2007 Mississippi Curriculum Framework

Secondary Food Products (Meats)

(Program CIP: 01.0401 – Agricultural and Food Products Processing)

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

Agriculture, Food, and Natural Resources Standards	Adapted from the publication, *Career Cluster Resources for Agriculture, Food, and Natural Resources*, National Association of State Directors of Career and Technical Education
Academic Standards	Mississippi Department of Education Subject Area Testing Program
21st Century Skills	Reproduced with permission of the Partnership for 21st Century Skills. Further information may be found at www.21stcenturyskills.org

Preface

Secondary Food Products (Meats) Research Synopsis

Articles, books, Web sites, and other materials listed at the end of each unit were considered during the revision process. The textbooks *Principles of Meat Science* and *The Meat We Eat;* journals and magazines such as *The National Provisioner* and *The Packaging Digest*; and organizations including The American Meat Institute, National FFA, and the U.S. Department of Labor 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 schools throughout the state 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 a strong work ethic, manners, respect, responsibility, communication skills, good attitude, and punctuality. Occupation-specific skills stated included performing calculations, knowledge of cuts, figuring mark-up and profit margin, computer skills, and charting. Safety practices emphasized included equipment safety and sanitation.

Instructors from schools throughout the state were also asked to give input on changes to be made to the curriculum framework. Changes suggested for the curriculum included addition of goat processing, wild game processing, and verification of animal health prior to slaughter. In addition, due to the lack of slaughter facilities in some schools, a reduction in the number of hours spent covering slaughter was requested.

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

- *Mississippi Department of Education Subject Area Testing Program Academic Standards*
- *21st 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 March, 2006, curriculum revision meeting included:

- Competencies and objectives were reviewed to ensure accuracy and appropriateness.
- The number of hours suggested for units related to custom slaughter and fabrication of lamb was reduced.
- The verbs used for the competencies related to custom slaughter were changed to accommodate schools without slaughter facilities.
- Goat fabrication was added to the lamb fabrication unit.
- The units on poultry and fish fabrication were combined.
- A unit on fabrication of wild game was added.
- Information related to waste management was added.

- The Recommended Tools and Equipment list was updated, and the number of freezer racks and freezer trucks was increased.

Assessment
Students will be assessed using the *Secondary Food Products (Meats) MS-CPAS2 Test*.

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

- 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 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 21st Century Skills, which were developed by the Partnership for 21st 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 21st Century Skills addresses learning skills needed in the 21st 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 21st 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 21st 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 21st 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.

Table of Contents

Program Description

The Food Products (Meats) program is designed to prepare the student for entry level employment in the various related phases of processing, marketing, and merchandising of meats. Students are exposed to career and leadership opportunities within their field of study. Students are given an opportunity to master the skills necessary for success in meat processing which may include slaughtering, chilling, aging, quartering, cutting, and inspecting pork, beef, lamb, poultry, goat, wild game, and fish.

Industry standards referenced are from the *Agriculture, Food, and Natural Resources Standards*.

Course Outline

Food Products (Meats) I

Course CIP Code: 01.0401

Course Description: Food Products (Meats) I is an instructional program that orients an individual to the field of meat processing, marketing, and merchandising. This course allows an individual to prepare for employment or continued education in the meat cutting, packing, and processing professions. Topics include careers, leadership, and orientation; safety, sanitation, equipment, and facility maintenance; livestock slaughter procedures; and pricing, wrapping, and marketing meats. (2 - 2½ Carnegie units, depending upon time spent in the course)

Unit	Title	Hours
1	Careers and Leadership	15.0
2	Orientation to Meat Processing	15.0
3	Safety, Sanitation, Equipment, and Facility Maintenance	75.0
4	Custom Livestock Slaughter	40.0
5	Pricing, Wrapping, and Marketing	22.5
6	Special Topics in Food Products (Meats) I	32.5

Food Products (Meats) II

Course CIP Code: 01.0490

Course Description: Food Products (Meats) II is a continuation of Food Products (Meats) I. This course allows an individual to prepare for employment or continued education in the meat cutting, packing, and processing professions. Topics include meat cutting; automated processing; quality and yield grading; and curing, smoking, and sausage making. (2 - 2½ Carnegie units, depending upon time spent in the course)

Unit	Title	Hours
1	Identification and Fabrication of Carcass and Box Beef	60.0
2	Identification and Fabrication of Carcass and Box Pork	37.5
3	Identification and Fabrication of Carcass Lamb and Goat	15.0
4	Identification and Fabrication of Poultry and Fish	7.5
5	Identification and Fabrication of Wild Game	20.0
6	Automated Processing of Meats	7.5
7	Quality and Yield Grading	18.0
8	Curing, Smoking, and Sausage Making	18.0
9	Special Topics in Food Products (Meats) II	18.0

Food Products (Meats) I
Unit 1: Careers and Leadership **(15 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Explain career opportunities in meat cutting, packing, and processing professions. a. Define meat cutter. b. Research the major categories of job classifications in the meat cutting, packing, and processing profession.	**Teaching:** • Introduce career opportunities in meat cutting, packing, and processing professions; discuss job requirements (e.g., certifications and education) and occupation-specific and soft skills needed. Lead students in a discussion about what they know about the field, the types of jobs available, and the salaries of those jobs. • Outline the units of the program and how they relate to various jobs in the field. • Use a multiple learning styles inventory to determine students' learning styles and interests. Share with the students their styles and the impact they have. Throughout the year, provide varied projects to meet the learning styles. • Work with the Special Populations instructor to assess the reading, writing, and math skills of each student and to provide materials that are appropriate for each student. Plan to reassess students at the end of the year. • Divide students into groups based on learning styles, and have them use the Internet or textbooks to research the major categories of job classifications in the meat cutting, packing, and processing professions in the U.S. and in different countries throughout the world. Have students present their findings by developing a dictionary, writing and conducting a mock training session for new employees, or making a video or tape recording. **Assessment:** • Monitor student participation in discussions using the Group Participation Assessment Rubric located in Appendix D. • Evaluate each group's project and presentation for content, clarity, and length.

2. Explain the leadership opportunities and activities which are beneficial to students in meat cutting, packing, and processing. a. Identify and describe leadership opportunities available from student youth organizations in the school and community, including FFA and 4-H. b. Describe activities available to students in meat cutting, packing, and processing programs including leadership development, competitions, club meetings, fund raisers, field trips, elected office leadership positions, and service projects.	**Teaching:** • Discuss the leadership opportunities and activities which are beneficial to students in meat cutting, packing, and processing. • Show a video about, invite a resource person to discuss, or have students use the Internet to research leadership opportunities in FFA and 4-H. • Have each student write an essay describing activities available to them. • Prepare a meats team for competition in FFA and 4-H through job-related and leadership development activities. • To provide closure to each unit throughout the year, have students summarize what they have learned about the topic covered and place the summaries in a notebook. Review the notebooks at the end of each unit and reteach as appropriate to ensure mastery. **Assessment:** • Monitor student participation in activities. • Evaluate essay using the Written Report Assessment Rubric located in Appendix D. • Review summary of unit for understanding of material and reteach as needed.

STANDARDS

Agriculture, Food, and Natural Resources 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.

LEA1 Use leadership skills in collaborating with others to accomplish organizational goals and objectives.
LEA2 Use personal growth skills in collaborating with others to accomplish organizational goals and objectives.
ELR1 Know and understand the importance of professional ethics and legal responsibilities.
ELR2 Demonstrate workplace ethics specific to Agriculture, Food, and Natural Resources (AFNR) occupations.

Academic Standards

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.
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.

21st 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

Aberle, E. D., Forrest, J. C., Gerrard, D. E., & Mills, E. W. (2001). *Principles of meat science* (4th ed.). Dubuque, IA: Kendall/Hunt.

National FFA Organization. (2005). *FFA manual*. Indianapolis, IN: Author.

National 4-H Council. (n.d.). Retrieved March 23, 2006, from http://www.fourhcouncil.edu/

Oklahoma Department of Vocational and Technical Education. (1992). *Meat and poultry processing*. Stillwater, OK: Curriculum Instructional Materials Center.

Romans, J. R., Costello, W. J., Carlson, C. W., & Greaser, M. L. (2001). *The meat we eat* (14th ed.). Danville, IL: Interstate.

Food Products (Meats) I
Unit 2: Orientation to Meat Processing **(15 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Explain trends in slaughtering and processing in the past and in the future. a. Compare trends in slaughtering and processing in the past 20 years and in the future. b. Discuss emerging technologies related to slaughtering and meat processing.	**Teaching:** • Discuss trends in slaughtering and processing during the last 20 years and in the future. • Have students work in groups based on their learning styles and use the Internet and current publications to research issues or trends. Have groups present information about the issue or trend. • Have students use the research to develop an idea for a new product, prepare, and deliver a presentation according to the preferred learning styles in order to sell the idea to a company (the class). Students may use technology to prepare brochures, posters, or handouts to distribute during a multimedia presentation; create a commercial and act it out; or develop a newspaper advertisement. • Have the class self-evaluate their own work and peer-evaluate their classmates' work. • Have each student select the one product that he or she thinks is most likely to be successful in the market and prepare a brief report justifying the product chosen and explaining the expected impact of the product on the field. **Assessment:** • Monitor group work to ensure that each member participates in research, idea development, and presentation preparation. • Evaluate each group's project for content, clarity, presentation, and length. • Evaluate each student's report using the Written Report Assessment Rubric in Appendix D.

2. Describe factors affecting consumer food spending. a. Describe factors affecting consumer food spending to include income, geographic area, ethnic group, and religious group. b. Discuss biological health hazards affecting consumer spending.	**Teaching:** • Have students work in groups to brainstorm factors affecting consumer food spending. Lead the class in a discussion of various factors, including supply and demand, reasons for the cost of various cuts, and other factors. • Have each student research a biological health hazard that might affect consumer spending and present a report to the class, write a letter to the editor, or create a bulletin board. • Have students develop and conduct a survey for the local community to determine which ethnic groups consume which types of foods and why. Have students summarize results. • Have each student summarize what he or she learned about the unit and place the summary in his or her notebook. Review the notebooks and reteach as appropriate to ensure mastery. **Assessment:** • Assess project for content and appearance. • Evaluate survey and summary for content. • Review summary of unit for understanding of material and reteach as needed.

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LEA1 Use leadership skills in collaborating with others to accomplish organizational goals and objectives.
LEA2 Use personal growth skills in collaborating with others to accomplish organizational goals and objectives.
ELR1 Know and understand the importance of professional ethics and legal responsibilities.
ELR2 Demonstrate workplace ethics specific to Agriculture, Food, and Natural Resources (AFNR) occupations.
FPP1 Apply principles of food processing to maintain equipment and facilities.
FPP2 Apply principles of food science to the food industry.

FPP4 Identify processing, handling, and storage factors to show how they impact product quality and safety.
TET1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
TEC1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.
ABS5 Utilize technology to accomplish AFNR business objectives.
ABS6 Use marketing and sales principles to accomplish an AFNR business objective.

Academic Standards

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

21st 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

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Romans, J. R., Costello, W. J., Carlson, C. W., & Greaser, M. L. (2001). *The meat we eat* (14th ed.). Danville, IL: Interstate.

Weiss, E., & Weiss, H. (1991). *Catering handbook*. New York: John Wiley & Sons.

Food Products (Meats) I
Unit 3: Safety, Sanitation, Equipment, and Facility Maintenance (75 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Explain general meat laboratory safety requirements. a. List and practice safety rules and procedures. b. Use meat processing equipment safely.	**Teaching:** • Show students videos demonstrating examples of accidents in the workplace or invite a speaker from Farm Bureau to speak about safety. Pre-assess knowledge of safety by having each student write a summary of the safety violations present in the videos or presentations. • Describe key school and program policies and safety procedures to the class based on industry standards and requirements (may use the school handbook and any program-specific information). Introduce workplace skills (SCANS) and how they will be used to relate the classroom work to meet industry requirements. • Lead the class in developing safety policies for the classroom based on industry policies to include general safety tools, hand tools, power cutting equipment, personal attire, and hand washing. • Divide students into groups based on learning styles, and assign each group a guideline for personal and laboratory safety or general laboratory conduct. Have each group role play, create a multimedia presentation or a rap song, or write a story to discuss the proper and improper procedures related to the guideline. • Demonstrate how to use meat processing equipment safely to include knife sharpener, steel and hone, stockinette, dead lock and tag, scales and weighing items, tenderizing machine, vacuum packer, slicing machine, salinometer, squeegee equipment, band saw, grinder, mixer, patty machine, and heat seal. Ensure that each student uses equipment safely. **Assessment:** • Evaluate the pre-assessment for accuracy. • Have students self-evaluate and peer-evaluate guideline project.

	• Monitor student use of equipment. • Ensure that students pass a safety test and demonstration of proper use of equipment with 100% accuracy.
2. Discuss sanitation as it applies to a meat cutting facility. a. Describe sanitary operations of a meat cutting facility. b. Describe state and federal inspection guidelines as they apply to meat processing facilities, including ways to avoid fecal contamination. c. Identify correct temperatures for meat processing and storage and explain the importance of each. d. Describe the benefits of a rail system. e. Select and use proper aprons, disposable gloves, hard hats, eye protection, hair nets, rubber boots, etc. f. Disinfect aprons and rubber boots after each use.	**Teaching:** • Discuss sanitation as it applies to a meat cutting facility. • Describe a meat cutting facility's sanitation rules and procedures. Lead students to discuss sanitary operations of a meat cutting facility to include water, drainage, waste disposal, floor and wall coverings, and refrigeration. • Have students research state and federal inspection guidelines as they apply to meat cutting facilities, including avoidance of fecal contamination. Have students write a paper summarizing state and federal inspection guidelines as they apply to meat processing facilities to include the Wholesome Meat Act of 1967. • Invite a guest speaker from USDA to discuss proper temperatures for processing, cooking, and storage. • Have students research and prepare a chart identifying correct temperatures for meat processing and storage and explain the importance of each to include freezer, cooler, and cutting room. • Have students research various diseases caused by microorganisms and their causes and present their findings to the class. • Demonstrate the safe use of a rail system. Lead students in a discussion about the benefits of a rail system to include handling carcasses and weighing carcasses. • Discuss and demonstrate the proper use of aprons, disposable gloves, hard hats, eye protection, hair nets, rubber boots, etc. Have student select and use proper aprons, disposable gloves, hard hats, eye protection, hair nets, rubber boots, etc. • Discuss and demonstrate cleaning and disinfecting aprons and rubber boots. Have student disinfect aprons and rubber boots

	after each use. **Assessment:** • Monitor student participation in discussions and activities using the Activity Performance Rubric located in Appendix D. • Evaluate inspection guideline report using the Written Report Assessment Rubric located in Appendix D. • Assess microorganism presentation using the Presentation Checklist located in Appendix D.
3. Discuss federal regulations relating to meat processing. a. Discuss HACCP (Hazards Analysis Critical Control Point) as a method to prevent foodborne illness. b. Discuss the role of the USDA Food Safety and Inspection Service relating to quality assurance.	**Teaching:** • Invite a guest speaker to discuss federal regulations relating to meat processing and have each student summarize the main points made by the speaker. • Discuss how HACCP (Hazards Analysis Critical Control Point) can help prevent foodborne illnesses. Have each student research and list steps of the HACCP system and describe the system's influence on food safety programs. • Have students work in groups to research the USDA Food Safety and Inspection Service's role in assuring consumer quality and prepare a game, video tape, or newspaper article. **Assessment:** • Review student summaries for accuracy. • Evaluate HACCP list for correctness. • Assess USDA project for content and neatness.
4. Identify and use equipment for meat cutting, packing, and processing. a. Identify equipment used in a meat laboratory including a band saw, grinder, mixer, tenderizer, slicing machine, stuffer, and pickle pump. b. Assemble and disassemble equipment including band saw, grinder, mixer, tenderizer, slicing machine, stuffer, and pickle pump. c. Identify, use, and sanitize other meat cutting equipment including knives, knife sharpener, steel and hone,	**Teaching:** • Identify and demonstrate the use of equipment for meat cutting, packing, and processing. • Have students work in groups to prepare a mock training session, display, or electronic presentation identifying the types and uses of various pieces of equipment. • Have each student identify and demonstrate the proper use of all equipment, including assembly, disassembly, and sterilization.

stockinette, dead lock and tag, scales and weighing items, vacuum packer, salinometer, squeegee equipment, patty machine, heat seal, cooler, freezer, rail system, tables, immobilizer, hoist, dehairing machine, skinning knife, and carcass split saw. d. Use sterilizer for knives and steel.	**Assessment:** • Assess group project for content and accuracy. • Ensure that each student demonstrates the proper use of all equipment with 100% accuracy.
5. Demonstrate equipment maintenance used in a meat cutting facility. a. Maintain a sharp knife including boning and butcher knives. b. Perform equipment and maintenance procedures for grinder, slicer, and band saw. c. Use proper disinfection procedures for cleaning tables after use. d. Demonstrate proper hand washing procedure before and after working in the meat cutting laboratory.	**Teaching:** • Demonstrate procedures for equipment maintenance used in a meat cutting facility, including sharpening, inspection, maintenance, disinfection, and hand washing. • Have each student accurately demonstrate all tasks, including sharpening, inspection, maintenance, disinfection, and hand washing. • Discuss and demonstrate proper disinfection procedures for cleaning tables after use. Have students work in groups to take samples from various areas (e.g., tables, door knobs, and equipment), plate the samples on agar plates, and analyze the growth of microorganisms. Have each student prepare a laboratory report. • Discuss and demonstrate proper hand washing procedure to be used before and after work in the meat cutting laboratory. Have students research the work of Joseph Lister and write a report on the significance of his work on meat processing. **Assessment:** • Assess each student's ability to perform tasks. • Assess student participation in lab activity, and evaluate lab report using the Lab Inquiry Rubric located in Appendix D. • Review Lister report using the Written Report Assessment Rubric located in Appendix D.
6. Maintain a safe and sanitary facility. a. Wash and disinfect walls and floors. b. Maintain a safe environment by	**Teaching:** • Describe methods necessary to maintain a safe and sanitary facility, including wall

wiping up spills, keeping aisles clear, and performing other tasks.	and floor sanitation procedures and safety procedures. • Have each student demonstrate how to wash and disinfect walls and floors and to maintain a safe working environment by wiping up spills, keeping aisles clear, and performing other tasks. • Discuss the pH scale and its relation to bacterial growth in the meat processing industry. Have each student measure pH levels of various solutions, summarize the effects on bacterial growth, and complete a lab report. • Have each student summarize what he or she learned about the unit and place the summary in his or her notebook. Review the notebooks and reteach as appropriate to ensure mastery. **Assessment:** • Monitor student participation in activities using the Activity Performance Rubric located in Appendix D. • Assess lab report using the Lab Inquiry Rubric located in Appendix D. • Review summary of unit for understanding of material and reteach as needed.

STANDARDS

Agriculture, Food, and Natural Resources Standards

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LEA1 Use leadership skills in collaborating with others to accomplish organizational goals and objectives.
LEA2 Use personal growth skills in collaborating with others to accomplish organizational goals and objectives.
ELR1 Know and understand the importance of professional ethics and legal responsibilities.
ELR2 Demonstrate workplace ethics specific to Agriculture, Food, and Natural Resources (AFNR) occupations.
FPP1 Apply principles of food processing to maintain equipment and facilities.
FPP2 Apply principles of food science to the food industry.
FPP3 Plan, implement, manage, and/or provide services for the preservation and packaging of food and food products.

FPP4 Identify processing, handling, and storage factors to show how they impact product quality and safety.
TET1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
PWR1 Apply physical science principles to engineering applications with mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
PWR2 Apply principles of operation and maintenance to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
PWR3 Apply principles of service and repair to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
TEC1 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.
A5 Utilize various formulas in problem-solving situations.
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.
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.
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.
H2 Describe the impact of science and technology on the historical development of the United States in the global community.

21st Century Skills

CS1 Global Awareness
CS2 Financial, Economic, and Business Literacy
CS3 Civic Literacy

Secondary Food Products (Meats)

CS4 Information and Communication Skills
CS5 Thinking and Problem-Solving Skills
CS6 Interpersonal and Self-Directional Skills

SUGGESTED REFERENCES

Aberle, E. D., Forrest, J. C., Gerrard, D. E., & Mills, E. W. (2001). *Principles of meat science* (4th ed.). Dubuque, IA: Kendall/Hunt.

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Romans, J. R., Costello, W. J., Carlson, C. W., & Greaser, M. L. (2001). *The meat we eat* (14th ed.). Danville, IL: Interstate.

Weiss, E., & Weiss, H. (1991). *Catering handbook*. New York: John Wiley & Sons.

Food Products (Meats) I
Unit 4: Custom Livestock Slaughter **(40 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Explain terms and procedures associated with livestock slaughter. a. Define terms and procedures associated with the slaughter of beef. b. Define terms and procedures associated with the slaughter of swine. c. Define terms and procedures associated with the slaughter of lamb and goat. d. Define terms and procedures associated with the slaughter of poultry. e. Define terms and procedures associated with the slaughter of fish. f. Define terms and procedures associated with dressing of wild game. g. Discuss the difference between antemortem and postmortem inspection.	**Teaching:** • Describe various procedures used for livestock slaughter in various parts of the world. • Pre-assess student knowledge of terms by leading a game requiring students to work in teams to match terms and definitions: beef to include immobilization, evisceration, skinning, splitting, and weighing; swine to include immobilization, dehairing process or skinning, evisceration, splitting, and weighing; lamb and goat to include immobilization, skinning, evisceration, splitting, and weighing; poultry to include immobilization, defeathering, evisceration, weighing, processing, and grading; and fish to include immobilization, evisceration, skinning, weighing, and processing. • Identify and discuss factors such as illness and malnutrition to consider when determining whether an animal is fit or unfit for slaughter. Have students brainstorm symptoms indicating that an animal is unfit for slaughter. Have each student research a reason that an animal would be considered unfit and present the information to the class. **Assessment:** • Monitor student participation in terminology game. • Evaluate slaughter presentation using the Presentation Checklist located in Appendix D.
2. Discuss types, cleaning, use, and maintenance of slaughter facility and equipment. a. Identify equipment including immobilizer, skinning knives, rails and rail hooks, scales, dehairing machine, hoist, and carcass split saw.	**Teaching:** • Identify and demonstrate how to clean and use equipment in the meat slaughter facility. Show a video, invite a guest speaker, or take students on a field trip to a slaughter facility. Have each student summarize key points learned.

b. Discuss maintenance of a safe and sanitary facility. c. Identify what constitutes contamination from biologic and toxic sources.	• Have students identify, clean, use, and maintain equipment to include immobilizer, skinning knives, rails and rail hooks, scales, dehairing machine, hoist, and carcass split saw. • Explain and reinforce proper safety and sanitation in the meat slaughter facility. • Have students maintain a safe and sanitary facility by following proper disinfection procedures for facility, equipment, and self. • Explain how facility, equipment, and meat products may be contaminated from biologic and toxic sources. • Have each student research ways to prevent livestock, equipment, and meat products from contamination by biologic and toxic sources and prepare a magazine article or bulletin board. **Assessment:** • Review summary for content. • Monitor student activity using the Activity Performance Rubric located in Appendix D. • Evaluate contamination product for content and appearance.
3. Discuss procedures for slaughtering livestock and dressing wild game. a. Discuss procedures for slaughtering a beef. b. Discuss procedures for slaughtering a swine. c. Discuss procedures for slaughtering a lamb and goat. d. Discuss procedures for dressing wild game. e. Discuss procedures for slaughtering livestock and recognize when to condemn part of a carcass. f. Describe methods of disposing of offal.	**Teaching:** • Discuss procedures for slaughtering various livestock and dressing wild game. Show a video, invite a guest speaker, or take students on a field trip to a slaughter facility. Have each student write a summary of key points. • Show students examples of livestock that will have parts condemned. Lead students to brainstorm when part of a carcass should be condemned. • Have each student research methods of disposing of offal and write a report. • Have each student summarize what he or she learned about the unit and place the summary in his or her notebook. Review the notebooks and reteach as appropriate to ensure mastery. **Assessment:** • Review slaughter summary for content.

	• Evaluate offal report using the Written Report Assessment Rubric located in Appendix D. • Review summary of unit for understanding of material and reteach as needed.

STANDARDS

Agriculture, Food, and Natural Resources 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.

LEA1 Use leadership skills in collaborating with others to accomplish organizational goals and objectives.
LEA2 Use personal growth skills in collaborating with others to accomplish organizational goals and objectives.
ELR1 Know and understand the importance of professional ethics and legal responsibilities.
ELR2 Demonstrate workplace ethics specific to Agriculture, Food, and Natural Resources (AFNR) occupations.
FPP1 Apply principles of food processing to maintain equipment and facilities.
FPP2 Apply principles of food science to the food industry.
FPP3 Plan, implement, manage, and/or provide services for the preservation and packaging of food and food products.
FPP4 Identify processing, handling, and storage factors to show how they impact product quality and safety.
ANM1 Apply knowledge of anatomy and physiology to produce and/or manage animals in a domesticated or natural environment.
ANM2 Recognize animal behaviors to facilitate working with animals safely.
ANM3 Provide proper nutrition to maintain animal performance.
ANM4 Know the factors that influence an animal's reproductive cycle to explain species response.
ANM5 Identify environmental factors that affect an animal's performance.
TET1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
PWR1 Apply physical science principles to engineering applications with mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
PWR2 Apply principles of operation and maintenance to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
PWR3 Apply principles of service and repair to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
TEC1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.
NRS5 Practice responsible conduct to protect natural resources.

ENV2 Identify public policies and regulations impacting environmental services to determine their effect on facility operations.

Academic Standards

A1 Recognize, classify, and use real numbers and their properties.
A5 Utilize various formulas in problem-solving situations.
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.
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.
H2 Describe the impact of science and technology on the historical development of the United States in the global community.

21st 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

Aberle, E. D., Forrest, J. C., Gerrard, D. E., & Mills, E. W. (2001). *Principles of meat science* (4th ed.). Dubuque, IA: Kendall/Hunt.

Hofer, L. (n.d). *Processing wild game the easy way* [Video]. (Available from Lee's Meats & Sausages, Tea, SD, 1-888-368-6644, www.leesmeats.com)

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Food Products (Meats) I
Unit 5: Pricing, Wrapping, and Marketing **(22.5 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Compare and contrast consumer trends, supply and demand, and the effects on meat prices. a. Discuss supply and demand and its effects on meat prices. b. Identify current consumer trends.	**Teaching:** • Present a current event item such as the results of a scientific study or a natural disaster that is related to consumer trends and supply and demand. • Divide students into groups and conduct a debate on supply and demand and its effects on meat prices to include current market price, location, cut of meat, quality of meat, and quantity of meat. • Have each student research current consumer trends to include special diets, reduction in fats, and precooked meats and prepare a report. **Assessment:** • Evaluate student participation in debate. • Assess trends report using the Written Report Assessment Rubric located in Appendix D.
2. List the steps and perform a cutting test. a. List the steps in a cutting test. b. Perform a cutting test.	**Teaching:** • List the steps and perform a cutting test. • Have each student list the steps in a cutting test and perform a cutting test to include weigh wholesale cut, weigh fat and bone, weigh each retail cut, price each cut, and then compare to original cost. **Assessment:** • Monitor student performance of cutting test using the Activity Performance Rubric located in Appendix D.
3. Discuss techniques and wrap retail meat. a. Discuss techniques of wrapping retail meats. b. Wrap and label meat for home freezing. c. Wrap, weigh, label, and price meat for retail sale. d. Describe the proper temperatures for maximum storage life of retail meats using a cooler, display case, or freezer. e. Vacuum seal various cuts of meat.	**Teaching:** • Discuss various techniques for wrapping meat to include wrapping and labeling meats for home freezing and wrapping, weighing, labeling, and pricing meats for retail sale. • Given a situation or case, have students work in groups to choose techniques of wrapping retail meats to include correct tray size, poultry mat, correct positioning of meat on tray, tight wrap, good seal, and position of label.

	• Have students work in groups to demonstrate how to wrap and label meat for home freezing to include tearing off desired length of freezer wrapping paper; placing desired portion of meat on the waxed side of the paper; wrapping airtight and taping each package of meat, padding sharp bones if necessary; and labeling each package according to the cut and other customer specifications. • Have each student demonstrate how to wrap, weigh, label, and price meat for retail sale using a commercially available system. • Have each student research the proper temperature ranges for maximum storage life of retail meats using a cooler, display case, or freezer and prepare a report. **Assessment:** • Assess retail meet case study using the Case Study Assessment Rubric located in Appendix D. • Monitor student wrapping using the Activity Performance Rubric located in Appendix D. • Evaluate temperature report for content.
4. Describe marketing principles related to the display of meat. a. Describe marketing principles related to the display of meat. b. Describe the effects vacuum sealing has on shelf life of meat.	**Teaching:** • Discuss marketing principles related to the display of meat including principles of mark-up and the position of retail cuts in meat counter, meat rotation, shelf life, and effects of vacuum sealing on shelf life. • Have students work in groups to develop marketing plans for a given cut based on sample invoices and to develop a grocery store ad, commercial, or sales pitch. Have students present their information to the class for peer-review. • Have students develop a marketing scheme to draw students into the Food Products program and present their information to other students during their classes. • Discuss marketing principles as related to displaying meats in a retail setting. Order materials from agencies such as the American Pork Board, American and

	Mississippi Cattleman's Associations, and other groups, and have students work in groups to develop display cases using materials. Have other teachers or industry personnel judge the displays; award a prize to the winning display(s). • Have each student summarize what he or she learned about the unit and place the summary in his or her notebook. Review the notebooks and reteach as appropriate to ensure mastery. **Assessment:** • Evaluate marketing plan and scheme for content and appearance. • Monitor student participation in display activity. • Review summary of unit for understanding of material and reteach as needed.

STANDARDS

Agriculture, Food, and Natural Resources 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.

LEA1 Use leadership skills in collaborating with others to accomplish organizational goals and objectives.
LEA2 Use personal growth skills in collaborating with others to accomplish organizational goals and objectives.
ELR1 Know and understand the importance of professional ethics and legal responsibilities.
ELR2 Demonstrate workplace ethics specific to Agriculture, Food, and Natural Resources (AFNR) occupations.
FPP1 Apply principles of food processing to maintain equipment and facilities.
FPP2 Apply principles of food science to the food industry.
FPP3 Plan, implement, manage, and/or provide services for the preservation and packaging of food and food products.
FPP4 Identify processing, handling, and storage factors to show how they impact product quality and safety.
ANM1 Apply knowledge of anatomy and physiology to produce and/or manage animals in a domesticated or natural environment.
TET1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
PWR1 Apply physical science principles to engineering applications with mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.

PWR2 Apply principles of operation and maintenance to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
PWR3 Apply principles of service and repair to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
TEC1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.
TEC2 Use available power sources to plan and apply control systems.
TEC3 Explain geospatial technology to demonstrate its applications.
ABS1 Employ leadership skills to accomplish goals and objectives in the AFNR business environment.
ABS2 Practice good record keeping to accomplish AFNR business objectives.
ABS4 Employ AFNR industry concepts and practices to manage inventory.
ABS5 Utilize technology to accomplish AFNR business objectives.
ABS6 Use marketing and sales principles to accomplish an AFNR business objective.

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.
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.
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.
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.).

21st 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

Aberle, E. D., Forrest, J. C., Gerrard, D. E., & Mills, E. W. (2001). *Principles of meat science* (4th ed.). Dubuque, IA: Kendall/Hunt.

Oklahoma Department of Vocational and Technical Education. (1992). *Meat and poultry processing*. Stillwater, OK: Curriculum Instructional Materials Center.

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Food Products (Meats) I
Unit 6: Special Topics in Food Products (Meats) I (Ongoing) (32.5 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.)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Investigate new and emerging technologies, practices, trends, and issues associated with Food Products (Meats). a. Prepare a report on a new and emerging technology associated with Food Products (Meats). b. Prepare a report on a current trend or issue associated with Food Products (Meats).	**Teaching:** • Have each student conduct research and prepare a report on a new or emerging technology, trend, or issue associated with Food Products (Meats). **Assessment:** • Evaluate report using the Written Report Assessment Rubric located in Appendix D.
2. Complete school-to-careers activities related to Food Products (Meats). a. Participate in a school-to-careers activity (shadowing, mentoring, career fair, etc.) related to Food Products (Meats). b. Investigate educational opportunities related to Food Products (Meats) at the postsecondary level. c. Describe national standards and certification/licensing procedures related to Food Products (Meats). d. Describe the role of trade organizations, associations, and unions as related to Food Products (Meats)	**Teaching:** • Have each student participate in a school-to-careers activity such as a shadowing or mentoring experience, or a career fair. • Have students work in groups to investigate postsecondary educational opportunities at the community/junior college, four-year college, and apprenticeship level and prepare a chart, electronic presentation, or booklet. • Have students work in groups to investigate any national standards that apply to Food Products (Meats) and prepare a written report on national or regional certification or licensure programs or agencies. • Have each student identify trade associations, professional organizations, and unions associated with Food Products (Meats) and describe how their role affects employees in an oral presentation. **Assessment:** • Monitor student participation in school-to-careers activity. • Evaluate educational opportunities product for content and appearance. • Assess certification/licensure report using the Written Report Checklist located in

	Appendix D. • Evaluate organization presentation using the Presentation Checklist located in Appendix D.
3. Demonstrate related academic skills and workplace skills associated with Food Products (Meats). a. Complete a cooperative project (paper, presentation, or demonstration) associated with an academic subject and Food Products (Meats). b. Practice human relations skills (team participation, client/customer service, leadership, negotiation, working with culturally diverse groups, etc.) related to Food Products (Meats). c. Research work ethics and employer expectations of employees in Food Products (Meats).	**Teaching:** • Have students work in groups to complete a cooperative project such as a paper, presentation, or demonstration associated with a related academic subject. • Lead students to practice human relations skills such as team participation, client/customer service, and negotiation throughout the year in Food Products (Meats). • Have students research acceptable work ethics and determine employer expectations for persons employed in Food Products (Meats) by interviewing employers, supervisors, and employees and reporting back to the class. **Assessment:** • Evaluate cooperative project for content. • Monitor practice of human relations skills. • Assess report on work ethics and employer expectations for content and presentation.
4. Investigate the concepts of quality assurance as related to Food Products (Meats). a. Describe quality concepts and methods for measuring quality related to Food Products (Meats). b. Apply quality concepts in the Food Products (Meats) laboratory.	**Teaching:** • Lead a discussion of the concepts of quality assurance and the methods that can be used to measure quality and gauge quality improvement as related to Food Products (Meats). • Have students apply quality concepts in the Food Products (Meats) by measuring the quality of their work and charting the increase in quality over time. **Assessment:** • Evaluate student assignment to chart quality increase over time in school laboratory or work experience for content and appearance.
5. Examine trends and changes related to Food Products (Meats) and global economic factors. a. Define and discuss the concept of global economics and competition. b. Describe global economic factors and	**Teaching:** • Lead a discussion of the different concepts of global economics and competition as related to Food Products (Meats). • Lead a discussion, using current newspaper and magazine articles, on

competition as related to Food Products (Meats). c. Identify regions and other countries which compete in Food Products (Meats).	specific issues related to Food Products (Meats) and global economics and competition. Identify other countries which compete with products made in the United States. • Have students determine other regions and countries that affect competition in Food Products (Meats) and describe in an oral presentation ways in which this competition affects workers. • Have each student summarize what he or she learned about the unit and place the summary in his or her notebook. Review the notebooks and reteach as appropriate to ensure mastery. **Assessment:** • Monitor student participation in discussions. • Evaluate competition report for content and presentation. • Review summary of unit for understanding of material and reteach as needed.

STANDARDS

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ELR1 Know and understand the importance of professional ethics and legal responsibilities.
ELR2 Demonstrate workplace ethics specific to Agriculture, Food, and Natural Resources (AFNR) occupations.
FPP1 Apply principles of food processing to maintain equipment and facilities.
FPP2 Apply principles of food science to the food industry.
FPP3 Plan, implement, manage, and/or provide services for the preservation and packaging of food and food products.
FPP4 Identify processing, handling, and storage factors to show how they impact product quality and safety.
ANM1 Apply knowledge of anatomy and physiology to produce and/or manage animals in a domesticated or natural environment.

ANM2 Recognize animal behaviors to facilitate working with animals safely.
ANM3 Provide proper nutrition to maintain animal performance.
ANM4 Know the factors that influence an animal's reproductive cycle to explain species response.
ANM5 Identify environmental factors that affect an animal's performance.
TET1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
PWR1 Apply physical science principles to engineering applications with mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
PWR2 Apply principles of operation and maintenance to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
PWR3 Apply principles of service and repair to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
TEC1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.
NRS4 Employ knowledge of natural resource industries to describe production practices and processing procedures.
NRS5 Practice responsible conduct to protect natural resources.
ENV2 Identify public policies and regulations impacting environmental services to determine their effect on facility operations.
ABS1 Employ leadership skills to accomplish goals and objectives in the AFNR business environment.
ABS2 Practice good record keeping to accomplish AFNR business objectives.
ABS4 Employ AFNR industry concepts and practices to manage inventory.
ABS5 Utilize technology to accomplish AFNR business objectives.
ABS6 Use marketing and sales principles to accomplish an AFNR business objective.

Academic Standards

A1 Recognize, classify, and use real numbers and their properties.
A5 Utilize various formulas in problem-solving situations.
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.
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.

Secondary Food Products (Meats)

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.
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.

21st 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

Meat and Poultry. (n.d.). Retrieved March 23, 2006, from http://www.meatpoultry.com/

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Food Products (Meats) II
Unit 1: Identification and Fabrication of Carcass and Box Beef (60 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Identify and fabricate cuts of beef. a. Identify carcass break cuts of beef. b. Make retail cuts of round. c. Make retail cuts of loin. d. Make retail cuts of rib. e. Make retail cuts of chuck. f. Make retail cuts of foreshank. g. Make retail cuts of brisket. h. Make retail cuts of plate. i. Make retail cuts of flank.	**Teaching:** • Show students grocery store ads and have them identify various cuts. • Show students videos demonstrating procedures for making various cuts, and discuss steps involved. • Have students identify carcass break cuts of beef to include round, loin, beef, chuck, foreshank, brisket, plate, and flank. • Have students make retail cuts of round to include top round, bottom round, eye o'round, heel o'round, round steak, tip roast, and rump roast. • Have students make retail cuts of loin to include sirloin steak, porterhouse steak, t-bone steak, club steak, top loin steak, and tenderloin steak. • Have students make retail cuts of rib to include ribeye steak, ribeye roast, prime rib roast, rib steak, and bone-in rib roast. • Have students make retail cuts of chuck to include chuck eye roast and steak, blade chuck roast and steak, 7-bone chuck roast and steak, top blade chuck roast and steak, under blade chuck roast and steak, and arm roast and steak. • Have students make retail cuts of foreshank to include shank cross cuts, soup bone, and ground beef. • Have students make retail cuts of brisket to include bone-in brisket, boneless brisket, and ground beef. • Have students make retail cuts of plate to include stew meat, short ribs, and ground beef. • Have students make retail cuts of flank to include flank steak and ground beef. • Have students keep a journal of questions that arise as they work. **Assessment:** • Pre-assess student knowledge of cuts. • Monitor student work using the Activity

	Performance Rubric located in Appendix D.
2. Identify and fabricate variety cuts of beef. a. Make retail cuts of tongue. b. Make retail cuts of heart. c. Make retail cuts of liver. d. Make retail cuts of kidney. e. Make retail cuts of brain.	**Teaching:** • Show students videos demonstrating procedures for making various cuts, and discuss steps involved. • Have students make retail cuts of tongue. • Have students make retail cuts of heart. • Have students make retail cuts of liver. • Have students make retail cuts of kidney. • Have students make retail cuts of brain. • Have each student summarize what he or she learned about the unit and place the summary in his or her notebook. Review the notebooks and reteach as appropriate to ensure mastery. **Assessment:** • Monitor student work using the Activity Performance Rubric located in Appendix D. • Review summary of unit for understanding of material and reteach as needed.

STANDARDS

Agriculture, Food, and Natural Resources 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.

LEA1 Use leadership skills in collaborating with others to accomplish organizational goals and objectives.
LEA2 Use personal growth skills in collaborating with others to accomplish organizational goals and objectives.
ELR1 Know and understand the importance of professional ethics and legal responsibilities.
ELR2 Demonstrate workplace ethics specific to Agriculture, Food, and Natural Resources (AFNR) occupations.
FPP1 Apply principles of food processing to maintain equipment and facilities.
FPP2 Apply principles of food science to the food industry.
FPP3 Plan, implement, manage, and/or provide services for the preservation and packaging of food and food products.
FPP4 Identify processing, handling, and storage factors to show how they impact product quality and safety.
ANM1 Apply knowledge of anatomy and physiology to produce and/or manage animals in a domesticated or natural environment.

ANM3 Provide proper nutrition to maintain animal performance.
ANM5 Identify environmental factors that affect an animal's performance.
TET1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
PWR1 Apply physical science principles to engineering applications with mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
PWR2 Apply principles of operation and maintenance to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
PWR3 Apply principles of service and repair to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
TEC1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.
NRS4 Employ knowledge of natural resource industries to describe production practices and processing procedures.
NRS5 Practice responsible conduct to protect natural resources.
ENV2 Identify public policies and regulations impacting environmental services to determine their effect on facility operations.
ENV3 Apply scientific principles to environmental services.
ABS1 Employ leadership skills to accomplish goals and objectives in the AFNR business environment.
ABS2 Practice good record keeping to accomplish AFNR business objectives.
ABS4 Employ AFNR industry concepts and practices to manage inventory.
ABS5 Utilize technology to accomplish AFNR business objectives.
ABS6 Use marketing and sales principles to accomplish an AFNR business objective.

Academic Standards

A1 Recognize, classify, and use real numbers and their properties.
A5 Utilize various formulas in problem-solving situations.
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.
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.
H2 Describe the impact of science and technology on the historical development of the United States in the global community.

21st 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

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Davis, G. W. (n.d.). *Beef retail cut ID* [Video]. Lubbock, TX: Creative Education Video.

Oklahoma Department of Vocational and Technical Education. (1992). *Meat and poultry processing*. Stillwater, OK: Curriculum Instructional Materials Center.

Romans, J. R., Costello, W. J., Carlson, C. W., & Greaser, M. L. (2001). *The meat we eat* (14th ed.). Danville, IL: Interstate.

Weiss, E., & Weiss, H. (1991). *Catering handbook*. New York: John Wiley & Sons.

Food Products (Meats) II
Unit 2: Identification and Fabrication of Carcass and Box Pork (37.5 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Identify and fabricate cuts of pork. a. Identify carcass break cuts of pork. b. Make retail cuts of ham. c. Make retail cuts of loin. d. Make retail cuts of shoulder (Boston butt and picnic). e. Make retail cuts of side.	**Teaching:** • Show students grocery store ads and have them identify various cuts. • Show students videos demonstrating procedures for making various cuts, and discuss steps involved. • Have students identify carcass break cuts of pork to include ham, loin, shoulder, and side. • Have students make retail cuts of ham to include shank half, butt half, center slice, whole ham, and hocks. • Have students make retail cuts of loin to include sirloin chops, blade chops, rib chops, center cut chops, loin eye roast, butterfly chops, and bone-in roast. • Have students make retail cuts of shoulder to include Boston butt and picnic, blade steak, boneless shoulder roast, and grind for sausage. • Have students make retail cuts of side to include salt pork, spare ribs, and slab bacon. • Have students keep a journal of questions that arise as they work. **Assessment:** • Pre-assess student knowledge of cuts. • Monitor student work using the Activity Performance Rubric located in Appendix D.
2. Identify and fabricate retail variety cuts of pork. a. Make retail cuts of tongue. b. Make retail cuts of liver. c. Make retail cuts of chitterlings. d. Make retail cuts of stomach. e. Make retail cuts of kidneys. f. Make retail cuts of snouts.	**Teaching:** • Show students videos demonstrating procedures for making various cuts, and discuss steps involved. • Have students make retail cuts of tongue. • Have students make retail cuts of chitterlings. • Have students make retail cuts of stomach. • Have students make retail cuts of kidneys. • Have students make retail cuts of snouts. • Have each student summarize what he or she learned about the unit and place the

	summary in his or her notebook. Review the notebooks and reteach as appropriate to ensure mastery. **Assessment:** • Monitor student work using the Activity Performance Rubric located in Appendix D. • Review summary of unit for understanding of material and reteach as needed.

STANDARDS

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FPP2 Apply principles of food science to the food industry.
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FPP4 Identify processing, handling, and storage factors to show how they impact product quality and safety.
ANM1 Apply knowledge of anatomy and physiology to produce and/or manage animals in a domesticated or natural environment.
ANM3 Provide proper nutrition to maintain animal performance.
ANM5 Identify environmental factors that affect an animal's performance.
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PWR1 Apply physical science principles to engineering applications with mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
PWR2 Apply principles of operation and maintenance to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
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TEC1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.

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ABS6 Use marketing and sales principles to accomplish an AFNR business objective.

Academic Standards

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B3 Investigate cell structures, functions, and methods of reproduction.
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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.
H2 Describe the impact of science and technology on the historical development of the United States in the global community.

21st 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

Secondary Food Products (Meats)

CS6 Interpersonal and Self-Directional Skills

SUGGESTED REFERENCES

Aberle, E. D., Forrest, J. C., Gerrard, D. E., & Mills, E. W. (2001). *Principles of meat science* (4th ed.). Dubuque, IA: Kendall/Hunt.

Davis, G. W. (n.d.). *Pork retail cut ID* [Video]. Lubbock, TX: Creative Education Video.

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Food Products (Meats) II
Unit 3: Identification and Fabrication of Carcass Lamb and Goat (15 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Identify and fabricate cuts of lamb and goat. a. Identify carcass break cuts of lamb and goat. b. Identify retail cuts of leg. c. Identify retail cuts of loin. d. Identify retail cuts of rib. e. Identify retail cuts of shoulder. f. Identify retail cuts of foreshank and breast.	**Teaching:** • Show students grocery store ads and have them identify various cuts. • Show students videos demonstrating procedures for making various cuts, and discuss steps involved. • Have students identify carcass break cuts of lamb to include leg, loin, rib, shoulder, foreshank, and breast. • Have students make retail cuts of leg to include whole leg, center cut leg roast, French style roast, center slice, hind shank, and boneless leg roast. • Have students make retail cuts of loin to include loin chop and double loin chop. • Have students make retail cuts of rib to include rib chop, French style rib chop, rib roast, and crown roast. • Have students make retail cuts of shoulder to include square cut shoulder, boneless shoulder roast, blade chop, arm chop, and neck slice. • Have students make retail cuts of foreshank and breast to include shank, spareribs, boneless rolled breast, and riblets. • Have students keep a journal of questions that arise as they work. • Have each student summarize what he or she learned about the unit and place the summary in his or her notebook. Review the notebooks and reteach as appropriate to ensure mastery. **Assessment:** • Pre-assess student knowledge of cuts. • Monitor student work using the Activity Performance Rubric located in Appendix D. • Review summary of unit for understanding of material and reteach as needed.

STANDARDS

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ELR1 Know and understand the importance of professional ethics and legal responsibilities.
ELR2 Demonstrate workplace ethics specific to Agriculture, Food, and Natural Resources (AFNR) occupations.
FPP1 Apply principles of food processing to maintain equipment and facilities.
FPP2 Apply principles of food science to the food industry.
FPP3 Plan, implement, manage, and/or provide services for the preservation and packaging of food and food products.
FPP4 Identify processing, handling, and storage factors to show how they impact product quality and safety.
ANM1 Apply knowledge of anatomy and physiology to produce and/or manage animals in a domesticated or natural environment.
ANM3 Provide proper nutrition to maintain animal performance.
ANM5 Identify environmental factors that affect an animal's performance.
TET1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
PWR1 Apply physical science principles to engineering applications with mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
PWR2 Apply principles of operation and maintenance to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
PWR3 Apply principles of service and repair to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
TEC1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.
NRS4 Employ knowledge of natural resource industries to describe production practices and processing procedures.
NRS5 Practice responsible conduct to protect natural resources.
ENV2 Identify public policies and regulations impacting environmental services to determine their effect on facility operations.
ENV3 Apply scientific principles to environmental services.
ABS1 Employ leadership skills to accomplish goals and objectives in the AFNR business environment.
ABS2 Practice good record keeping to accomplish AFNR business objectives.
ABS4 Employ AFNR industry concepts and practices to manage inventory.
ABS5 Utilize technology to accomplish AFNR business objectives.

ABS6 Use marketing and sales principles to accomplish an AFNR business objective.

Academic Standards

A1 Recognize, classify, and use real numbers and their properties.
A5 Utilize various formulas in problem-solving situations.
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.
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.
H2 Describe the impact of science and technology on the historical development of the United States in the global community.

21st 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

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Food Products (Meats) II
Unit 4: Identification and Fabrication of Poultry and Fish (7.5 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Identify and fabricate cuts of poultry. a. Identify carcass break cuts of poultry. b. Make retail cuts of breast quarter. c. Make retail cuts of leg quarter. d. Make retail cuts of back quarter.	**Teaching:** • Take students on a field trip to a local poultry processor. • Have students work in groups to research the importance of poultry in Mississippi and prepare a report. • Show students videos demonstrating procedures for making various cuts, and discuss steps involved. • Have students identify carcass break cuts of poultry to include breast quarter, leg quarter, and back quarter. • Have students make retail cuts of breast quarter to include breast and wing, dreamboat, and boneless breast. • Have students make retail cuts of leg quarter to include thigh and leg. • Have students make retail cuts of back quarter to include back. • Have students keep a journal of questions that arise as they work. **Assessment:** • Monitor student participation in field trip using the Field Trip Participation Checklist located in Appendix D. • Assess poultry report using the Written Report Checklist located in Appendix D. • Monitor student work using the Activity Performance Rubric located in Appendix D.
2. Identify variety cuts of poultry. a. Identify retail cuts of heart. b. Identify retail cuts of liver. c. Identify retail cuts of gizzard. d. Identify retail cuts of neck.	**Teaching:** • Show students videos demonstrating procedures for making various cuts, and discuss steps involved. • Have students make retail cut of heart. • Have students make retail cut of liver. • Have students make retail cut of gizzard. • Have students make retail cut of neck. **Assessment:** • Monitor student work using the Activity Performance Rubric located in Appendix D.

3. Identify retail cuts of fish.	**Teaching:** • Have students work in groups to research the importance of catfish in Mississippi and prepare a bulletin board or other display. • Demonstrate procedures for making retail cuts of fish. • Have students identify and make retail cuts of fish to include whole fish or fillet fish. • Have each student summarize what he or she learned about the unit and place the summary in his or her notebook. Review the notebooks and reteach as appropriate to ensure mastery. **Assessment:** • Review catfish project for content and appearance. • Monitor student work using the Activity Performance Rubric located in Appendix D. • Review summary of unit for understanding of material and reteach as needed.

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FPP3 Plan, implement, manage, and/or provide services for the preservation and packaging of food and food products.
FPP4 Identify processing, handling, and storage factors to show how they impact product quality and safety.
ANM1 Apply knowledge of anatomy and physiology to produce and/or manage animals in a domesticated or natural environment.

ANM3 Provide proper nutrition to maintain animal performance.
ANM5 Identify environmental factors that affect an animal's performance.
TET1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
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ABS6 Use marketing and sales principles to accomplish an AFNR business objective.

Academic Standards

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B1 Utilize critical thinking and scientific problem solving in designing and performing biological research and experimentation.
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Food Products (Meats) II
Unit 5: Identification and Fabrication of Wild Game **(20 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Identify and fabricate cuts of wild game. a. Make cuts of top round. b. Make cuts of bottom round. c. Make cuts of tip roast. d. Make cuts of eye round. e. Make cuts of loin eye. f. Make cuts of ribs. f. Debone front shoulders.	**Teaching:** • Have students work in groups to research the importance of wild game in Mississippi and prepare a bulletin board or other display. • Demonstrate procedures for making cuts of wild game. • Have students identify and make cuts of wild game including top round, bottom round, tip roast, eye round, loin eye, and ribs. Have students debone front shoulders. **Assessment:** • Review wild game project for content and appearance. • Monitor student work using the Activity Performance Rubric located in Appendix D.
2. Prepare wild game specialty products. a. Prepare various sausage products. b. Prepare ground products. c. Prepare jerky products.	**Teaching:** • Demonstrate procedures for making wild game specialty products. • Have students identify and make wild game specialty products including sausage, ground products, and jerky. • Have each student summarize what he or she learned about the unit and place the summary in his or her notebook. Review the notebooks and reteach as appropriate to ensure mastery. **Assessment:** • Monitor student work using the Activity Performance Rubric located in Appendix D. • Review summary of unit for understanding of material and reteach as needed.

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ANM1 Apply knowledge of anatomy and physiology to produce and/or manage animals in a domesticated or natural environment.
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PWR3 Apply principles of service and repair to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
TEC1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.
NRS4 Employ knowledge of natural resource industries to describe production practices and processing procedures.
NRS5 Practice responsible conduct to protect natural resources.
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A5 Utilize various formulas in problem-solving situations.
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.
E1 Produce writing which reflects increasing proficiency through planning, writing, revising, and editing and which is specific to audience and purpose.
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Food Products (Meats) II
Unit 6: Automated Processing of Meats **(7.5 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Observe the automated processing of various types of meat. a. Observe step-by-step procedures for the automated slaughtering and fabrication processing of beef, pork, lamb, poultry, and fish. b. Observe step-by-step procedures for the automated canning processing of beef, pork, poultry, and fish.	**Teaching:** • Take students on a field trip or show a video about processing plants. Lead students in a discussion about automated processing of beef, pork, lamb, poultry, and fish. • Have students describe step-by-step procedures of automated processing of beef, pork, lamb, poultry, and fish to include slaughtering, fabrication, and canning processes, as appropriate. • Have students use magazines or the Internet to research new technologies in automated processing and develop a bulletin board or brochure about the product. • Have each student summarize what he or she learned about the unit and place the summary in his or her notebook. Review the notebooks and reteach as appropriate to ensure mastery. **Assessment:** • Evaluate student list of processing procedures. • Assess technologies project for content and appearance. • Review summary of unit for understanding of material and reteach as needed.

STANDARDS

Agriculture, Food, and Natural Resources 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.

LEA1 Use leadership skills in collaborating with others to accomplish organizational goals and objectives.
LEA2 Use personal growth skills in collaborating with others to accomplish organizational goals and objectives.
ELR1 Know and understand the importance of professional ethics and legal responsibilities.

ELR2 Demonstrate workplace ethics specific to Agriculture, Food, and Natural Resources (AFNR) occupations.
FPP1 Apply principles of food processing to maintain equipment and facilities.
FPP2 Apply principles of food science to the food industry.
FPP3 Plan, implement, manage, and/or provide services for the preservation and packaging of food and food products.
FPP4 Identify processing, handling, and storage factors to show how they impact product quality and safety.
ANM1 Apply knowledge of anatomy and physiology to produce and/or manage animals in a domesticated or natural environment.
TET1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
PWR1 Apply physical science principles to engineering applications with mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
PWR2 Apply principles of operation and maintenance to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
PWR3 Apply principles of service and repair to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
TEC1 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.
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.
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.
H2 Describe the impact of science and technology on the historical development of the United States in the global community.

21st Century Skills

CS1 Global Awareness

Secondary Food Products (Meats)

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

Aberle, E. D., Forrest, J. C., Gerrard, D. E., & Mills, E. W. (2001). *Principles of meat science* (4th ed.). Dubuque, IA: Kendall/Hunt.

Oklahoma Department of Vocational and Technical Education. (1992). *Meat and poultry processing*. Stillwater, OK: Curriculum Instructional Materials Center.

Romans, J. R., Costello, W. J., Carlson, C. W., & Greaser, M. L. (2001). *The meat we eat* (14th ed.). Danville, IL: Interstate.

Weiss, E., & Weiss, H. (1991). *Catering handbook*. New York: John Wiley & Sons.

Food Products (Meats) II
Unit 7: Quality and Yield Grading **(18 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Explain quality and yield grades for beef and determine classifications of beef. a. Explain quality grades for beef. b. Explain yield grades of beef. c. Determine classification of beef. d. Estimate amount of kidney fat, pelvic fat, and age. e. Estimate amount of marbling in a ribeye.	**Teaching:** • Show students quality and yield grades for various animals and have them determine classifications. • Show videos on quality grades, yield grades, classification, and estimation. Have students summarize key points. • Have students use artificial meat models to practice grading and classification. • Have students explain quality grades for beef to include prime, choice, select, standard, commercial, utility, cutter, and canner. • Have student explain yield grades of beef to include 1, 2, 3, 4, and 5. • Have student determine classification of beef to include bull, cow, heifer, steer, and stag. • Have student estimate amount of kidney, pelvic fat, and age. • Have student estimate amount of marbling in a ribeye. **Assessment:** • Review video summary for content. • Monitor student work using the Activity Performance Rubric located in Appendix D.
2. Explain quality grades and determine classification of pork. a. Explain quality grades for pork. b. Determine classification of pork.	**Teaching:** • Show students quality and yield grades for various animals and have them determine classifications. • Show videos on quality grades, yield grades, classification, and estimation. Have students summarize key points. • Have students use artificial meat models to practice grading and classification. • Have student explain quality grades for pork to include US1, US2, US3, Medium, and cull. • Have student determine classification of pork to include barrow, gilt, boar, sow, and stag.

	Assessment: • Review video summary for content. • Monitor student work using the Activity Performance Rubric located in Appendix D.
3. Explain quality and yield grades for lamb and determine classifications of sheep. a. Explain quality grades of lamb. b. Explain yield grades of lamb. c. Determine classification of sheep.	**Teaching:** • Show students quality and yield grades for various animals and have them determine classifications. • Show videos on quality grades, yield grades, classification, and estimation. Have students summarize key points. • Have students use artificial meat models to practice grading and classification. • Have student explain quality grades of lamb to include prime, choice, good, utility, and cull. • Have student explain yield grades of lamb to include 1, 2, 3, 4, and 5. • Have student determine classification of sheep to include lamb, yearling, and mutton. **Assessment:** • Review video summary for content. • Monitor student work using the Activity Performance Rubric located in Appendix D.
4. Explain grades in poultry. a. Explain grades of poultry. b. Discuss poultry classifications.	**Teaching:** • Show students quality and yield grades for various animals and have them determine classifications. • Show videos on quality grades, yield grades, classification, and estimation. Have students summarize key points. • Have students research the use of various parts and grades of poultry and where various products are shipped and prepare a written report. • Have students use artificial meat models to practice grading and classification. • Have student explain grades of poultry to include A grade and plant grade. • Have each student summarize what he or she learned about the unit and place the summary in his or her notebook. Review the notebooks and reteach as appropriate to

	ensure mastery. **Assessment:** • Review video summary for content. • Evaluate poultry report using the Written Report Checklist located in Appendix D. • Monitor student work using the Activity Performance Rubric located in Appendix D. • Review summary of unit for understanding of material and reteach as needed.

STANDARDS

Agriculture, Food, and Natural Resources Standards

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LEA1 Use leadership skills in collaborating with others to accomplish organizational goals and objectives.
LEA2 Use personal growth skills in collaborating with others to accomplish organizational goals and objectives.
ELR1 Know and understand the importance of professional ethics and legal responsibilities.
ELR2 Demonstrate workplace ethics specific to Agriculture, Food, and Natural Resources (AFNR) occupations.
FPP1 Apply principles of food processing to maintain equipment and facilities.
FPP2 Apply principles of food science to the food industry.
FPP3 Plan, implement, manage, and/or provide services for the preservation and packaging of food and food products.
FPP4 Identify processing, handling, and storage factors to show how they impact product quality and safety.
ANM1 Apply knowledge of anatomy and physiology to produce and/or manage animals in a domesticated or natural environment.
TET1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
PWR1 Apply physical science principles to engineering applications with mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
PWR2 Apply principles of operation and maintenance to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
TEC1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.
ABS1 Employ leadership skills to accomplish goals and objectives in the AFNR business environment.
ABS5 Utilize technology to accomplish AFNR business objectives.

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.
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.
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.
H2 Describe the impact of science and technology on the historical development of the United States in the global community.
H4 Demonstrate the ability to use social studies tools (e.g., timelines, maps, globes, resources, graphs, a compass, technology, etc.).

21st 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

Aberle, E. D., Forrest, J. C., Gerrard, D. E., & Mills, E. W. (2001). *Principles of meat science* (4th ed.). Dubuque, IA: Kendall/Hunt.

Butler, M., & McCain J. (n.d.). *Beef grading: Quality* [Video]. Lubbock, TX: Creative Education Video.

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Oklahoma Department of Vocational and Technical Education. (1992). *Meat and poultry processing*. Stillwater, OK: Curriculum Instructional Materials Center.

Romans, J. R., Costello, W. J., Carlson, C. W., & Greaser, M. L. (2001). *The meat we eat* (14th ed.). Danville, IL: Interstate.

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Food Products (Meats) II
Unit 8: Curing, Smoking, and Sausage Making (18 hours)

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Explain and demonstrate meat curing and smoking processes. a. Define curing, smoking, and sausage making terms. b. Describe the functions of curing and smoking. c. Describe meat curing ingredients and calculate correct amount of each. d. Explain methods of meat curing. e. Identify and use equipment used in smoking and curing process. f. Cure bacon in brine solution. g. Cure jowl in brine solution. h. Pump shoulders. i. Pump hams. j. Pump loin. k. Smoke shoulder, ham, loins, bacon, and jowls in smoker.	**Teaching:** • Have students define curing, smoking, and sausage making terms to include artery cure, cover pickle, emersion cure, injection cure, overhaul, quick cure, salinometer, and stitch or gun and create a dictionary. • Discuss the functions of curing and smoking to include color development (internal and external), flavor development, preservation, and shelf life extension. • Explain meat curing ingredients including salt, sugar, nitrite and nitrate, sodium erythorbate and ascorbate, alkaline phosphates, spices and flavorings, and water. Have each student calculate the correct amount of each. • Discuss and demonstrate meat curing methods and describe their effect on product weight and grade to include dry salt cure, dry sugar cure, box curing, hot salt cure, sweet pickle cure, combination cure, pump pickling, and artery cure. • Have students identify and use equipment used in smoking and curing process to include grinder, stuffer, mixer, casing, pump, curing tank, ham hooks, bacon hooks, stockinette, smoke sticks, and smoke house. • Have students cure bacon in brine solution, cure jowl in brine solution, pump shoulders, pump hams, and pump loin. • Have students work in groups to research how climate affects the various spices used throughout the world in curing, smoking, and sausage making. Have each group develop a map indicating the climate, spices, and types of meats produced in various areas. • Have each student develop a sausage recipe, bring the materials to make the sausage, prepare the sausage, develop a

	label and marketing scheme, and present the product to the class for peer-review. **Assessment:** • Review dictionary for accuracy. • Assess calculations for correctness. • Monitor student work using the Activity Performance Rubric located in Appendix D. • Evaluate map for accuracy and appearance.
2. Explain and demonstrate sausage making. a. Mix and grind sausage with cure and seasoning. b. Read a salinometer. c. Prepare a brine solution. d. Stuff sausage in casing. e. Smoke sausage in smoker.	**Teaching:** • Explain and demonstrate sausage making processes. • Have students mix and grind sausage with cure and seasoning. • Have students read a salinometer. • Have students prepare a brine solution. • Have students stuff sausage in casing. • Have students smoke sausage in smoker. • Have each student summarize what he or she learned about the unit and place the summary in his or her notebook. Review the notebooks and reteach as appropriate to ensure mastery. **Assessment:** • Monitor student work using the Activity Performance Rubric located in Appendix D. • Review summary of unit for understanding of material and reteach as needed.

STANDARDS

Agriculture, Food, and Natural Resources 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.

LEA1 Use leadership skills in collaborating with others to accomplish organizational goals and objectives.
LEA2 Use personal growth skills in collaborating with others to accomplish organizational goals and objectives.
ELR1 Know and understand the importance of professional ethics and legal responsibilities.
ELR2 Demonstrate workplace ethics specific to Agriculture, Food, and Natural Resources (AFNR) occupations.

FPP1 Apply principles of food processing to maintain equipment and facilities.
FPP2 Apply principles of food science to the food industry.
FPP3 Plan, implement, manage, and/or provide services for the preservation and packaging of food and food products.
FPP4 Identify processing, handling, and storage factors to show how they impact product quality and safety.
ANM1 Apply knowledge of anatomy and physiology to produce and/or manage animals in a domesticated or natural environment.
TET1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
PWR1 Apply physical science principles to engineering applications with mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
PWR2 Apply principles of operation and maintenance to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
PWR3 Apply principles of service and repair to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
TEC1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.
ABS1 Employ leadership skills to accomplish goals and objectives in the AFNR business environment.
ABS2 Practice good record keeping to accomplish AFNR business objectives.
ABS4 Employ AFNR industry concepts and practices to manage inventory.
ABS5 Utilize technology to accomplish AFNR business objectives.
ABS6 Use marketing and sales principles to accomplish an AFNR business objective.

Academic Standards

A1 Recognize, classify, and use real numbers and their properties.
A5 Utilize various formulas in problem-solving situations.
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.
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.
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.
H4 Demonstrate the ability to use social studies tools (e.g., timelines, maps, globes, resources, graphs, a compass, technology, etc.).

21st 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

Aberle, E. D., Forrest, J. C., Gerrard, D. E., & Mills, E. W. (2001). *Principles of meat science* (4th ed.). Dubuque, IA: Kendall/Hunt.

Harris, K. (n.d.). *Value added and specialty products* [Video]. Lubbock, TX: Creative Education Video.

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Romans, J. R., Costello, W. J., Carlson, C. W., & Greaser, M. L. (2001). *The meat we eat* (14th ed.). Danville, IL: Interstate.

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Food Products (Meats) II
Unit 9: Special Topics in Food Products (Meats) II **(18 hours)**

Competencies and Suggested Objectives	Suggested Strategies for Competencies
1. Investigate new and emerging technologies, practices, trends, and issues associated with Food Products (Meats). a. Prepare a report on a new and emerging technology associated with Food Products (Meats). b. Prepare a report on a current trend or issue associated with Food Products (Meats).	**Teaching:** • Have each student conduct research and prepare a report on a new or emerging technology, trend, or issue associated with Food Products (Meats). **Assessment:** • Evaluate report using the Written Report Assessment Rubric located in Appendix D.
2. Complete school-to-careers activities related to Food Products (Meats). a. Participate in a school-to-careers activity (shadowing, mentoring, career fair, etc.) related to Food Products (Meats). b. Investigate educational opportunities related to Food Products (Meats) at the postsecondary level. c. Describe national standards and certification/licensing procedures related to Food Products (Meats). d. Describe the role of trade organizations, associations, and unions as related to Food Products (Meats).	**Teaching:** • Have each student participate in a school-to-careers activity such as a shadowing or mentoring experience, or a career fair. • Have students work in groups to investigate postsecondary educational opportunities at the community/junior college, four-year college, and apprenticeship level and prepare a chart, electronic presentation, or booklet. • Have students work in groups to investigate any national standards that apply to Food Products (Meats) and prepare a written report on national or regional certification or licensure programs or agencies. • Have each student identify trade associations, professional organizations, and unions associated with Food Products (Meats) and describe how their role affects employees in an oral presentation. **Assessment:** • Monitor student participation in school-to-careers activity. • Evaluate educational opportunities product for content and appearance. • Assess certification/licensure report using the Written Report Checklist located in Appendix D. • Evaluate organization presentation using the Presentation Checklist located in Appendix D.
3. Demonstrate related academic skills and	**Teaching:**

workplace skills associated with Food Products (Meats). a. Complete a cooperative project (paper, presentation, or demonstration) associated with an academic subject and Food Products (Meats). b. Practice human relations skills (team participation, client/customer service, leadership, negotiation, working with culturally diverse groups, etc.) related to Food Products (Meats). c. Research work ethics and employer expectations of employees in Food Products (Meats).	• Have students work in groups to complete a cooperative project such as a paper, presentation, or demonstration associated with a related academic subject. • Lead students to practice human relations skills such as team participation, client/customer service, and negotiation throughout the year in Food Products (Meats). • Have students research acceptable work ethics and determine employer expectations for persons employed in Food Products (Meats) by interviewing employers, supervisors, and employees and reporting back to the class. **Assessment:** • Evaluate cooperative project for content. • Monitor practice of human relations skills. • Assess report on work ethics and employer expectations for content and presentation.
4. Investigate the concepts of quality assurance as related to Food Products (Meats). a. Describe quality concepts and methods for measuring quality related to Food Products (Meats). b. Apply quality concepts in the Food Products (Meats) laboratory.	**Teaching:** • Lead a discussion of the concepts of quality assurance and the methods that can be used to measure quality and gauge quality improvement as related to Food Products (Meats). • Have students apply quality concepts in the Food Products (Meats) by measuring the quality of their work and charting the increase in quality over time. **Assessment:** • Evaluate student assignment to chart quality increase over time in school laboratory or work experience for content and appearance.
5. Examine trends and changes related to Food Products (Meats) and global economic factors. a. Define and discuss the concept of global economics and competition. b. Describe global economic factors and competition as related to Food Products (Meats). c. Identify regions and other countries which compete in Food Products (Meats).	**Teaching:** • Lead a discussion of the different concepts of global economics and competition as related to Food Products (Meats). • Lead a discussion, using current newspaper and magazine articles, on specific issues related to Food Products (Meats) and global economics and competition. Identify other countries which compete with products made in the United States.

	• Have students determine other regions and countries that affect competition in Food Products (Meats) and describe in an oral presentation ways in which this competition affects workers. • Have each student summarize what he or she learned about the unit and place the summary in his or her notebook. Review the notebooks and reteach as appropriate to ensure mastery. **Assessment:** • Monitor student participation in discussions. • Evaluate competition report for content and presentation. • Review summary of unit for understanding of material and reteach as needed.

STANDARDS

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LEA1 Use leadership skills in collaborating with others to accomplish organizational goals and objectives.
LEA2 Use personal growth skills in collaborating with others to accomplish organizational goals and objectives.
ELR1 Know and understand the importance of professional ethics and legal responsibilities.
ELR2 Demonstrate workplace ethics specific to Agriculture, Food, and Natural Resources (AFNR) occupations.
FPP1 Apply principles of food processing to maintain equipment and facilities.
FPP2 Apply principles of food science to the food industry.
FPP3 Plan, implement, manage, and/or provide services for the preservation and packaging of food and food products.
FPP4 Identify processing, handling, and storage factors to show how they impact product quality and safety.
ANM1 Apply knowledge of anatomy and physiology to produce and/or manage animals in a domesticated or natural environment.
ANM2 Recognize animal behaviors to facilitate working with animals safely.
ANM3 Provide proper nutrition to maintain animal performance.
ANM4 Know the factors that influence an animal's reproductive cycle to explain species response.
ANM5 Identify environmental factors that affect an animal's performance.

TET1 Use tools, equipment, machinery, and technology to work in areas related to AFNR.
PWR1 Apply physical science principles to engineering applications with mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
PWR2 Apply principles of operation and maintenance to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
PWR3 Apply principles of service and repair to mechanical equipment, structures, biological systems, land treatment, power utilization, and technology.
TEC1 Use a variety of tools available in computer systems to accomplish fast, accurate production in the workplace.
NRS4 Employ knowledge of natural resource industries to describe production practices and processing procedures.
NRS5 Practice responsible conduct to protect natural resources.
ENV2 Identify public policies and regulations impacting environmental services to determine their effect on facility operations.
ABS1 Employ leadership skills to accomplish goals and objectives in the AFNR business environment.
ABS2 Practice good record keeping to accomplish AFNR business objectives.
ABS4 Employ AFNR industry concepts and practices to manage inventory.
ABS5 Utilize technology to accomplish AFNR business objectives.
ABS6 Use marketing and sales principles to accomplish an AFNR business objective.

Academic Standards

A1 Recognize, classify, and use real numbers and their properties.
A5 Utilize various formulas in problem-solving situations.
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.
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.

Secondary Food Products (Meats)

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.

21st 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

Meat and Poultry. (n.d.). Retrieved March 23, 2006, from http://www.meatpoultry.com/

MEATing Place. (n.d.). Retrieved March 23, 2006, from http://www.meatingplace.com/

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The Packaging Digest. (n.d.). Retrieved March 23, 2006, from http://www.packagingdigest.com/

Recommended Tools and Equipment

CAPITALIZED ITEMS

1. Grinder (1 per program)
2. Mixer (1 per program)
3. Band saw (1 per program)
4. Tenderizer with table (1 per program)
5. Slicer, automatic, with table (1 per program)
6. Slicer, manual, with table (1 per program)
7. Stuffer, hydraulic (1 per program)
8. Table, stainless steel, 3' x 8' (3 per program)
9. Table, boning, 3' x 8' (2 per program)
10. Rail system with hoist, scales, and easy drop off (1 per program)
11. Patty machine with table (1 per program)
12. Saw, carcass split (1 per program)
13. Platform scales with table (1 per program)
14. Smoker truck, stainless steel (1 per program)
15. Pickle pump (1 per program)
16. Sink, double, stainless steel (1 per program)
17. Hand wash basin, stainless steel (1 per program)
18. Freezer, walk-in, 10' x 15' (1 per program)
19. Cooler, walk-in, 10' x 15' (1 per program)
20. Power washer (1 per program)
21. Washer, clothes (1 per program)
22. Dryer, clothes (1 per program)
23. Hot water heater, 100 gallon size (1 per program)
24. Dehairing machine (1 per program)
25. Table, break down, 3' x 8' (2 per program)
26. Vacuum packing machine with table (1 per program)
27. Stuffing table, 3' x 8' (1 per program)
28. Immobilizer (1 per program)
29. Vacuum tumbler (1 per program)
30. Computer (1 per 4 students)
31. Printer (1 per 4 students)

NON-CAPITALIZED ITEMS

1. Aprons (30 per program)
2. Hard hats (30 per program)
3. Safety glasses (30 pairs per program)
4. Rubber boots (30 pairs per program)
5. Safety gloves (30 pairs per program)
6. Safety aprons (30 per program)
7. Steels (30 per program)
8. Sharpening hones (16 per program)

9. Band saw blades (10 per program)
10. Handsaw (3 per program)
11. Handsaw blades (10 per program)
12. Grinder knives (10 per program)
13. Boning knives (30 per program)
14. Butcher knives (10 per program)
15. Rail hooks (30 per program)
16. Heat seal machine (1 per program)
17. Knife sterilizer (2 per program)
18. Knife and steel racks (5 per program)
19. Paper racks (4 per program)
20. High pressure water hose, 50' (1 per program)
21. Knife and steel scabbards (30 per program)
22. Stocking hooks (30 per program)
23. Freezer trucks (6 per program)
24. Freezer baskets (50 per program)
25. Plastic lugs (20 per program)
26. Portable lugs (20 per program)
27. Brine vats (6 per program)
28. Salinometer (1 per program)
29. Weight scales, small (1 per program)
30. Skinning knives (20 per program)
31. Gambrel (10 per program)
32. Thermometer (5 per program)
33. First aid kit with supplies for 20 students (1 per program)
34. Hair net (1 per student)

RECOMMENDED INSTRUCTIONAL AIDS

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

1. VCR (1 per program)
2. Screen, projection (1 per program)
3. Monitor, 25" color (1 per program)
4. A/V stand (1 per program)
5. Internet access

Student Competency Profile for Food Products (Meats) I

Student:_____

This record is intended to serve as a method of noting student achievement of the competencies in each unit. It can be duplicated for each student and serve as a cumulative record of competencies achieved in the course.

In the blank before each competency, place the date on which the student mastered the competency.

Unit 1: Careers and Leadership

_____1. Explain career opportunities in meat cutting, packing, and processing professions.
_____2. Explain the leadership opportunities and activities which are beneficial to students in meat cutting, packing, and processing.

Unit 2: Orientation to Meat Processing

_____1. Explain trends in slaughtering and processing in the past and in the future.
_____2. Describe factors affecting consumer food spending.

Unit 3: Safety, Sanitation, Equipment, and Facility Maintenance

_____1. Explain general meat laboratory safety requirements.
_____2. Discuss sanitation as it applies to a meat cutting facility.
_____3. Discuss federal regulations relating to meat processing.
_____4. Identify and use equipment for meat cutting, packing, and processing.
_____5. Demonstrate equipment maintenance used in a meat cutting facility.
_____6. Maintain a safe and sanitary facility.

Unit 4: Custom Livestock Slaughter

_____1. Explain terms and procedures associated with livestock slaughter.
_____2. Discuss types, cleaning, use, and maintenance of slaughter facility and equipment.
_____3. Discuss procedures for slaughtering livestock and dressing wild game.

Unit 5: Pricing, Wrapping, and Marketing

_____1. Compare and contrast consumer trends, supply and demand, and the effects on meat prices.
_____2. List the steps and perform a cutting test.

_____3. Discuss techniques and wrap retail meat.
_____4. Describe marketing principles related to the display of meat.

Unit 6: Special Topics in Food Products (Meats) I (Ongoing)

_____1. Investigate new and emerging technologies, practices, trends, and issues associated with Food Products (Meats).

_____2. Complete school-to-careers activities related to Food Products (Meats).
_____3. Demonstrate related academic skills and workplace skills associated with Food Products (Meats).
_____4. Investigate the concepts of quality assurance as related to Food Products (Meats).
_____5. Examine trends and changes related to Food Products (Meats) and global economic factors.

Student Competency Profile for Food Products (Meats) II

Student:_____

This record is intended to serve as a method of noting student achievement of the competencies in each unit. It can be duplicated for each student and serve as a cumulative record of competencies achieved in the course.

In the blank before each competency, place the date on which the student mastered the competency.

Unit 1: Identification and Fabrication of Carcass and Box Beef

_____1. Identify and fabricate cuts of beef.
_____2. Identify and fabricate variety cuts of beef.

Unit 2: Identification and Fabrication of Carcass and Box Pork

_____1. Identify and fabricate cuts of pork.
_____2. Identify and fabricate retail variety cuts of pork.

Unit 3: Identification and Fabrication of Carcass Lamb and Goat

_____1. Identify and fabricate cuts of lamb and goat.

Unit 4: Identification and Fabrication of Poultry and Fish

_____1. Identify and fabricate cuts of poultry.
_____2. Identify variety cuts of poultry.
_____3. Identify retail cuts of fish.

Unit 5: Identification and Fabrication of Wild Game

_____1. Identify and fabricate cuts of wild game.
_____2. Prepare wild game specialty products.

Unit 6: Automated Processing of Meats

_____1. Observe the automated processing of various types of meat.

Unit 7: Quality and Yield Grading

_____1. Explain quality and yield grades for beef and determine classifications of beef.
_____2. Explain quality grades and determine classification of pork.
_____3. Explain quality and yield grades for lamb and determine classifications of sheep.
_____4. Explain grades in poultry.

Unit 8: Curing, Smoking, and Sausage Making

_____1. Explain and demonstrate meat curing and smoking processes.
_____2. Explain and demonstrate sausage making.

Unit 9: Special Topics in Food Products (Meats) II

_____1. Investigate new and emerging technologies, practices, trends, and issues associated with Food Products (Meats).
_____2. Complete school-to-careers activities related to Food Products (Meats).
_____3. Demonstrate related academic skills and workplace skills associated with Food Products (Meats).
_____4. Investigate the concepts of quality assurance as related to Food Products (Meats).
_____5. Examine trends and changes related to Food Products (Meats) and global economic factors.

ASSESSMENT

BLUEPRINT

Title of Program & Code: SEC Food Products (Meats); 40NS Program Level: Secondary

This program is assessed using the MS-CPAS. The following blueprint summary contains the competencies that are measured when assessing this program. Competencies are grouped into *clusters* and a weight is given to each cluster to determine the number of items needed from each cluster. The numbers of C1s and C2s (item difficulty levels) are also indicated on the blueprint.

Cluster/Competency	Level 1 (C1)	Level 2 (C2)	TOTAL	%
	Number	Number		
Cluster 1: Careers, Orientation, & Safety Careers and Leadership Orientation to Meat Processing Safety, Sanitation, Equipment, & Facility Maintenance	23	7		30
Cluster 2 : Slaughter Custom Livestock Slaughter	8	3		11
Cluster 3: Marketing and Grading Pricing, Wrapping, and Marketing Quality and Yield Grading	9	3		12
Cluster 4: Identification and Fabrication Identification & Fabrication of Carcass & Box Beef Identification & Fabrication of Carcass & Box Pork Identification & Fabrication of Carcass Lamb & Goat Identification & Fabrication of Poultry & Fish Identification & Fabrication of Wild Game	30	10		40
Cluster 5: Processing Meats Automated Processing of Meats Curing, Smoking, and Sausage Making	5	2		7
Total Questions:	75	25		100%

Appendix A: Agriculture, Food, and Natural Resources Standards[1]

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.
- a. Embrace empowerment, risk, communication, focusing on results, decision-making, problem-solving, investment in individuals, and resource use and access to develop premier leadership.
- b. Embrace compassion, service, listening, coaching, developing others, team development, and understanding and appreciating others to develop premier leadership.
- c. Embrace enthusiasm, creativity, the future, conviction, mission, courage, concept, focus, principles, and change to develop premier leadership.
- d. Embrace integrity, courage, values, ethics, humility, perseverance, self-discipline, and responsibility to develop premier leadership.
- e. Include self, community, diversity, environment, global awareness, and knowledge to develop premier leadership.
- f. 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.
- a. Embrace attitude, exercise, goal-setting, planning, self-discipline, sense of balance, persistence, and respect to develop personal growth.
- b. Embrace friendship, integrity, morals, values, etiquette, citizenship, cross-cultural awareness, acceptance/change, and respect for differences to develop personal growth.
- c. Embrace goal setting, planning, decision-making, principles, respect, attitude, dependability, loyalty, trustworthiness, and communication to develop personal growth.
- d. Embrace learning, critical thinking, reasoning, creative thinking, attitude, dependability, decision-making, and problem-solving to develop personal growth.
- e. Embrace attitude, self-discovery, coping, friendship, self-reliance, sense of balance, empathy, compassion, and integrity to develop personal growth.
- f. Embrace ethics, coping, courage, attitude, self-image/worth, values, principles, and sense of balance to develop personal growth.

[1] *Career Cluster Resources for Agriculture, Food, and Natural Resources.* Retrieved September 21, 2005, from http://www.careerclusters.org/ClusterDocuments/agdocuments/AGFinal.pdf

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.
- a. Select the appropriate tool to perform a given task.

b. Keep tools in good working order for efficient work use.
c. 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.
a. Relate power generation to energy sources.
b. 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.
a. Perform scheduled service routines to maintain machinery and equipment.
b. 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.
a. Troubleshoot problems and evaluate performance to service and repair components of internal combustion engines.
b. Follow manufacturer's guidelines to service and repair power transmission systems.
c. Evaluate performance and check maintenance manuals to service and repair hydraulic lines.
d. Troubleshoot from schematics to service vehicle electrical systems.
e. Use company diagrams and scenarios to service vehicle heating and air conditioning systems.
f. Check performance parameters to service and repair steering, suspension, traction, and vehicle performance systems.
g. 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.
a. Use computer skills to develop simple sketches and plans.

STR2 Read and relate structural plans to specifications and building codes.
a. 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.
a. Use science concepts, processes, and research techniques to examine natural resource topics.
b. Examine biological and physical characteristics to identify and classify natural resources.
c. 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.

a. Prepare presentations to describe how natural resource products are produced, harvested, processed, and used.

NRS5 Practice responsible conduct to protect natural resources.

a. Employ techniques and equipment needed to prevent wildfire.
b. Use wildfire suppression techniques to demonstrate abilities in firefighting and control.
c. Recognize symptoms of animal and plant diseases and use appropriate techniques to prevent their spread.
d. Recognize insect types and available controls to prevent insect infestation.
e. Use acceptable pesticides to treat insect infestation.
f. 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.

a. Use instrumentation to monitor samples.
b. Calibrate and service instruments on a timely schedule to maintain environmental instrumentation.
c. 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.

a. Consult reliable resources or training to identify the major laws impacting environmental services.

ENV3 Apply scientific principles to environmental services.

a. Apply meteorological knowledge to recognize weather systems and weather patterns.
b. Describe soil composition and properties to demonstrate knowledge of soil science.
c. Explain well design and groundwater supplies to demonstrate knowledge of hydrology.
d. Discuss properties, classifications, and functions in order to understand wetland principles.
e. Discuss properties, classifications, and functions in order to understand watershed principles.
f. Use chemical analysis to conduct tests.
g. 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 record keeping to accomplish AFNR business objectives.
a. Prepare and maintain all files as needed to accomplish effective record keeping.

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[2]

Competencies and Suggested Objective(s)

A1 Recognize, classify, and use real numbers and their properties.
- a. Describe the real number system using a diagram to show the relationships of component sets of numbers that compose the set of real numbers.
- b. Model properties and equivalence relationships of real numbers.
- c. Demonstrate and apply properties of real numbers to algebraic expressions.
- d. Perform basic operations on square roots excluding rationalizing denominators.

A2 Recognize, create, extend, and apply patterns, relations, and functions and their applications.
- a. Analyze relationships between two variables, identify domain and range, and determine whether a relation is a function.
- b. Explain and illustrate how change in one variable may result in a change in another variable.
- c. Determine the rule that describes a pattern and determine the pattern given the rule.
- d. Apply patterns to graphs and use appropriate technology.

A3 Simplify algebraic expressions, solve and graph equations, inequalities and systems in one and two variables.
- a. Solve, check, and graph linear equations and inequalities in one variable, including rational coefficients.
- b. Graph and check linear equations and inequalities in two variables.
- c. Solve and graph absolute value equations and inequalities in one variable.
- d. Use algebraic and graphical methods to solve systems of linear equations and inequalities.
- e. Translate problem-solving situations into algebraic sentences and determine solutions.

A4 Explore and communicate the characteristics and operations of polynomials.
- a. Classify polynomials and determine the degree.
- b. Add, subtract, multiply, and divide polynomial expressions.
- c. Factor polynomials using algebraic methods and geometric models.
- d. Investigate and apply real number solutions to quadratic equations algebraically and graphically.
- e. Use convincing arguments to justify unfactorable polynomials.
- f. Apply polynomial operations to problems involving perimeter and area.

A5 Utilize various formulas in problem-solving situations.
- a. Evaluate and apply formulas (e.g., circumference, perimeter, area, volume, Pythagorean Theorem, interest, distance, rate, and time).
- b. Reinforce formulas experimentally to verify solutions.

[2] *Mississippi mathematics framework—Algebra I.* (2003). Retrieved September 10, 2003, from 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[3]

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.

[3] *Mississippi science framework—Biology I.* (2003). Retrieved September 10, 2003, from 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[4]

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.

[4] *Mississippi language arts framework—English II*. (2003). Retrieved September 10, 2003, from 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[5]

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.).

[5] *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

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: 21st Century Skills[6]

CS1 Global Awareness

- Using 21st 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 21st 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 21st 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

[6] *21st century skills.* (n.d.). Washington, DC: Partnership for 21st 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

Group Participation Assessment Rubric

	Beginning	Developing	Accomplished	Exemplary	Score
	1 point	2 points	3 points	4 points	
Group Discussions	Rarely contributed to discussions of the group	Contributed good effort to discussions of the group	Contributed great effort to discussions of the group	Contributed exceptional effort to discussions of the group	
On-task Behavior	Exhibited on-task behavior inconsistently	Exhibited on-task behavior some of the time	Exhibited on-task behavior most of the time	Exhibited on-task behavior consistently	
Helping Others	Did not assist other group members	Seldom assisted other group members	Occasionally assisted other group members	Assisted other group members	
Listening	Ignored ideas of group members	Seldom listened to ideas of group members	Occasionally listened to ideas of group members	Always listened to ideas of group members	

Written Report Assessment Rubric

	Exemplary	Accomplished	Developing	Beginning	Score
	4 points	3 points	2 points	1 point	
Content	Clear thesis and focus that remains apparent	Thesis and focus that remains apparent	Addresses subject matter with minimal support	Does not focus on topic	
Grammar	Correct and effective use of grammar and mechanics	Occasional errors in use of grammar and mechanics	Problems in use of grammar and mechanics	Repeated errors in use of grammar and mechanics	
Organization	Ideas flow smoothly and logically with clarity and coherence	Logical order and appropriate sequencing of ideas with adequate transition	Some evidence of an organizational plan or strategy	Lacks organization	

Activity Performance Rubric

Student Name _____ Date _____

Task to be performed_____

	Possible Points	Points Awarded
Safety Personal safety (glasses, clothing, etc.) Safe use of tool Safely performs the task	25	
Performance of the Task Follows the task instructions Performs the task efficiently Performs the task satisfactorily	50	
Lab Maintenance Area clean-up (clean and tidy) Area organization (before, during, and after the task)	25	
Total	100	

Comments for deductions:

Presentation Checklist

_____/16 Preparation
_____/28 Organization
_____/24 Thoroughness
_____/19 Extra Materials
_____/13 Actual Presentation

Preparation:

1. _____/2 Information written (neatly)
2. _____/2 Sources used listed
3. _____/5 Worked every day (did not waste time)
4. _____/5 Has all materials ready for use
5. _____/2 Cooperative

Organization

1. _____/2 Report in a logical order
2. _____/2 Interesting manner
3. _____/20 Notebook check
4. _____/2 Understanding of topic
5. _____/2 Spelling and sentence structure (do not copy from books)

Thoroughness

1. _____/5 Main points given
2. _____/5 Details to explain given
3. _____/5 Information presented clearly
4. _____/4 More than one source used
5. _____/5 Extra materials are appropriate

Extra Materials

1. _____/2 Neatness
2. _____/7 Creativity
3. _____/2 Dramatic value
4. _____/3 Useful
5. _____/5 Correctness

Actual Presentation

1. _____/3 Speaks clearly and distinctly
2. _____/2 Uses extra materials effectively
3. _____/2 Posture
4. _____/2 Pronounces all words correctly
5. _____/2 Organized in thought
6. _____/2 Rate

_____/100 Total points earned

Lab Inquiry Rubric

Requirements	5 points	4 points	3 points	2 points	1 point	0 points
Lab Introduction (date, name, title, sequence, and clarity	All parts of the lab intro. are present, and in sequence with clarity	All parts of the lab intro. are present, but not in sequence and/or not with clarity	One part of the lab intro. is missing, but in sequence and/or not with clarity	Parts of the lab intro. are missing, but the report is in sequence with clarity	Parts of the lab intro. are missing, and the report is not in sequence with clarity	The total require-ment is missing
Hypothesis (if required) and Procedures - written as part of the pre-lab discussion	The hypo. and procedures are written in sequence and clarity	The hypo. is not clearly defined, but the procedures are written in sequence and clarity	The hypo. is clearly defined, and the procedures are in sequence but without clarity	The hypo. is clearly defined, but some procedures that are not in sequence with some clarity	The hypo. is not clearly defined, and some of the procedures are not in sequence or clearly defined	The total require-ment is missing
Observation, Accuracy, and Data Collection	Well written observations with data collection and calculations are clearly laid out and correct	Well written observations with data collections and calculations are clearly laid out but not correct	Most written observations with data collections presented, but the calculations are not clearly laid out but correct	Some written observations without data collections, but calculations are correct	Few written observations without data collections and no calculations are correct	The total require-ment is missing
Conclusion - to include a summarization of the lab data and with logical answered questions about the hypo. or assignment	The conclusion completely summarized with all questions answered in a logical manner	Most of the conclusion is summarized with questions answered in a logical manner	Some of the conclusion is summarized with most questions answered in a logical manner	Only a small amount of the conclusion is summarized with some of questions being answered	Only a small amount of the conclusion is summarized with no questions being answered.	The total require-ment is missing
Presentation and Lab Safety Rules	The lab report is completely correct; no spelling or grammar mistakes. No safety violations	The lab report is mostly correct; few grammar or spelling mistakes. No safety violations	The lab report is mostly correct; few grammar or spelling mistakes. With a minor safety violation	The lab report is somewhat correct; some grammar or spelling mistakes. No safety violations	The lab report is completely incorrect with a lot of grammar errors. No safety violations	The lab report is complete-ly incorrect with a lot of grammar errors with safety violations

Teacher comments:

Score: _____

Case Study Assessment Rubric

	Excellent 4 Points	Accomplished 3 Points	Needs Improvement 2 Points	Unsatisfactory 1 Point
Comprehension	Shows complete understanding of the issues, and grasps implications beyond the immediate issue	Asks for more details to clarify understanding of the issue	Shows partial understanding of the issue but does not ask for clarification	Resists attempts to get clarification
Strategizing	Develops realistic strategies that would provide a satisfactory conclusion	Chooses appropriate strategies that may satisfy	Shows evidence of strategy that may or may not satisfy	Needs assistance to choose a strategy
Innovation	Devises more than one resolution to the problem	Offers a solution	Offers a solution with a limited point of view	Shows some understanding of the problem
Communications	Convincingly communicates resolution	Explains solution so others can understand	Conveys an opinion	Unsure of how to explain

Written Report Checklist

_____/16 Preparation
_____/28 Organization
_____/24 Thoroughness
_____/19 Extra Materials
_____/13 Final Report

Preparation:

1. _____/2 Information written (neatly)
2. _____/2 Sources used listed
3. _____/5 Worked every day (did not waste time)
4. _____/5 Has all materials ready for use
5. _____/2 Cooperative

Organization

1. _____/2 Report in a logical order
2. _____/2 Interesting manner
3. _____/20 Notebook check
4. _____/2 Understanding of topic
5. _____/2 Spelling and sentence structure (do not copy from books)

Thoroughness

1. _____/5 Main points given
2. _____/5 Details to explain given
3. _____/5 Information presented clearly
4. _____/4 More than one source used
5. _____/5 Extra materials are appropriate

Extra Materials

1. _____/2 Neatness
2. _____/7 Creativity
3. _____/2 Dramatic value
4. _____/3 Useful
5. _____/5 Correctness

Final Report

1. _____/3 Written clearly
2. _____/2 Organized
3. _____/2 Sources documented correctly
4. _____/2 Spelling
5. _____/2 Grammar
6. _____/2 Neatness

_____/100 Total points earned

Field Trip Participation Checklist

_____1. The student arrived at the designated meeting place on time with all materials and supplies required for the field trip.
_____2 The student observed all safety rules and policies while traveling to and participating in the field trip.
_____3. The student demonstrated interest in the content of the field trip by paying attention to the exhibits and speakers, asking pertinent questions, and taking notes.
_____4. The student exhibited a positive attitude toward the events and activities of the field trip.
_____5. The student remained on task throughout the field trip.
_____6. The student exhibited cooperative workplace skills with other students throughout the field trip.