woodin, R. J. (1994). *Mastering parliamentary procedure*. Columbus, OH: Ohio Curriculum Materials Service.

Kimbrell, B., & Chambers, D. (2002). *Developing safety skills for the shop and home*. Winterville, GA: American Association for Vocational Instructional Materials.

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National Association of FFA. (2004). *Student handbook*. Indianapolis, IN: Author.

## Custodian/Caretaker Services II

### Unit 2: Plant Classification, Nursery and Landscape Plant Identification

(25.5 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>1. Apply systems of plant classification.</p> <ol style="list-style-type: none"> <li>a. Compare the different systems of plant classification according to life cycle (annual, biennial, and perennial); leaf cycle (evergreen and deciduous); and seed leaf number (monocot and dicot).</li> <li>b. Describe the use of the binomial system in classifying plants including common and scientific names.</li> <li>c. Demonstrate the use of the binomial system.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>• Use a K-W-L-R chart to determine students prior knowledge of plant classification and closure and reflection about what was learned.</li> <li>• Read and respond to Unit 2 in Reiley and Shry (“Plant Taxonomy: How Plants are Named”) by completing the self-evaluation at the end of the unit. Use a PowerPoint or overhead transparency presentation to define terms, systems, cycles, and seed leaf number. Use “Word Rounds” to reinforce the terms by forming two teams. Each team picks a representative to begin sitting in front of the board/screen facing classmates. Show a new term on the board/screen. Teams give up to three clues about the vocabulary word; representative tries to guess the vocabulary word. Correct answer the team goes again. Wrong answer, the other team has a chance to respond. Rotate representative after every word. <sup>B3, E1, E2, E3, E4, CS4, CS5</sup></li> <li>• Identify the use of binomial nomenclature and scientific names in classifying plants to the students. <sup>B1</sup></li> <li>• Research and create a leaf collection and classify the plants in that collection by scientific and common names. <sup>B1, B7, E3, E4, T1, T3, T4, T5</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>• KWLR Chart.</li> <li>• Self-evaluation activity.</li> <li>• Observation of Word Rounds.</li> <li>• Teacher-evaluation of leaf collection based on a checklist.</li> <li>• Teacher developed test on plant classification and identification.</li> </ul>
<p>2. Identify and describe the use of major plants associated with nursery and landscape operations.</p> <ol style="list-style-type: none"> <li>a. Identify and describe the use of major</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>• Use specimens, pictures, walking tours or field trips, and presentation media, to identify nursery and landscaping plants by</li> </ul>

<p>nursery plants including trees, shrubs, ground covers, vines, and ornamental grasses.</p> <p>b. Identify and describe the use of major flowering plants including annuals, biennials, and perennials.</p> <p>c. Identify and describe the use of major foliage plants used in nursery and landscape operations.</p>	<p>common and scientific name. <sup>B7</sup></p> <ul style="list-style-type: none"> <li>• Watch America’s Career InfoNet video <i>Nursery and Greenhouse Managers</i>. Write a journal/discussion response about what was learned and feelings about this career. <a href="http://www.acinet.org/acinet/videos_by_cluster.asp?id+27=nodeid=288cluster=1">http://www.acinet.org/acinet/videos_by_cluster.asp?id+27=nodeid=288cluster=1</a> <small>CS1, CS2</small></li> <li>• Have students compile a leaf collection of these plants showing common and scientific name and create a portfolio of each plant including its use and culture. <sup>B7, E1, E3, E4</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>• Leaf collections portfolio.</li> <li>• Journal/discussion response.</li> <li>• Teacher-made test on scientific and common names of plants, their identification and use.</li> </ul>
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## STANDARDS

### *Agriculture, Food, and Natural Resources (AFNR) Standards*

The following standards were adapted from the publication, *Career Cluster Resources for Agriculture, Food, and Natural Resources*. The complete text of this document can be found at <http://www.careerclusters.org/ClusterDocuments/agdocuments/AGFinal.pdf>.

- PLT 1 Apply principles of anatomy and physiology to produce and manage plants in both a domesticated and a natural environment.
- PLT 2 Address taxonomic or other classifications to explain basic plant anatomy and physiology.
- PLT 3 Apply fundamentals of production and harvesting to produce plants.
- PLT 4 Exercise elements of design to enhance an environment (e.g., floral, forest, landscape, and farm).
- TET 1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
- TEC 1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.

### *Academic Standards*

- B1 Utilize critical thinking and scientific problem solving in designing and performing biological research and experimentation.
- B3 Investigate cell structures, functions, and methods of reproduction.
- B7 Investigate the interdependence and interactions that occur within an ecosystem.

## Secondary Custodian Caretaker Services

- E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
- E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.

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### *21<sup>st</sup> Century Skills*

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- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

### **SUGGESTED REFERENCES**

Bridwell, F. M. (2003). *Landscape plants: Their identification, culture, and use*. Albany, NY: Delmar.

National FFA Organization. (2004). *Floriculture plant identification list*. Retrieved October 13, 2004, from [www.ffa.org/ageducators/documents/lpsguide/programs/cde/cde\\_handbook04.pdf](http://www.ffa.org/ageducators/documents/lpsguide/programs/cde/cde_handbook04.pdf)

National FFA Organization. (2004). *Nursery and landscape plant identification*. Retrieved October 12, 2004, from [www.ffa.org/ageducators/documents/lpsguide/programs/cde/cde\\_handbook04.pdf](http://www.ffa.org/ageducators/documents/lpsguide/programs/cde/cde_handbook04.pdf)

*Nursery and greenhouse managers*. Retrieved May 22, 2006 from [http://www.acinet.org/acinet/videos\\_by\\_cluster.asp?id+27=nodeid=288cluster=1](http://www.acinet.org/acinet/videos_by_cluster.asp?id+27=nodeid=288cluster=1)

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**Custodian/Caretaker Services II**  
**Unit 3: Landscape Maintenance**

(15 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>1. Describe and apply principles of landscape maintenance.</p> <ol style="list-style-type: none"> <li>Discuss skills required for year-round landscape maintenance.</li> <li>Identify and demonstrate the safe use of equipment and hand tools for landscape maintenance.</li> <li>Identify and discuss the proper procedures for pruning trees and shrubs.</li> <li>Determine and discuss fertilizer and pest control needs of trees, shrubs, and beds.</li> <li>Develop cost estimate for maintenance of trees, shrubs, and beds.</li> <li>Discuss maintenance of a landscape irrigation system.</li> <li>Describe elements of a contract and warranty agreement for landscape maintenance.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Invite a resource person from the landscape maintenance industry to speak to the class on year round maintenance and associated skills. <sup>E2, CS1, CS2, CS6</sup></li> <li>Watch the America's Career InfoNet videos <i>Landscape and Groundskeeping Workers</i> and <i>Lawn Maintenance Workers and Tree Trimmers and Pruners</i>.  <a href="http://www.acinet.org/acinet/videos_by_cluster.asp?id+27=nodeid=288cluster=1">http://www.acinet.org/acinet/videos_by_cluster.asp?id+27=nodeid=288cluster=1</a></li> <li>Write a journal response/discussion about what was learned and feelings about this career:</li> <li>Demonstrate the safe and proper use of landscape maintenance. Students complete a series of activities demonstrating the safe and proper use of these tools.</li> <li>Demonstrate procedures for pruning trees and shrubs with the students. Have students work in small groups to prune trees and shrubs. <sup>E2, E4</sup></li> <li>Review procedures for collecting soil samples and interpreting soil test results. Also review common landscape pests and their control. Have students complete hands-on lab to calculate fertilizer requirements and pest control practices for a given scenario. <sup>A1, A2, A5, E2, E3, E4</sup></li> <li>Demonstrate a cost estimate for landscape maintenance and identify key elements and practices. Complete a cost estimate of a given scenario. <sup>A1, A2, A5, E1, E2, E3, E4, CS1, CS2, CS5</sup></li> <li>Onsite of a commercial/domestic location discuss maintenance procedures for an irrigation system. <sup>E2, E4</sup></li> <li>Using examples of contracts and warranty agreements, have students identify and describe key elements and practices. Complete a sample contract and warranty agreement. <sup>A1, A2, A5, E1, E2, E3, E4, CS1, CS2</sup></li> </ul>

Competencies and Suggested Objectives	Suggested Strategies for Competencies
	<p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>• Safe and proper use of landscape maintenance tools using checklist.</li> <li>• Journal/discussion response.</li> <li>• Calculation lab results.</li> <li>• Cost estimate rubric (see Appendix D).</li> <li>• Contract and warranty agreement rubric (see Appendix D).</li> <li>• Teacher-constructed test on principles of landscape maintenance.</li> </ul>

## STANDARDS

### *Agriculture, Food, and Natural Resources (AFNR) Standards*

The following standards were adapted from the publication, *Career Cluster Resources for Agriculture, Food, and Natural Resources*. The complete text of this document can be found at <http://www.careerclusters.org/ClusterDocuments/agdocuments/AGFinal.pdf>.

- LEA 1 Use leadership skills in collaborating with others to accomplish organizational goals and objectives
- LEA 2 Use personal growth skills in collaborating with others to accomplish organizational goals and objectives
- ELR 2 Demonstrate workplace ethics specific to AFNR (Agriculture, Food, and Natural Resources) occupations.
- PLT 1 Apply principles of anatomy and physiology to produce and manage plants in both a domesticated and a natural environment.
- PLT 2 Address taxonomic or other classifications to explain basic plant anatomy and physiology.
- PLT 4 Exercise elements of design to enhance an environment (e.g., floral, forest, landscape, and farm).
- TET 1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
- PWR 1 Apply physical science principles to engineering applications with mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
- PWR 3 Apply principles of service and repair to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
- STR 3 Examine structural requirements to estimate project costs.
- STR 4 Develop skills required to use construction/fabrication equipment and tools.
- STR 5 Plan implement manage, and/or provide support services for facility design and construction, equipment design, manufacture, repair, and service; and agricultural technology.
- TEC 1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.
- TEC 2 Use available power sources to plan and apply control systems.

- NRS 1 Recognize importance of resource and human interrelations to conduct management activities in natural habitats.
- NRS 5 Practice responsible conduct to protect natural resources.
- ENV 1 Use analysis procedures to plan and evaluate environmental service impacts.
- ENV 2 Identify public policies and regulations impacting environmental services to determine their effect on facility operation.
- ENV 5 Use tools, equipment, machinery, and technology to accomplish tasks in environmental services.
- ABS 1 Employ leadership skills to accomplish goals and objectives in the Agriculture, Food, and Natural Resources business environment.
- ABS 2 Practice good recordkeeping to accomplish AFNR business objectives.
- ABS 3 Apply generally accepted accounting principles and skills to manage budget, credit, and optimal application of AFNR business assets.
- ABS 3 Employ AFNR industry concepts and practices to manage inventory.
- ABS 4 Utilize technology to accomplish AFNR business objectives.
- ABS 5 Use marketing and sales principles to accomplish an AFNR business objective.

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### *Academic Standards*

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- A1 Recognize, classify, and use real numbers and their properties.
- A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
- A5 Utilize various formulas in problem-solving situations.
- E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
- E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
- E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
- E10 Use language and critical thinking strategies to serve as tools for learning.

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### *21<sup>st</sup> Century Skills*

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- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

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**Custodian/Caretaker Services II**  
**Unit 4: Turfgrass Installation and Maintenance**

(15 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>1. Describe and apply principles of turfgrass installation.</p> <ol style="list-style-type: none"> <li>Describe factors to consider in selecting a turfgrass for a specific area.</li> <li>Identify varieties of turfgrass and describe their characteristics.</li> <li>Describe installation practices for different turfgrasses including site preparation and initial care.</li> <li>Develop a plan and cost estimate for establishing turf.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Read and respond to Unit 35 in Reiley and Shry and complete the self-evaluation activity. <sup>E1, E2, E3, E4</sup></li> <li>Tour the campus and local area. Identify common varieties of turfgrass and their characteristics. In a journal, note varieties of turfgrass and their characteristics, uses, and limitations. <sup>E2, E4</sup></li> <li>Take a picture of lawn at home or near home to identify turf using <i>Establish and Manage Your Home Lawn</i> from Mississippi State University Extension Service. Discuss installation for different turfgrasses commonly grown in Mississippi. <sup>E2, E3, E4</sup></li> <li>Develop a plan and cost estimate for establishing turf. <sup>A1, A2, A5, B7, E1, E2, E3, E4, CS1, CS2</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Self-evaluation activity.</li> <li>Observation and journal response to walking tour.</li> <li>Student plan and cost estimate rubric (see Appendix D).</li> <li>Identification of own turf.</li> <li>Teacher-constructed test on turfgrass identification and installation.</li> </ul>
<p>2. Describe and apply principles of turfgrass maintenance.</p> <ol style="list-style-type: none"> <li>Identify and demonstrate the safe use of equipment and tools used for turfgrass maintenance including mowers, dethatchers, aerators, etc.</li> <li>Mow turf to correct height for a specific grass.</li> <li>Identify common pests of turfgrass including insects, diseases, and weeds.</li> <li>Calibrate equipment and apply fertilizer to turf in correct proportions.</li> <li>Calibrate equipment and apply herbicides, pesticides, and other pest</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Demonstrate operation of power equipment (or field trip), stressing the safe use of the equipment and precautions to be followed. Allow students to operate equipment under close supervision if possible. <sup>E2, E3, E4</sup></li> <li>Demonstrate proper mowing height and techniques for different grasses. <sup>E2</sup></li> <li>Use a PowerPoint presentation to identify the most common insect, weed, and disease pests of turf; their symptoms; and their control. <sup>E2, E3,</sup></li> <li>Demonstrate calibration of a sprayer and spreader. Students recalibrate to</li> </ul>

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>control chemicals in correct proportions.</p> <p>f. Describe common irrigation methods for turfgrass.</p> <p>g. Perform repair/renovation practices including aeration and dethatching.</p> <p>h. Develop a plan/cost estimate for a turfgrass management program.</p>	<p>specifications based on scenario. <sup>A1, A2, A5, E2, E3 E4</sup></p> <ul style="list-style-type: none"> <li>• Class discussion and field trip to view different types of irrigation systems and equipment. <sup>E2</sup></li> <li>• Demonstrate turf repair and renovation procedures and equipment to students. Allow students to operate the equipment under close supervision if possible. If equipment is not available, take students on a field trip to let them see the equipment in operation. <sup>E2, E3, E4</sup></li> <li>• Provide students with a sample plan and a scenario where they have to develop a simple plan for turf management. <sup>B7, E1, E2, E3, E4</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>• Operate turf equipment checklist.</li> <li>• Recalibration of sprayer or spreader checklist.</li> <li>• Repair and renovate turf checklist.</li> <li>• Plan for turf management rubric (see Appendix D).</li> <li>• Written reflection of field trip or walking tour experiences.</li> <li>• Teacher-constructed test on principles and procedures for turfgrass management.</li> </ul>
<p>3. Demonstrate safe and proper maintenance of turf equipment.</p>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>• Demonstrate common maintenance procedures for power equipment to the students. <sup>E2, E3, E4</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>• Maintenance activities checklist.</li> </ul>

## STANDARDS

### *Agriculture, Food, and Natural Resources (AFNR) Standards*

The following standards were adapted from the publication, *Career Cluster Resources for Agriculture, Food, and Natural Resources*. The complete text of this document can be found at <http://www.careerclusters.org/ClusterDocuments/agdocuments/AGFinal.pdf>.

PLT 1 Apply principles of anatomy and physiology to produce and manage plants in both a domesticated and a natural environment.

- PLT 2 Address taxonomic or other classifications to explain basic plant anatomy and physiology.
- PLT 3 Apply fundamentals of production and harvesting to produce plants.
- PLT 4 Exercise elements of design to enhance an environment (e.g., floral, forest, landscape, and farm).
- PWR 1 Apply physical science principles to engineering applications with mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
- PWR 3 Apply principles of service and repair to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
- TEC 1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.

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### *Academic Standards*

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- A1 Recognize, classify, and use real numbers and their properties.
- A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
- A5 Utilize various formulas in problem-solving situations.
- B7 Investigate the interdependence and interactions that occur within an ecosystem.
- E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
- E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.

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### *21<sup>st</sup> Century Skills*

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- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

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Schroeder, C. B., Seagle, E. D., Felton, L. M., Ruter, J. M., Kelley, W. T., & Krewer, G. (2004). *Introduction to horticulture* (4<sup>th</sup> ed.). Upper Saddle River, NJ: Prentice Hall.

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**Custodian/Caretaker Services II**  
**Unit 5: Building Maintenance Safety**

(15 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>1. Describe job-site safety practices including the hazards, carelessness, safety equipment, safety regulations, and accident prevention.</p> <ol style="list-style-type: none"> <li>Recognize key words on product labels.</li> <li>Demonstrate how to use cleaning materials safely.</li> <li>Identify and demonstrate the ability to use tools and equipment safely.</li> <li>Identify and demonstrate the ability to use safety equipment properly.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Demonstrate using media/video job-site safety practices including the hazards, carelessness, safety equipment, safety regulations, and accident prevention for students to then role-play with a scenario.</li> <li>Watch the America's Career InfoNet video <i>Maintenance Workers and Outdoor Power Equipment and Other Small Engine Mechanics</i>. Write a journal response/class discussion about what was learned and feelings about this career.  <a href="http://www.acinet.org/acinet/videos_by_cluster.asp?id+27=nodeid=288cluster=1">http://www.acinet.org/acinet/videos_by_cluster.asp?id+27=nodeid=288cluster=1</a></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Safety role-play checklist.</li> <li>Journal response.</li> <li>Unit test.</li> </ul>

## STANDARDS

### Academic Standards

- A1 Recognize, classify, and use real numbers and their properties.
- A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
- A3 Simplify algebraic expressions, solve and graph equations, inequalities and systems in one and two variables.
- A4 Explore and communicate the characteristics and operations of polynomials.
- A5 Utilize various formulas in problem-solving situations.
- A6 Communicate using the language of algebra.
- A7 Interpret and apply slope as a rate of change.
- A8 Analyze data and apply concepts of probability.
- B1 Utilize critical thinking and scientific problem solving in designing and performing biological research and experimentation.
- B2 Investigate the biochemical basis of life.
- B3 Investigate cell structures, functions, and methods of reproduction.
- B4 Investigate the transfer of energy from the sun to living systems.
- B5 Investigate the principles, mechanisms, and methodology of classical and molecular genetics.
- B6 Investigate concepts of natural selection as they relate to diversity of life.
- B7 Investigate the interdependence and interactions that occur within an ecosystem.

- E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
- E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
- E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
- E6 Explore cultural contributions to the history of the English language and its literature.
- E7 Discover the power and effect of language by reading and listening to selections from various literary genres.
- E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
- E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
- E10 Use language and critical thinking strategies to serve as tools for learning.
- H1 Explain how geography, economics, and politics have influenced the historical development of the United States in the global community.
- H2 Describe the impact of science and technology on the historical development of the United States in the global community.
- H3 Describe the relationship of people, places, and environments through time.
- H4 Demonstrate the ability to use social studies tools (e.g., timelines, maps, globes, resources, graphs, a compass, technology, etc.).
- H5 Analyze the contributions of Americans to the ongoing democratic process to include civic responsibilities.

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### *21<sup>st</sup> Century Skills*

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- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

### **SUGGESTED REFERENCES**

Building maintenance checklist. Retrieved January 19, 2006, from

<http://www.epa.gov/iaq/schools/tfs/building.html>

*Maintenance workers and outdoor power equipment and other small engine mechanics.*

Retrieved May 22, 2006, from

[http://www.acinet.org/acinet/videos\\_by\\_cluster.asp?id+27=nodeid=288cluster=7](http://www.acinet.org/acinet/videos_by_cluster.asp?id+27=nodeid=288cluster=7)

**Custodian/Caretaker Services II**  
**Unit 6: Hard Surface Floor Care**

**(37.5 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>1. Demonstrate hard surface floor care in commercial or residential areas including sweeping, stain removal, scrubbing, mopping vinyl, brick, wood, stone, and tile.</p> <ol style="list-style-type: none"> <li>Identify proper tools and equipment needed for hard surface floor care.</li> <li>Demonstrate the proper use of tools and equipment used in caring for a hard surface floor.</li> <li>Identify supplies needed for hard surface floor care.</li> <li>Demonstrate the proper use of supplies needed for hard surface floor care.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Explore hard floor cleaning tips using a web quest at <a href="http://www.parish-supply.com">http://www.parish-supply.com</a> including stripping, finishing, buffing, and mopping and <a href="http://www.mrsCLEANNW.com/house-cleaning-tips.html">http://www.mrsCLEANNW.com/house-cleaning-tips.html</a> for cleaning tips on different surfaces. <sup>T1,T3,T5</sup></li> <li>Demonstrate hard surface floor care tools, equipment, supplies and techniques in commercial or residential areas.</li> <li>Complete a lab that includes selecting proper tools, equipment, supplies, and techniques in commercial or residential areas and sweeping, removing stains, scrubbing, and mopping floors including vinyl, brick, wood, stone, and tile. <sup>CS5, CS6</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Web quest.</li> <li>Lab checklist.</li> <li>Unit test.</li> </ul>
<p>2. Demonstrate procedures for stripping, sealing, waxing, and buffing hard surface floors including wood, vinyl, brick, stone, and tile.</p> <ol style="list-style-type: none"> <li>Demonstrate the procedure for stripping floors.</li> <li>Demonstrate the procedure for sealing floors.</li> <li>Demonstrate the procedure for waxing and buffing floors.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Demonstrate procedures for stripping, sealing, waxing, and buffing hard surface floors including wood, vinyl, brick, stone, and tile.</li> <li>Complete a lab that includes stripping, sealing, waxing, and buffing hard surface floors including wood, vinyl, brick, stone, and tile.</li> <li>Research American Cleaning Solutions <a href="http://www.cleaning-solutions.com/helpful.htm">http://www.cleaning-solutions.com/helpful.htm</a> to chart common floor problems and solutions. <sup>T1,T3,T5</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Lab checklist.</li> <li>Troubleshooting Chart.</li> <li>Unit test.</li> </ul>

## STANDARDS

### *Academic Standards*

- A1 Recognize, classify, and use real numbers and their properties.
- A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
- A3 Simplify algebraic expressions, solve and graph equations, inequalities and systems in one and two variables.
- A4 Explore and communicate the characteristics and operations of polynomials.
- A5 Utilize various formulas in problem-solving situations.
- A6 Communicate using the language of algebra.
- A7 Interpret and apply slope as a rate of change.
- A8 Analyze data and apply concepts of probability.
- B1 Utilize critical thinking and scientific problem solving in designing and performing biological research and experimentation.
- B2 Investigate the biochemical basis of life.
- B3 Investigate cell structures, functions, and methods of reproduction.
- B4 Investigate the transfer of energy from the sun to living systems.
- B5 Investigate the principles, mechanisms, and methodology of classical and molecular genetics.
- B6 Investigate concepts of natural selection as they relate to diversity of life.
- B7 Investigate the interdependence and interactions that occur within an ecosystem.
- E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
- E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
- E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
- E6 Explore cultural contributions to the history of the English language and its literature.
- E7 Discover the power and effect of language by reading and listening to selections from various literary genres.
- E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
- E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
- E10 Use language and critical thinking strategies to serve as tools for learning.
- H1 Explain how geography, economics, and politics have influenced the historical development of the United States in the global community.
- H2 Describe the impact of science and technology on the historical development of the United States in the global community.

- H3 Describe the relationship of people, places, and environments through time.
- H4 Demonstrate the ability to use social studies tools (e.g., timelines, maps, globes, resources, graphs, a compass, technology, etc.).
- H5 Analyze the contributions of Americans to the ongoing democratic process to include civic responsibilities.

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### *21<sup>st</sup> Century Skills*

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- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

### **SUGGESTED REFERENCES**

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**Custodian/Caretaker Services II**  
**Unit 7: Carpet and Upholstery Care**

(30 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>1. Demonstrate carpet and upholstery care in commercial and residential areas.</p> <ol style="list-style-type: none"> <li>Identify proper tools and equipment needed for carpet and upholstery care.</li> <li>Demonstrate the proper use of tools and equipment used in caring for a carpeted or upholstered area.</li> <li>Identify supplies needed for carpet and upholstery care.</li> <li>Demonstrate the proper use of supplies needed for carpet or upholstery care.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Using swatches, identify a variety of different types of carpets and upholsteries.</li> <li>Complete a lab demonstrating carpet and upholstery care in commercial and residential areas using appropriate tools, supplies, and methods.</li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Lab checklist.</li> <li>Unit test.</li> </ul>
<p>2. Demonstrate procedures for removing stains, vacuuming, dry cleaning, and steam cleaning of carpet and upholstery including oriental rugs, wool carpets, natural fibers, and synthetic fiber carpets.</p> <ol style="list-style-type: none"> <li>Identify care of various types of carpet and upholstery fabrics.</li> <li>Demonstrate the ability to remove stains from carpet and upholstery.</li> <li>Demonstrate how to vacuum carpet and upholstery.</li> <li>Demonstrate the ability to clean carpet and upholstery using dry foam shampoo.</li> <li>Demonstrate the ability to clean carpet and upholstery using a steam cleaning process.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Demonstrate procedures for removing stains, vacuuming, dry cleaning, and steam cleaning of carpet and upholstery including oriental rugs, wool carpets, natural fibers, and synthetic fiber carpets.</li> <li>Review the <i>Carpet and Rug Institute's Carpet Maintenance Guidelines</i> to determine methods for cleaning carpets and area rugs. Students assigned an individual scenario will research and determine the method, technique, and supplies needed for that situation to demonstrate. <sup>T1, T3, T5</sup></li> <li>Interview a local carpet cleaner such as ServPro. <sup>CS1, CS2, CS6</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Scenario demonstration.</li> <li>Interview checklist.</li> <li>Unit test.</li> </ul>

## STANDARDS

### Academic Standards

- A1 Recognize, classify, and use real numbers and their properties.
- A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
- A3 Simplify algebraic expressions, solve and graph equations, inequalities and systems in one and two variables.

## Secondary Custodian Caretaker Services

- A4 Explore and communicate the characteristics and operations of polynomials.
- A5 Utilize various formulas in problem-solving situations.
- A6 Communicate using the language of algebra.
- A7 Interpret and apply slope as a rate of change.
- A8 Analyze data and apply concepts of probability.
- B1 Utilize critical thinking and scientific problem solving in designing and performing biological research and experimentation.
- B2 Investigate the biochemical basis of life.
- B3 Investigate cell structures, functions, and methods of reproduction.
- B4 Investigate the transfer of energy from the sun to living systems.
- B5 Investigate the principles, mechanisms, and methodology of classical and molecular genetics.
- B6 Investigate concepts of natural selection as they relate to diversity of life.
- B7 Investigate the interdependence and interactions that occur within an ecosystem.
- E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
- E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
- E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
- E6 Explore cultural contributions to the history of the English language and its literature.
- E7 Discover the power and effect of language by reading and listening to selections from various literary genres.
- E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
- E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
- E10 Use language and critical thinking strategies to serve as tools for learning.
- H1 Explain how geography, economics, and politics have influenced the historical development of the United States in the global community.
- H2 Describe the impact of science and technology on the historical development of the United States in the global community.
- H3 Describe the relationship of people, places, and environments through time.
- H4 Demonstrate the ability to use social studies tools (e.g., timelines, maps, globes, resources, graphs, a compass, technology, etc.).
- H5 Analyze the contributions of Americans to the ongoing democratic process to include civic responsibilities.

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### *21<sup>st</sup> Century Skills*

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- CS1 Global Awareness

- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

## SUGGESTED REFERENCES

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**Custodian/Caretaker Services II**  
**Unit 8: Residential/Commercial Bathroom Care**

(37.5 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
<p>1. Demonstrate residential/commercial bathroom cleaning procedures.</p> <ol style="list-style-type: none"> <li>Identify tools and equipment needed for cleaning residential or commercial bathrooms.</li> <li>Demonstrate how to use proper tools and equipment for cleaning residential or commercial bathrooms.</li> <li>Identify supplies needed to clean a residential/commercial bathroom.</li> <li>Demonstrate how to properly use supplies to clean a residential/commercial bathroom.</li> <li>Demonstrate the proper procedure(s) for sanitizing all surfaces in a residential/commercial bathroom.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Based on their prior knowledge, students will develop standards for restroom floors, windows/sills, lavatories, urinals, toilets, wall/accessories, sanitary receptacles, ceilings, trash receptacles, and periodic cleaning. Compare/contrast their original standards to <i>Custodial Standards of Brevard County School District</i> or other published standards.<sup>CS5</sup></li> <li>Using a custodial checklist, students will audit a facility on campus and make necessary recommendations.<sup>CS5</sup></li> <li>Complete a residential/commercial bathroom cleaning procedures lab.</li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Standards compare/contrast activity.</li> <li>Audit with recommendations.</li> <li>Lab checklist.</li> <li>Unit test.</li> </ul>

## STANDARDS

### Academic Standards

- A1 Recognize, classify, and use real numbers and their properties.
- A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
- A3 Simplify algebraic expressions, solve and graph equations, inequalities and systems in one and two variables.
- A4 Explore and communicate the characteristics and operations of polynomials.
- A5 Utilize various formulas in problem-solving situations.
- A6 Communicate using the language of algebra.
- A7 Interpret and apply slope as a rate of change.
- A8 Analyze data and apply concepts of probability.
- B1 Utilize critical thinking and scientific problem solving in designing and performing biological research and experimentation.
- B2 Investigate the biochemical basis of life.
- B3 Investigate cell structures, functions, and methods of reproduction.
- B4 Investigate the transfer of energy from the sun to living systems.
- B5 Investigate the principles, mechanisms, and methodology of classical and molecular genetics.

- B6 Investigate concepts of natural selection as they relate to diversity of life.
- B7 Investigate the interdependence and interactions that occur within an ecosystem.
- E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
- E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
- E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
- E6 Explore cultural contributions to the history of the English language and its literature.
- E7 Discover the power and effect of language by reading and listening to selections from various literary genres.
- E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
- E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
- E10 Use language and critical thinking strategies to serve as tools for learning.
- H1 Explain how geography, economics, and politics have influenced the historical development of the United States in the global community.
- H2 Describe the impact of science and technology on the historical development of the United States in the global community.
- H3 Describe the relationship of people, places, and environments through time.
- H4 Demonstrate the ability to use social studies tools (e.g., timelines, maps, globes, resources, graphs, a compass, technology, etc.).
- H5 Analyze the contributions of Americans to the ongoing democratic process to include civic responsibilities.

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### *21<sup>st</sup> Century Skills*

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- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

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**Custodian/Caretaker Services II****Unit 9: Special Topics in Custodian/Caretaker Services II****(22.5 hours)**

(NOTE: Competencies and suggested objectives in this unit should be integrated into other instructional units throughout the year. This unit is designated as ongoing and is repeated in both years of the program; however, students should be expected to continually observe and report on current topics.)

<b>Competencies and Suggested Objectives</b>	<b>Suggested Strategies for Competencies</b>
<p>1. Investigate new and emerging technologies, practices, trends, and issues associated with CCS.</p> <ol style="list-style-type: none"> <li>Prepare a report on a new and emerging technology associated with CCS.</li> <li>Prepare a report on a current trend or issue associated with CCS.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Investigate new and emerging technologies, practices, trends, and issues associated with CCS. <sup>CS1, CS2, CS4, CS5, T1, T3, T4, T5</sup></li> <li>Research and prepare a PowerPoint presentation on new or emerging technology, trend, or issue associated with CCS. <sup>CS4, T1, T3, T4, T5</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Investigate new and emerging technologies, practices, trends, and issues associated with CCS.</li> <li>PowerPoint presentation.</li> </ul>
<p>2. Complete school-to-careers activities related to CCS.</p> <ol style="list-style-type: none"> <li>Participate in a school-to-careers activity (shadowing, mentoring, career fair, etc.) related to CCS.</li> <li>Investigate educational opportunities related to CCS at the postsecondary level.</li> <li>Describe national standards and certification/licensing procedures related to CCS.</li> <li>Describe the role of trade organizations, associations, and unions as related to CCS.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>Complete school-to-careers activities related to CCS by participating in a shadowing or mentoring experience, or a career fair. <sup>CS1, CS2, CS4, CS5, CS6</sup></li> <li>Have students investigate postsecondary educational opportunities at the community/junior college, four-year college, and apprenticeship level and create a recruitment PowerPoint or poster.</li> <li>Research the Institute of Inspection Cleaning and Restoration® or other national standards that apply to custodial services.</li> <li>Research trade associations, professional organizations, and unions associated with CCS and describe how their role affects employees. Choose one to feature in a membership drive advertisement.</li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>Written reflection/discussion on school-to-careers activity.</li> </ul>

	<ul style="list-style-type: none"> <li>• Recruitment PowerPoint or poster for postsecondary educational opportunities.</li> <li>• Group discussion of national certification/licensure agencies.</li> <li>• Presentation of membership drive advertisement rubric (see Appendix D).</li> </ul>
<p>3. Demonstrate related academic skills and workplace skills associated with CCS.</p> <ol style="list-style-type: none"> <li>a. Complete a cooperative project (paper, presentation, or demonstration) associated with an academic subject and CCS.</li> <li>b. Practice human relations skills (team participation, client/customer service, leadership, negotiation, working with culturally diverse groups, etc.) related to CCS.</li> <li>c. Research work ethics and employer expectations of employees in CCS.</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>• For academic integration, set up a lab requiring students to measure and mix cleaners/chemicals based on accurate ratios.</li> <li>• Using assigned work scenarios, role-play human relations skills such as team participation, client/customer service, negotiation, etc. related to CCS. <sup>E2, E4, CS4</sup></li> <li>• Research acceptable work ethics and determine employer expectations for persons employed in CCS by interviewing employers, supervisors, and employees from all different settings. <sup>E3, CS2, CS4</sup></li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>• Measure and mixing lab rubric (see Appendix D).</li> <li>• Role-play rubric (see Appendix D).</li> <li>• Completed interview checklist and oral presentation rubric (see Appendix D).</li> </ul>
<p>4. Investigate the concepts of quality assurance as related to CCS.</p> <ol style="list-style-type: none"> <li>a. Describe quality concepts and methods for measuring quality related to CCS.</li> <li>b. Apply quality concepts in the CCS laboratory</li> </ol>	<p><b>Teaching:</b></p> <ul style="list-style-type: none"> <li>• Research concept of quality assurance as related to CCS. <sup>T5</sup></li> <li>• Group discussion on concepts of quality assurance and the methods that can be used to measure quality and gauge quality improvement as related to CCS.</li> <li>• Have students apply quality concepts in the CCS by measuring the quality of their work and charting the increase in quality over time.</li> </ul> <p><b>Assessment:</b></p> <ul style="list-style-type: none"> <li>• Portfolio of findings on quality assurance.</li> <li>• Test on quality concepts and methods for measuring quality.</li> <li>• Chart of quality in school laboratory or work experience.</li> </ul>

## STANDARDS

### *Academic Standards*

- A1 Recognize, classify, and use real numbers and their properties.
- A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
- A3 Simplify algebraic expressions, solve and graph equations, inequalities and systems in one and two variables.
- A4 Explore and communicate the characteristics and operations of polynomials.
- A5 Utilize various formulas in problem-solving situations.
- A6 Communicate using the language of algebra.
- A7 Interpret and apply slope as a rate of change.
- A8 Analyze data and apply concepts of probability.
- B1 Utilize critical thinking and scientific problem solving in designing and performing biological research and experimentation.
- B2 Investigate the biochemical basis of life.
- B3 Investigate cell structures, functions, and methods of reproduction.
- B4 Investigate the transfer of energy from the sun to living systems.
- B5 Investigate the principles, mechanisms, and methodology of classical and molecular genetics.
- B6 Investigate concepts of natural selection as they relate to diversity of life.
- B7 Investigate the interdependence and interactions that occur within an ecosystem.
- E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
- E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
- E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
- E6 Explore cultural contributions to the history of the English language and its literature.
- E7 Discover the power and effect of language by reading and listening to selections from various literary genres.
- E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
- E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
- E10 Use language and critical thinking strategies to serve as tools for learning.
- H1 Explain how geography, economics, and politics have influenced the historical development of the United States in the global community.
- H2 Describe the impact of science and technology on the historical development of the United States in the global community.

- H3 Describe the relationship of people, places, and environments through time.
- H4 Demonstrate the ability to use social studies tools (e.g., timelines, maps, globes, resources, graphs, a compass, technology, etc.).
- H5 Analyze the contributions of Americans to the ongoing democratic process to include civic responsibilities.

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### *21<sup>st</sup> Century Skills*

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- CS1 Global Awareness
- CS2 Financial, Economic, and Business Literacy
- CS3 Civic Literacy
- CS4 Information and Communication Skills
- CS5 Thinking and Problem-Solving Skills
- CS6 Interpersonal and Self-Directional Skills

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*Professional Carpet and Upholstery Cleaners Association*. Retrieved January 10, 2006, from <http://www.pcuca.org>

*Soap and Detergent Association*. Retrieved January 10, 2006, from <http://www.sdahq.org/>

## Recommended Tools and Equipment

### CAPITALIZED ITEMS

1. Greenhouse (minimum size 30' x 100') with, heating, and ventilation systems (2 per program recommended)
2. Lathe house (minimum size 50' by 40') (1 per program)
3. Floral cooler (1 per program)
4. Rotary mower (1 per program)
5. Carpet shampoo/steam cleaner (1 per program)
6. Chemical storage cabinet (1 per program)

### NON-CAPITALIZED ITEMS

1. First aid kit (1 per program)
2. Fire extinguisher - ABC (1 per program)
3. pH meter (1 per program)
4. Soil sterilizer (1 per program)
5. Soil test kit (1 per program)
6. Soil salinity meter (1 per program)
7. Soil probe (1 per program)
8. Potting bench (1 per program)
9. Misting system with timer (1 per program)
10. Day/night timer (1 per program)
11. Greenhouse benches (1 per program)
12. Heating pads or cables for hotbed (1 per program)
13. Shade cloth for greenhouse (1 per program)
14. Emergency backup heater (1 per program)
15. Water hoses with racks or reels (1 per program)
16. Watering nozzles and breakers (1 per program)
17. "Hose-on" sprayer (1 per program)
18. Buckets (assorted sizes)
19. Wheelbarrow (1 per program)
20. Greenhouse cart (1 per program)
21. Flat carrier (1 per program)
22. Trash cans (metal)
23. Sink with running water (1 per program)
24. Hedge shears (1 per program)
25. Lopping shears (1 per program)
26. Hand pruners (1 per program)
27. Pole pruners (1 per program)
28. Hand trowel (1 per program)
29. Grafting knife (1 per program)
30. Germination chamber/seed incubator (1 per program)
31. Plant mobile with fluorescent light (1 per program)
32. Pruning saw (1 per program)



33. Hand pump pressure sprayer (1 per program)
34. Respirator (1 per program)
35. Power-operated pressure sprayer (1 per program)
36. Power-operated pressure washer (1 per program)
37. Face mask (1 per student)
38. Safety gloves (1 pair per student)
39. Protective suit (1 per program)
40. Sanitizing cabinet with safety goggles/glasses (1 pair per student)
41. Floral shears (1 per program)
42. Ribbon shears (1 per program)
43. Glue gun (1 per program)
44. Wire cutters (1 per program)
45. Glue pan (1 per program)
46. Small hand tool set (including pliers, channel lock pliers, screwdrivers, small wrenches, pipe wrench, sockets, etc.) (1 per program)
47. Hoe (1 per program)
48. Garden rake (1 per program)
49. Leaf rake (1 per program)
50. Pitchfork (1 per program)
51. Pick (1 per program)
52. Potato fork (1 per program)
53. Scuffle hoe (1 per program)
54. Round point shovel (1 per program)
55. Square point shovel (1 per program)
56. Axe (1 per program)
57. Kaiser blade (1 per program)
58. Sledge hammer (1 per program)
59. Hammers, claw and ball peen (1 per program)
60. Posthole digger (1 per program)
61. Fertilizer spreader (1 per program)
62. Files (1 per program)
63. Bench grinder (1 per program)
64. Power drill (1 per program)
65. 7½" hand held circular saw (1 per program)
66. Measuring tape (1 per program)
67. Extension cord (1 per program)
68. Light meter (1 per program)
69. Hand misters (1 per program)
70. Measuring cups and spoons (1 set per program)
71. Water pool with recirculation pump (1 per program)
72. Calculator (1 per program)
73. Filing cabinet (1 per program)
74. Soil temperature meter (1 per program)
75. High/low registering thermometer (1 per program)
76. Mulching machine/shredder (1 per program)
77. String trimmer (1 per program)

78. Lawn edger (1 per program)
79. Hedge trimmer (1 per program)
80. Lawn blower (1 per program)
81. Soil plugger (1 per program)
82. Bulb planter (1 per program)
83. Aerator (1 per program)
84. Dethatcher (1 per program)
85. Roller (1 per program)
86. Dust pan (1 per program)
87. Dust mop (1 per program)
88. Push broom (1 per program)
89. Rags (1 lb. bag)
90. Vacuum, upright (1 per program)
91. Mop bucket on casters with wringer (1 per program)
92. Mop, wet (16, 24, 32 oz.) (1 per program)
93. Sponges
94. Garbage can (1 per program)
95. Pail (bucket)(1 per program)
96. Toilet bowl mop (1 per program)
97. Scrubber/buffer machine (1 per program)
98. Putty knife (1 per program)
99. Scrub brushes
100. Steel wools
101. Front tine tiller (1 per program)
102. Rear tine tiller (1 per program)
103. Vacuum, wet/dry (1 per program)
104. Ladder, step, 6' and 10' (1 per program)
105. Squeegee, window (1 per program)
106. Squeegee, floor (1 per program)
107. Broom, corn (1 per program)
108. Hand duster (1 per program)
109. Oil can (1 per program)
110. Flashlight (1 per program)
111. Paint brushes (assorted sizes)
112. Ladders, extension, 20' (1 per program)
113. Service cart, hand truck (1 per program)
114. Mop cart (1 per program)
115. Trouble light (1 per program)
116. Hacksaw (1 per program)
117. Pliers, side cutter (1 per program)
118. File, flat mill (1 per program)
119. Drill, hand (1 per program)
120. Augers, drain (1 per program)
121. Applicator, lambs wool (1 per program)
122. Saws, carpenter (crosscut) (1 per program)
123. Aluminum wand, window (1 per program)

124. Rodent traps (1 dozen per program)
125. Vacuum, portable backpack type (1 per program)
126. Chisel mallet (1 per program)

#### RECOMMENDED INSTRUCTIONAL AIDS

It is recommended that instructors have access to the following items:

1. 35 mm slide projector (1 per program)
2. 35 mm SLR camera with macro lens (1 per program)
3. Projection screen (1 per program)
4. Video out (Microcomputer to TV monitor) (1 per program)
5. Overhead projector (1 per program)
6. Video camcorder (1 per program)
7. VCR (1 per program)
8. TV monitor (1 per program)
9. Compound video camera with microscope adapter (1 per program)
10. Plant growth models (1 per program)
11. Plant identification kit (slides or CD-ROM software) (1 per program)
12. Plant disease identification kit (slides or CD-ROM software) (1 per program)
13. Insect identification kit (slides or CD-ROM software) (1 per program)
14. Cart, AV (1 per program)
15. Microcomputer with CD-ROM, SVGA graphics, and modem (1 per 4 students)

#### REQUIRES ACCESS TO:

1. Washer, clothes
2. Dryer, clothes

## ASSESSMENT

### BLUEPRINT

#### **Certificate**

This program will be assessed using teacher-made assessments.

## Appendix A: Proposed Standards for Mississippi Agriculture Education Programs<sup>1</sup>

The following standards were adapted from the publication, *Career Cluster Resources for Agriculture, Food, and Natural Resources*. Each standard represents a pathway knowledge and skill statement as listed in this document. Standards are clustered by career pathway. The complete text of this document can be found at

<http://www.careerclusters.org/ClusterDocuments/agdocuments/AGFinal.pdf>.

### LEADERSHIP (LEA)

- LEA1 Use leadership skills in collaborating with others to accomplish organizational goals and objectives.
- Embrace empowerment, risk, communication, focusing on results, decision-making, problem-solving, investment in individuals, and resource use and access to develop premier leadership.
  - Embrace compassion, service, listening, coaching, developing others, team development, and understanding and appreciating others to develop premier leadership.
  - Embrace enthusiasm, creativity, the future, conviction, mission, courage, concept, focus, principles, and change to develop premier leadership.
  - Embrace integrity, courage, values, ethics, humility, perseverance, self-discipline, and responsibility to develop premier leadership.
  - Include self, community, diversity, environment, global awareness, and knowledge to develop premier leadership.
  - Embrace innovation, intuition, adaptation, life-long learning, and coachability to develop premier leadership.
- LEA2 Use personal growth skills in collaborating with others to accomplish organizational goals and objectives.
- Embrace attitude, exercise, goal-setting, planning, self-discipline, sense of balance, persistence, and respect to develop personal growth.
  - Embrace friendship, integrity, morals, values, etiquette, citizenship, cross-cultural awareness, acceptance/change, and respect for differences to develop personal growth.
  - Embrace goal setting, planning, decision-making, principles, respect, attitude, dependability, loyalty, trustworthiness, and communication to develop personal growth.
  - Embrace learning, critical thinking, reasoning, creative thinking, attitude, dependability, decision-making, and problem-solving to develop personal growth.
  - Embrace attitude, self-discovery, coping, friendship, self-reliance, sense of balance, empathy, compassion, and integrity to develop personal growth.

<sup>1</sup> *Career cluster resources for agriculture, food, and natural resources*. (n.d.). Retrieved October 20, 2004, from <http://www.careerclusters.org/ClusterDocuments/agdocuments/AGFinal.pdf>

- f. Embrace ethics, coping, courage, attitude, self-image/worth, values, principles, and sense of balance to develop personal growth.

#### ETHICS AND LEGAL RESPONSIBILITIES (ELR)

- ELR1 Know and understand the importance of professional ethics and legal responsibilities.
  - a. Apply knowledge of professional and workplace ethics and legal responsibilities to organize guidelines for workplace conduct.
  - b. Apply ethical and legal reasoning to workplace situations.
  - c. Review appropriate resources to identify national and international rules associated with a desired career.
  - d. Identify what ethical issues and concerns affect a desired career field to assist in making career decisions.
- ELR2 Demonstrate workplace ethics specific to Agriculture, Food, and Natural Resources (AFNR) occupations.
  - a. Evidence interest and concern to demonstrate natural resource stewardship and ethics.
  - b. Exercise personal habits and actions to demonstrate workplace ethics.

#### FOOD PRODUCTS AND PROCESSING SYSTEMS (FPP)

- FPP1 Apply principles of food processing to maintain equipment and facilities.
  - a. Develop management plans to maintain equipment and facilities.
  - b. Interpret and follow, develop, and implement Hazardous Critical Control Point (HACCP) procedures to establish operating parameters.
- FPP2 Apply principles of food science to the food industry.
  - a. Apply food science principles to enhance product development.
- FPP3 Plan, implement, manage, and/or provide services for the preservation and packaging of food and food products.
  - a. Analyze product preparation options to prepare products for distribution.
  - b. Compare and select food preservation methods to develop food preservation programs.
- FPP4 Identify processing, handling, and storage factors to show how they impact product quality and safety.
  - a. Develop a “quality factors program” to comply with local, national, and governmental, and international standards.
  - b. Develop slaughter/inspection techniques to process foods and analyze food product options.

#### PLANT SYSTEMS (PLT)

- PLT1 Apply principles of anatomy and physiology to produce and manage plants in both a domesticated and a natural environment.
  - a. Analyze and evaluate nutritional requirements and environmental conditions to develop and implement a fertilization plan.

- b. Test appropriate materials or examine data to evaluate and manage soil/media nutrients.
  - c. Explain and use basic methods for reproducing and propagating plants.
  - d. Develop and use a plan for integrated pest management.
- PLT2 Address taxonomic or other classifications to explain basic plant anatomy and physiology.
- a. Examine unique plant properties to identify/describe functional differences in plant structures including roots, stems, flowers, leaves, and fruit.
  - b. Classify plants on physiology for taxonomic or other classifications.
- PLT3 Apply fundamentals of production and harvesting to produce plants.
- a. Apply fundamentals of plant management to develop a production plan.
  - b. Apply fundamentals of plant management to harvest, handle, and store crops.
- PLT4 Exercise elements of design to enhance an environment (e.g., floral, forest, landscape, and farm).
- a. Apply basic design elements and principles to create a design using plants.

#### ANIMAL SYSTEMS (ANM)

- ANM1 Apply knowledge of anatomy and physiology to produce and/or manage animals in a domesticated or natural environment.
- a. Use classification systems to explain basic functions of animal anatomy and physiology.
  - b. Recognize the anatomy of animal species to understand how the body structures interact and affect animal health.
  - c. Analyze a subject animal to determine the nature of its health status.
- ANM2 Recognize animal behaviors to facilitate working with animals safely.
- a. Develop a safety plan for working with a specific animal.
- ANM3 Provide proper nutrition to maintain animal performance.
- a. Examine animal developmental stages to comprehend why nutrient requirements are different throughout an animal's life cycle.
  - b. Analyze a feed ration to determine whether or not it fulfills a given animal's nutrient requirements.
  - c. Record and compare feed variations to assess whether the nutritional requirements of an animal are being met.
- ANM4 Know the factors that influence an animal's reproductive cycle to explain species response.
- a. Analyze elements in the reproductive cycle to explain differences in the male and female reproductive systems.
  - b. Discuss reproductive cycles to show how they differ from species to species.
  - c. Evaluate an animal to determine its breeding soundness.
- ANM5 Identify environmental factors that affect an animal's performance.
- a. Recognize optimum performance for a given animal species.
  - b. Create a program to develop an animal to its highest potential performance.
  - c. Assess an animal to determine if it has reached its optimum performance level.
  - d. Develop efficient procedures to produce consistently high-quality animals, well-suited for their intended purposes.

## TOOLS, EQUIPMENT, TECHNOLOGY, AND SAFETY (TET)

- TET1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
- Select the appropriate tool to perform a given task.
  - Keep tools in good working order for efficient work use.
  - Wear protective equipment and handle natural resource tools and equipment with skill to demonstrate safe use of tools and equipment.

## POWER SYSTEMS (PWR)

- PWR1 Apply physical science principles to engineering applications with mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
- Relate power generation to energy sources.
  - Apply principles of lubricants to sort and classify lubricants.
- PWR2 Apply principles of operation and maintenance to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
- Perform scheduled service routines to maintain machinery and equipment.
  - Observe rules of the road to operate machinery and equipment.
- PWR3 Apply principles of service and repair to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
- Troubleshoot problems and evaluate performance to service and repair components of internal combustion engines.
  - Follow manufacturer's guidelines to service and repair power transmission systems.
  - Evaluate performance and check maintenance manuals to service and repair hydraulic lines.
  - Troubleshoot from schematics to service vehicle electrical systems.
  - Use company diagrams and scenarios to service vehicle heating and air conditioning systems.
  - Check performance parameters to service and repair steering, suspension, traction, and vehicle performance systems.
  - Use tools in the workplace to demonstrate safe and proper skills with construction/fabrication hand tools.

## STRUCTURAL SYSTEMS (STR)

- STR1 Exercise basic skills in blueprint and design development to create sketches, drawings, and plans.
- Use computer skills to develop simple sketches and plans.
- STR2 Read and relate structural plans to specifications and building codes.
- Examine blueprints and local codes to develop a logical construction plan.



- STR3 Examine structural requirements to estimate project costs.
- a. Use bids and billing information to develop a complete materials list and project cost estimate.
- STR4 Develop skills required to use construction/fabrication equipment and tools.
- a. Use tools in the workplace to demonstrate safe and proper skills with construction/fabrication hand tools.
- STR5 Plan, implement, manage, and/or provide support services for facility design and construction; equipment design, manufacture, repair, and service; and agricultural technology.
- a. Design machinery and equipment including vehicles, implements, buildings, and facilities (e.g., feeding, feed storage).
  - b. Follow architectural and mechanical plans to construct buildings and facilities.

#### TECHNICAL SYSTEMS (TEC)

- TEC1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.
- a. Identify and explain the various types of hardware systems to show their applications and potentials.
- TEC2 Use available power sources to plan and apply control systems.
- a. Measure with selective instruments to demonstrate knowledge of basic electricity.
  - b. Reference electrical drawings to design, install, and troubleshoot control systems.
- TEC3 Explain geospatial technology to demonstrate its applications.
- a. Employ appropriate techniques to demonstrate application of GPS/GIS systems principles.
  - b. Use computer applications to produce maps that reflect surveying and mapping principles.
  - c. Select an area of personal expertise to demonstrate knowledge of end applications.

#### NATURAL RESOURCE SYSTEMS (NRS)

- NRS1 Recognize importance of resource and human interrelations to conduct management activities in natural habitats.
- a. Identify resource management components to establish relationships in natural resource systems.
  - b. Apply cartographic skills to natural resource activities.
  - c. Monitor natural resource status to obtain planning data.
  - d. Employ environmental and wildlife knowledge to demonstrate natural resource enhancement techniques.
  - e. Examine weather and other criteria to recognize dangers related to work in an outdoor environment.
  - f. Learn applicable rules or laws to demonstrate natural resource mitigation techniques.
- NRS2 Use effective venues to communicate natural phenomena to the public.
- a. Communicate natural resources information to the general public.
  - b. Personally interpret natural resource phenomena to natural resource users.

- NRS3 Apply scientific principles to natural resource management activities.
- Use science concepts, processes, and research techniques to examine natural resource topics.
  - Examine biological and physical characteristics to identify and classify natural resources.
  - Examine natural cycles and related phenomena to describe ecologic concepts and principles.
- NRS4 Employ knowledge of natural resource industries to describe production practices and processing procedures.
- Prepare presentations to describe how natural resource products are produced, harvested, processed, and used.
- NRS5 Practice responsible conduct to protect natural resources.
- Employ techniques and equipment needed to prevent wildfire.
  - Use wildfire suppression techniques to demonstrate abilities in firefighting and control.
  - Recognize symptoms of animal and plant diseases and use appropriate techniques to prevent their spread.
  - Recognize insect types and available controls to prevent insect infestation.
  - Use acceptable pesticides to treat insect infestation.
  - Know law enforcement procedures to manage public gatherings and to gain entry into secure, closed, or restricted areas.

#### ENVIRONMENTAL SERVICE SYSTEMS (ENV)

- ENV1 Use analysis procedures to plan and evaluate environmental service impacts.
- Use instrumentation to monitor samples.
  - Calibrate and service instruments on a timely schedule to maintain environmental instrumentation.
  - Apply statistics, charts, and scattergrams to measure and monitor operations.
- ENV2 Identify public policies and regulations impacting environmental services to determine their effect on facility operations.
- Consult reliable resources or training to identify the major laws impacting environmental services.
- ENV3 Apply scientific principles to environmental services.
- Apply meteorological knowledge to recognize weather systems and weather patterns.
  - Describe soil composition and properties to demonstrate knowledge of soil science.
  - Explain well design and groundwater supplies to demonstrate knowledge of hydrology.
  - Discuss properties, classifications, and functions in order to understand wetland principles.
  - Discuss properties, classifications, and functions in order to understand watershed principles.
  - Use chemical analysis to conduct tests.
  - Apply sampling techniques and other assessments to demonstrate background knowledge of microbiology.

- ENV4 Operate environmental service systems (e.g., pollution control, water treatment, wastewater treatment, solid waste management, and energy) to manage a facility environment.
- a. Use pollution control measures to maintain a safe facility environment.
  - b. Apply principles of solid waste management (landfill) to manage safe disposal of all categories of waste.
  - c. Apply drinking water treatment principles to assure safe drinking water at a facility.
  - d. Apply wastewater treatment operations principles to manage wastewater disposal in keeping with rules and regulations.
  - e. Apply hazardous materials management principles to assure a safe facility and to comply with applicable regulations.
  - f. Explore conventional and alternative supplies to define energy sources.
- ENV5 Use tools, equipment, machinery, and technology to accomplish tasks in environmental services.
- a. Use technology tools to map land, facilities, and infrastructure.

#### AGRIBUSINESS SYSTEMS (ABS)

- ABS1 Employ leadership skills to accomplish goals and objectives in the AFNR business environment.
- a. Develop a mission statement to guide business activities effectively.
  - b. Apply leadership skills to accomplish general business activities from production to public relations.
  - c. Apply management skills to accomplish general business activities from production to public relations.
- ABS2 Practice good recordkeeping to accomplish AFNR business objectives.
- a. Prepare and maintain all files as needed to accomplish effective recordkeeping.
- ABS3 Apply generally accepted accounting principles and skills to manage budget, credit, and optimal application of AFNR business assets.
- a. Use key accounting fundamentals to accomplish dependable bookkeeping and associated files.
- ABS4 Employ AFNR industry concepts and practices to manage inventory.
- a. Monitor inventory levels to accomplish practical inventory control.
- ABS5 Utilize technology to accomplish AFNR business objectives.
- a. Use technology and information technology strategies for business improvement.
- ABS6 Use marketing and sales principles to accomplish an AFNR business objective.
- a. Conduct market research.
  - b. Develop a marketing plan.
  - c. Implement a marketing plan.
  - d. Merchandise products and services.

## Appendix B: Academic Standards

### Algebra I<sup>2</sup>

#### Competencies and Suggested Objective(s)

- A1 Recognize, classify, and use real numbers and their properties.
- Describe the real number system using a diagram to show the relationships of component sets of numbers that compose the set of real numbers.
  - Model properties and equivalence relationships of real numbers.
  - Demonstrate and apply properties of real numbers to algebraic expressions.
  - Perform basic operations on square roots excluding rationalizing denominators.
- A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
- Analyze relationships between two variables, identify domain and range, and determine whether a relation is a function.
  - Explain and illustrate how change in one variable may result in a change in another variable.
  - Determine the rule that describes a pattern and determine the pattern given the rule.
  - Apply patterns to graphs and use appropriate technology.
- A3 Simplify algebraic expressions, solve and graph equations, inequalities and systems in one and two variables.
- Solve, check, and graph linear equations and inequalities in one variable, including rational coefficients.
  - Graph and check linear equations and inequalities in two variables.
  - Solve and graph absolute value equations and inequalities in one variable.
  - Use algebraic and graphical methods to solve systems of linear equations and inequalities.
  - Translate problem-solving situations into algebraic sentences and determine solutions.
- A4 Explore and communicate the characteristics and operations of polynomials.
- Classify polynomials and determine the degree.
  - Add, subtract, multiply, and divide polynomial expressions.
  - Factor polynomials using algebraic methods and geometric models.
  - Investigate and apply real-number solutions to quadratic equations algebraically and graphically.
  - Use convincing arguments to justify unfactorable polynomials.
  - Apply polynomial operations to problems involving perimeter and area.
- A5 Utilize various formulas in problem-solving situations.
- Evaluate and apply formulas (e.g., circumference, perimeter, area, volume, Pythagorean Theorem, interest, distance, rate, and time).
  - Reinforce formulas experimentally to verify solutions.

<sup>2</sup> *Mississippi mathematics framework—Algebra I*. (2003). Retrieved September 10, 2003, from [http://www.mde.k12.ms.us/curriculum/index\\_1.htm](http://www.mde.k12.ms.us/curriculum/index_1.htm)

- c. Given a literal equation, solve for any variable of degree one.
  - d. Using the appropriate formula, determine the length, midpoint, and slope of a segment in a coordinate plane.
  - e. Use formulas (e.g., point-slope and slope-intercept) to write equations of lines.
- A6 Communicate using the language of algebra.
- a. Recognize and demonstrate the appropriate use of terms, symbols, and notations.
  - b. Distinguish between linear and non-linear equations.
  - c. Translate between verbal expressions and algebraic expressions.
  - d. Apply the operations of addition, subtraction, and scalar multiplication to matrices.
  - e. Use scientific notation to solve problems.
  - f. Use appropriate algebraic language to justify solutions and processes used in solving problems.
- A7 Interpret and apply slope as a rate of change.
- a. Define slope as a rate of change using algebraic and geometric representations.
  - b. Interpret and apply slope as a rate of change in problem-solving situations.
  - c. Use ratio and proportion to solve problems including direct variation ( $y=kx$ ).
  - d. Apply the concept of slope to parallel and perpendicular lines.
- A8 Analyze data and apply concepts of probability.
- a. Collect, organize, graph, and interpret data sets, draw conclusions, and make predictions from the analysis of data.
  - b. Define event and sample spaces and apply to simple probability problems.
  - c. Use counting techniques, permutations, and combinations to solve probability problems.

### Biology I<sup>3</sup>

#### Competencies and Suggested Objective(s)

- B1 Utilize critical thinking and scientific problem solving in designing and performing biological research and experimentation.
- a. Demonstrate the proper use and care for scientific equipment used in biology.
  - b. Observe and practice safe procedures in the classroom and laboratory.
  - c. Apply the components of scientific processes and methods in the classroom and laboratory investigations.
  - d. Communicate results of scientific investigations in oral, written, and graphic form.
- B2 Investigate the biochemical basis of life.
- a. Identify the characteristics of living things.
  - b. Describe and differentiate between covalent and ionic bonds using examples of each.
  - c. Describe the unique bonding and characteristics of water that makes it an essential component of living systems.

<sup>3</sup> *Mississippi science framework—Biology I*. (2003). Retrieved September 10, 2003, from [http://www.mde.k12.ms.us/curriculum/index\\_1.htm](http://www.mde.k12.ms.us/curriculum/index_1.htm)

- d. Classify solutions using the pH scale and relate the importance of pH to organism survival.
  - e. Compare the structure, properties and functions of carbohydrates, lipids, proteins and nucleic acids in living organisms.
  - f. Explain how enzymes work and identify factors that can affect enzyme action.
- B3 Investigate cell structures, functions, and methods of reproduction.
- a. Differentiate between prokaryotic and eukaryotic cells.
  - b. Distinguish between plant and animal (eukaryotic) cell structures.
  - c. Identify and describe the structure and basic functions of the major eukaryotic organelles.
  - d. Describe the way in which cells are organized in multicellular organisms.
  - e. Relate cell membrane structure to its function in passive and active transport.
  - f. Describe the main events in the cell cycle and cell mitosis including differences in plant and animal cell divisions.
  - g. Relate the importance of meiosis to sexual reproduction and the maintenance of chromosome number.
  - h. Identify and distinguish among forms of asexual and sexual reproduction.
- B4 Investigate the transfer of energy from the sun to living systems.
- a. Describe the structure of ATP and its importance in life processes.
  - b. Examine, compare, and contrast the basic processes of photosynthesis and cellular respiration.
  - c. Compare and contrast aerobic and anaerobic respiration.
- B5 Investigate the principles, mechanisms, and methodology of classical and molecular genetics.
- a. Compare and contrast the molecular structures of DNA and RNA as they relate to replication, transcription, and translation.
  - b. Identify and illustrate how changes in DNA cause mutations and evaluate the significance of these changes.
  - c. Analyze the applications of DNA technology (forensics, medicine, agriculture).
  - d. Discuss the significant contributions of well-known scientists to the historical progression of classical and molecular genetics.
  - e. Apply genetic principles to solve simple inheritance problems including monohybrid crosses, sex linkage, multiple alleles, incomplete dominance, and codominance.
  - f. Examine inheritance patterns using current technology (gel electrophoresis, pedigrees, karyotypes).
- B6 Investigate concepts of natural selection as they relate to diversity of life.
- a. Analyze how organisms are classified into a hierarchy of groups and subgroups based on similarities and differences.
  - b. Identify characteristics of kingdoms including monerans, protists, fungi, plants and animals.
  - c. Differentiate among major divisions of the plant and animal kingdoms (vascular/non-vascular; vertebrate/invertebrate).
  - d. Compare the structures and functions of viruses and bacteria relating their impact on other living organisms.

- e. Identify evidence of change in species using fossils, DNA sequences, anatomical and physiological similarities, and embryology.
  - f. Analyze the results of natural selection in speciation, diversity, adaptation, behavior and extinction.
- B7 Investigate the interdependence and interactions that occur within an ecosystem.
- a. Analyze the flow of energy and matter through various cycles including carbon, oxygen, nitrogen and water cycles.
  - b. Interpret interactions among organisms in an ecosystem (producer/consumer/decomposer, predator/prey, symbiotic relationships and competitive relationships).
  - c. Compare variations, tolerances, and adaptations of plants and animals in major biomes.
  - d. Investigate and explain the transfer of energy in an ecosystem including food chains, food webs, and food pyramids.
  - e. Examine long and short-term changes to the environment as a result of natural events and human actions.

## English II<sup>4</sup>

### Competencies and Suggested Objective(s)

- E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
- a. Produce individual and/or group compositions and/or projects to persuade, tell a story, describe, create an effect, explain or justify an action or event, inform, entertain, etc.
  - b. Produce writing typically used in the workplace such as social, business, and technical correspondence; explanation of procedures; status reports; research findings; narratives for graphs; justification of decisions, actions, or expenses; etc.
  - c. Write a response, reaction, interpretation, analysis, summary, etc., of literature, other reading matter, or orally presented material.
  - d. Revise to ensure effective introductions, details, wording, topic sentences, and conclusions.
- E2 Communicate ideas for a variety of school and other life situations through listening, speaking, and reading aloud.
- a. Listen to determine the main idea and supporting details, to distinguish fact from opinion, and to determine a speaker's purpose or bias.
  - b. Speak with appropriate intonation, articulation, gestures, and facial expression.
  - c. Speak effectively to explain and justify ideas to peers, to inform, to summarize, to persuade, to entertain, to describe, etc.
- E3 Read, evaluate, and use print, non-print, and technological sources to research issues and problems, to present information, and to complete projects.
- a. Read, view, and listen to distinguish fact from opinions and to recognize persuasive and manipulative techniques.

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<sup>4</sup> *Mississippi language arts framework—English II*. (2003). Retrieved September 10, 2003, from [http://www.mde.k12.ms.us/curriculum/index\\_1.htm](http://www.mde.k12.ms.us/curriculum/index_1.htm)

- b. Access both print and non-print sources to produce an I-Search paper, research paper, or project.
  - c. Use computers and audio-visual technology to access and organize information for purposes such as resumes, career search projects, and analytical writings, etc.
  - d. Use reference sources, indices, electronic card catalog, and appropriate research procedures to gather and synthesize information.
- E4 Work individually and as a member of a team to analyze and interpret information, to make decisions, to solve problems, and to reflect, using increasingly complex and abstract thinking.
- a. Interact with peers to examine real world and literary issues and ideas.
  - b. Show growth in critical thinking, leadership skills, consensus building, and self-confidence by assuming a role in a group, negotiating compromise, and reflecting on individual or group work.
- E5 Complete oral and written presentations which exhibit interaction and consensus within a group.
- a. Share, critique, and evaluate works in progress and completed works through a process approach.
  - b. Communicate effectively in a group to present completed projects and/or compositions.
  - c. Edit oral and written presentations to reflect correct grammar, usage, and mechanics.
- E6 Explore cultural contributions to the history of the English language and its literature.
- a. Explore a variety of works from various historical periods, geographical locations, and cultures, recognizing their influence on language and literature.
  - b. Identify instances of dialectal differences which create stereotypes, perceptions, and identities.
  - c. Recognize root words, prefixes, suffixes, and cognates.
  - d. Relate how vocabulary and spelling have changed over time.
- E7 Discover the power and effect of language by reading and listening to selections from various literary genres.
- a. Listen to and read aloud selected works to recognize and respond to the rhythm and power of language to convey a message.
  - b. Read aloud with fluency and expression.
  - c. Analyze the stylistic devices, such as alliteration, assonance, word order, rhyme, onomatopoeia, etc., that make a passage achieve a certain effect.
  - d. Demonstrate how the use of language can confuse or inform, repel or persuade, or inspire or enrage.
  - e. Analyze how grammatical structure or style helps to create a certain effect.
- E8 Read, discuss, analyze, and evaluate literature from various genres and other written material.
- a. Read and explore increasingly complete works, both classic and contemporary, for oral discussion and written analysis.
  - b. Read, discuss, and interpret literature to make connections to life.
  - c. Read from a variety of genres to understand how the literary elements contribute to the overall quality of the work.



- d. Identify qualities in increasingly complex literature that have produced a lasting impact on society.
  - e. Read for enjoyment, appreciation, and comprehension of plot, style, vocabulary, etc.
- E9 Sustain progress toward fluent control of grammar, mechanics, and usage of standard English in the context of writing and speaking.
- a. Infuse the study of grammar and vocabulary into written and oral communication.
  - b. Demonstrate, in the context of their own writing, proficient use of the conventions of standard English, including, but not limited to, the following: complete sentences, subject-verb agreement, plurals, spellings, homophones, possessives, verb forms, punctuation, capitalization, pronouns, pronoun-antecedent agreement, parallel structure, and dangling and misplaced modifiers.
  - c. Give oral presentations to reinforce the use of standard English.
  - d. Employ increasingly proficient editing skills to identify and solve problems in grammar, usage, and structure.
- E10 Use language and critical thinking strategies to serve as tools for learning.
- a. Use language to facilitate continuous learning, to record observations, to clarify thought, to synthesize information, and to analyze and evaluate language.
  - b. Interpret visual material orally and in writing.

### U. S. History from 1877<sup>5</sup>

#### Competencies and Suggested Objective(s)

- H1 Explain how geography, economics, and politics have influenced the historical development of the United States in the global community.
- a. Apply economic concepts and reasoning when evaluating historical and contemporary social developments and issues (e.g., gold standard, free coinage of silver, tariff issue, laissez faire, deficit spending, etc.).
  - b. Explain the emergence of modern America from a domestic perspective (e.g., frontier experience, Industrial Revolution and organized labor, reform movements of Populism and Progressivism, Women’s Movement, Civil Rights Movement, the New Deal, etc.).
  - c. Explain the changing role of the United States in world affairs since 1877 through wars, conflicts, and foreign policy (e.g., Spanish-American War, Korean conflict, containment policy, etc.).
  - d. Trace the expansion of the United States and its acquisition of territory from 1877 (e.g., expansionism and imperialism).
- H2 Describe the impact of science and technology on the historical development of the United States in the global community.
- a. Analyze the impact of inventions on the United States (e.g., telephone, light bulb, etc.).
  - b. Examine the continuing impact of the Industrial Revolution on the development of our nation (e.g., mass production, computer operations, etc.).

<sup>5</sup> *Mississippi social studies framework—U.S. History from 1877*. (2003). Retrieved September 10, 2003, from [http://www.mde.k12.ms.us/curriculum/index\\_1.htm](http://www.mde.k12.ms.us/curriculum/index_1.htm)

- c. Describe the effects of transportation and communication advances since 1877.
- H3 Describe the relationship of people, places, and environments through time.
- a. Analyze human migration patterns since 1877 (e.g., rural to urban, the Great Migration, etc.).
  - b. Analyze how changing human, physical, geographic characteristics can alter a regional landscape (e.g., urbanization, Dust Bowl, etc.).
- H4 Demonstrate the ability to use social studies tools (e.g., timelines, maps, globes, resources, graphs, a compass, technology, etc.).
- a. Interpret special purpose maps, primary/secondary sources, and political cartoons.
  - b. Analyze technological information on graphs, charts, and timelines.
  - c. Locate areas of international conflict (e.g., Caribbean, Southeast Asia, Europe, etc.).
- H5 Analyze the contributions of Americans to the ongoing democratic process to include civic responsibilities.
- a. Examine various reform movements (e.g., Civil Rights, Women’s Movement, etc.).
  - b. Examine the government’s role in various movements (e.g., arbitration, 26th Amendment, etc.).
  - c. Examine the role of government in the preservation of citizens’ rights (e.g., 19th Amendment, Civil Rights Act of 1964).
  - d. Examine individuals’ duties and responsibilities in a democratic society (e.g., voting, volunteerism, etc.).

## Appendix C: 21<sup>st</sup> Century Skills<sup>6</sup>

### CS1 Global Awareness

- Using 21<sup>st</sup> century skills to understand and address global issues
- Learning from and working collaboratively with individuals representing diverse cultures, religions, and lifestyles in a spirit of mutual respect and open dialogue in personal, work, and community contexts
- Promoting the study of non-English language as a tool for understanding other nations and cultures

### CS2 Financial, Economic, and Business Literacy

- Knowing how to make appropriate personal economic choices
- Understanding the role of the economy and the role of business in the economy
- Applying appropriate 21<sup>st</sup> century skills to function as a productive contributor within an organizational setting
- Integrating oneself within and adapting continually to our nation's evolving economic and business environment

### CS3 Civic Literacy

- Being an informed citizen to participate effectively in government
- Exercising the rights and obligations of citizenship at local, state, national, and global levels
- Understanding the local and global implications of civic decisions
- Applying 21<sup>st</sup> century skills to make intelligent choices as a citizen

### CS4 Information and Communication Skills

- Information and media literacy skills: Analyzing, accessing, managing, integrating, evaluating, and creating information in a variety of forms and media; understanding the role of media in society
- Communication skills: Understanding, managing, and creating effective oral, written, and multimedia communication in a variety of forms and contexts

### CS5 Thinking and Problem-Solving Skills

- Critical thinking and systems thinking: Exercising sound reasoning in understanding and making complex choices, understanding the interconnections among systems
- Problem identification, formulation, and solution: Ability to frame, analyze, and solve problems
- Creativity and intellectual curiosity: Developing, implementing, and communicating new ideas to others, staying open and responsive to new and diverse perspectives

### CS6 Interpersonal and Self-Directional Skills

- Interpersonal and collaborative skills: Demonstrating teamwork and leadership, adapting to varied roles and responsibilities, working productively with others, exercising empathy, respecting diverse perspectives
- Self-direction: Monitoring one's own understanding and learning needs, locating appropriate resources, transferring learning from one domain to another
- Accountability and adaptability: Exercising personal responsibility and flexibility in personal, workplace, and community contexts; setting and meeting high standards and goals for one's self and others; tolerating ambiguity

<sup>6</sup> *21<sup>st</sup> century skills*. (n.d.). Washington, DC: Partnership for 21<sup>st</sup> Century Skills.

- Social responsibility: Acting responsibly with the interests of the larger community in mind; demonstrating ethical behavior in personal, workplace, and community contexts

## Appendix D: Rubrics

### Role-Play Rubric

Scoring criteria	5 Excellent	4 Good	3 Needs Some Improvement	2 Needs Much Improvement	1 N/A
<b>Relates to audience.</b>					
<b>Provides a fluent rendition of scenario.</b>					
<b>Role-plays scenario with feeling and expression.</b>					
<b>Varies intonation/signing.</b>					
<b>Presents characters appropriately.</b>					
<b>Information communicated is relevant to the topic.</b>					
<b>Role-play shows adequate knowledge of topic.</b>					
<b>TOTAL Score</b>					

Scale:

30-35 A Excellent

25-29 B Good

19-24 C Needs Some Improvement

13-18 D Needs Much Improvement

7-12 F Not Appropriate

Comments:

### Presentation Rubric

<b>Indicator</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>Total</b>
<b>Organization</b>	Audience cannot understand presentation because there is no sequence of information.	Audience has difficulty following presentation because student jumps around.	Student presents information in logical sequence which audience can follow.	Student presents information in logical, interesting sequence which audience can follow.	
<b>Subject Knowledge</b>	Student does not have grasp of information; student cannot respond to questions about subject.	Student is uncomfortable with information and is able to answer only rudimentary questions.	Student is at ease with expected answers to all questions, but fails to elaborate.	Student demonstrates full knowledge (more than required) by answering all class questions with explanations and elaboration.	
<b>Graphics</b>	Student uses superfluous graphics/visual aid or no graphics/visual aid.	Student occasionally uses graphics that rarely support text and presentation.	Student's graphics relate to text and presentation.	Student's graphics explain and reinforce screen text and presentation.	
<b>Mechanics</b>	Student's presentation has four or more signing errors.	Presentation has three signing errors.	Presentation has no more than two signing errors.	Presentation has no signing errors.	
<b>Eye Contact</b>	Student signs all of report with no eye contact/reading/head down.	Student occasionally uses eye contact, but still reads most of report.	Student maintains eye contact most of the time but frequently returns to notes.	Student maintains eye contact with audience, seldom returning to notes.	
<b>Total Score</b>					

### Group Work Rubric

<b>CATEGORY</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>Contributions</b>	Routinely provides useful ideas when participating in the group and in classroom discussion. A definite leader who contributes a lot of effort.	Usually provides useful ideas when participating in the group and in classroom discussion. A strong group member who tries hard!	Sometimes provides useful ideas when participating in the group and in classroom discussion. A satisfactory group member who does what is required.	Rarely provides useful ideas when participating in the group and in classroom discussion. May refuse to participate.
<b>Time management</b>	Routinely uses time well throughout the project to ensure things get done on time. Group does not have to adjust deadlines or work responsibilities because of this person's procrastination.	Usually uses time well throughout the project, but may have procrastinated on one thing. Group does not have to adjust deadlines or work responsibilities because of this person's procrastination.	Tends to procrastinate, but always gets things done by the deadlines. Group does not have to adjust deadlines or work responsibilities because of this person's procrastination.	Rarely gets things done by the deadlines AND group has to adjust deadlines or work responsibilities because of this person's inadequate time management.
<b>Quality of Work</b>	Provides work of the highest quality.	Provides high quality work.	Provides work that occasionally needs to be checked/redone by other group members to ensure quality.	Provides work that usually needs to be checked/redone by others to ensure quality.
<b>Attitude</b>	Never is publicly critical of the project or the work of others. Always has a positive attitude about the task(s).	Rarely is publicly critical of the project or the work of others. Often has a positive attitude about the task(s).	Occasionally is publicly critical of the project or the work of other members of the group. Usually has a positive attitude about the task(s).	Often is publicly critical of the project or the work of other members of the group. Often has a negative attitude about the task(s).
<b>Total Score</b>				

### Sample Project Rubric

Scoring criteria	4. Excellent	3. Good	2. Needs Some Improvement	1. Needs Much Improvement	N/A
<b>Clearly/effectively communicates the main idea or theme.</b>					
<b>Information clearly provided.</b>					
<b>Strong examples used to describe the theme or objective.</b>					
<b>Illustrations follow a logical reasoning.</b>					
<b>All images and font sizes are legible to entire audience.</b>					

NOTE: N/A represents a response to the performance which is “not appropriate.”

Scale:

22-25 - A Excellent

18-21 - B Good

14-17 - C Needs Some Improvement

10-13 - D Needs Much Improvement

5-9 - F Not Appropriate

TOTAL

Comments



## Science Performance Task Rubric

(May be adapted for specific science performance tasks)

### Problem Definition

- |  |   |
|--|---|
| A. The problem is stated clearly. Clear identification of variables.                                   | 3 |
| B. The problem is stated adequately. Adequate identification of variables.                             | 2 |
| C. The problem is poorly stated. Poor identification of variables.                                     | 1 |
| D. The statement of the problem is very limited or missing altogether. No identification of variables. | 0 |

### Experimental Design

- |  |   |
|--|---|
| A. The experimental design matches the stated problem. Variables are controlled. The procedures are clear. Complete and replicable. A control is included when appropriate.                        | 3 |
| B. The experimental design generally matches the stated problem. Attempt at controlling variables is made. Procedures are generally complete. Minor modifications or clarifications may be needed. | 2 |
| C. The experimental design matches the stated problem to some extent. Little attempt to control variables. Procedures are incomplete. Major modifications or clarifications may be needed.         | 1 |
| D. The experimental design matches the stated problem, is very incomplete or missing. There is no attempt to control variables.  | 0 |

### Data Presentation

- |   |   |
|---|---|
| A. Data are well organized and presented in an appropriate manner.  | 3 |
| B. Data are organized and presented in an appropriate manner. Minor errors or omissions may be present.         | 2 |
| C. Data are poorly organized or presented in an inappropriate manner. Major omissions or errors may be present. | 1 |
| D. Data are very poorly organized or presented in an inappropriate manner or missing altogether.                | 0 |

### Conclusions

- |   |   |
|---|---|
| A. Conclusions are related to the stated problem and fully supported by data.   | 3 |
| B. Conclusions are generally related to the stated problem and supported by data. Minor errors in the interpretation of results may be present.       | 2 |
| C. Conclusions are related to the stated problem and supported by data to a limited extent. Major errors in interpretation of results may be present. | 1 |
| D. Conclusions are not related to the stated problem, are not supported by data, or are missing.  | 0 |

Total Pts. \_\_\_\_\_

\_\_\_\_\_ Excellent (10-12 points) \_\_\_\_\_ Marginal (4-6 points)

\_\_\_\_\_ Proficient (7-9 points) \_\_\_\_\_ Unsatisfactory (0-3 points)