WARREN COUNTY SCHOOL DISTRICT

Planned Instruction

Course Title: Auto Collision Technology

Course Number: 00901

Suggested Educational Level(s): 10-12

Suggested Periods Per Week: 15 **Length of Period**: 40 minutes

Suggested Length Of Course: 3 years

Units Of Credit (If Appropriate): 3 per year

Date Written: April 18, 2005 **Date Approved**: June 13, 2005

Date Reviewed: 2004-2005 **Implementation Year**: 2005--2006

Teacher Certification Required: Vocational Auto Body

Standards Addressed (code):
Automotive Service Excellence (ASE) Standards
Reading, Writing, Speaking, and Listening: 1.6.11 e; 1.8.11 a, b, c
Mathematics: 2.1.11 a; 2.2.11 a, b, d, e; 2.3.11 a, c; 2.4.11 b, e; 2.5.11 a ,c, d
Career and Tech: 13. 1.11 a, b, c, d, e, f, g

Relationship to Other Planned Instruction:

Prerequisites: Students must have passed all required coursework in 9th grade.

Special Requirements: Modifications will be made for special needs students

Writing Team Members: Jim Young, Mark Lindberg

Standards addressed:

Reading, Writing, Speaking and Listening

1.1.11 Reading

a. Locate various texts, media and traditional resources for assigned and independent projects before reading.

e. Establish a reading vocabulary by identifying and correctly using new words acquired through the study of their relationships to other words. Use a dictionary or related reference.

f. Understand the meaning of and apply key vocabulary across the various subject areas.

1.2.11 Reading Critically in All Content Areas

a. Read and understand essential content of informational texts and documents in all academic areas.
- Differentiate fact from opinion across a variety of texts by using complete and accurate information, coherent arguments and points of view.
- Distinguish between essential and nonessential information across a variety of sources, identifying the use of proper references or authorities and propaganda techniques where present.
- Use teacher and student established criteria for making decisions and drawing conclusions.
- Evaluate text organization and content to determine the author's purpose and effectiveness according to the author's theses, accuracy, thoroughness, logic and reasoning.

1.4.11 Types of Writing

b. Write complex informational pieces (e.g., research papers, analyses, evaluations, essays).
- Include a variety of methods to develop the main idea.
- Use precise language and specific detail.
- Include cause and effect.
- Use relevant graphics (e.g., maps, charts, graphs, tables, illustrations, photographs).
- Use primary and secondary sources.

c. Write persuasive pieces.
- Include a clearly stated position or opinion.
- Include convincing, elaborated and properly cited evidence.
- Develop reader interest.
- Anticipate and counter reader concerns and arguments.
- Include a variety of methods to advance the argument or position.

e. Write a personal resume.

1.6.11 Speaking and Listening

a. Listen to others.
- Ask clarifying questions.
- Synthesize information, ideas and opinions to determine relevancy.
- Take notes.

b. Listen to selections of literature (fiction and/or nonfiction).
- Relate them to previous knowledge.
- Predict solutions to identified problems.

- Summarize and reflect on what has been heard.
- Identify and define new words and concepts.
- Analyze and synthesize the selections relating them to other selections heard or read.

c. Speak using skills appropriate to formal speech situations.
- Use a variety of sentence structures to add interest to a presentation.
- Pace the presentation according to audience and purpose.
- Adjust stress, volume and inflection to provide emphasis to ideas or to influence the audience.

d. Contribute to discussions.
- Ask relevant, clarifying questions.
- Respond with relevant information or opinions to questions asked.
- Listen to and acknowledge the contributions of others.
- Adjust tone and involvement to encourage equitable participation.
- Facilitate total group participation.
- Introduce relevant, facilitating information, ideas and opinions to enrich the discussion.
- Paraphrase and summarize as needed.

e. Participate in small and large group discussions and presentations.
- Initiate everyday conversation.
- Select and present an oral reading on an assigned topic.
- Conduct interviews
- Participate in a formal interview (e.g., for a job, college).
- Organize and participate in informal debate around a specific topic.
- Use evaluation guides (e.g., National Issues forum, Toastmasters) to evaluate group discussion (e.g., of peers, on television).

Mathematics

2.1.11 Numbers, Number Systems and Number Relationships

a. Use operations (e.g., opposite, reciprocal, absolute value, raising to a power, finding roots, finding logarithms)

2.2.11 Computation and Estimation

a. Develop and use computation concepts, operations and procedures with real numbers in problem-solving situations.

b. Use estimation to solve problems for which an exact answer is not needed.

d. Describe and explain the amount of error that may exist in a computation using estimates.

e. Recognize that the degree of precision needed in calculating a number depends on how the results will be used and the instruments used to generate the measure.

2.3.11 Measurement and Estimation

a. Select and use appropriate units and tools to measure to the degree of accuracy required in particular measurement situations.

c. Demonstrate the ability to produce measures with specified levels of precision.

2.4.11 Mathematical Reasoning and Connections

b. Construct valid arguments from stated facts.

e. Demonstrate mathematical solutions to problems (e.g., in the physical sciences).

2.5.11 Mathematical Problem-Solving and Communication

a. Select and use appropriate mathematical concepts and techniques from different area of mathematics and apply them to solving non-routine and multi-step problems.

c. Present mathematical procedures and results clearly, systematically, succinctly and correctly.

d. Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem and why the reasoning is valid.

Science and Technology

3.1.12 Unifying Themes

a. Apply concepts of systems, subsystems, feedback and control to solve complex technological problems.

- Apply knowledge of control systems concept by designing and modeling control systems that solve specific problems.
- Apply systems analysis to predict results.
- Analyze and describe the function, interaction and relationship among subsystems and the system itself.
- Compare and contrast several systems that could be applied to solve a single problem.
- Evaluate the causes of a system's inefficiency.

3.2.12 Inquiry and Design

c. Apply the elements of scientific inquiry to solve multi-step problems.

- Generate questions about objects, organisms and/or events that can be answered through scientific investigations.
- Evaluate the appropriateness of questions.
- Design an investigation with adequate control and limited variables to investigate a question.
- Organize experimental information using analytic and descriptive techniques.
- Evaluate the significance of experimental information in answering the question.
- Project additional questions from a research study that could be studied.

d. Analyze and use the technological design process to solve problems.

- Assess all aspects of the problem, prioritize the necessary information and formulate questions that must be answered.
- Propose, develop and appraise the best solution and develop alternative solutions.
- Implement and assess the solution.
- Evaluate and assess the solution, redesign and improve as necessary.
- Communicate and assess the process and evaluate and present the impacts of the solution.

3.6.12 Technology Education

c. Analyze physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design to real world problems.

- Apply knowledge of construction technology by designing, planning and applying all the necessary resources to successfully solve a construction problem.
- Compare resource options in solving a specific manufacturing problem.
- Analyze and apply complex skills needed to process materials in complex manufacturing enterprises.
- Apply advanced information collection and communication techniques to successfully convey solutions to specific construction problems.
- Assess the importance of capital on specific construction applications.
- Analyze the positive and negative qualities of several different types of materials as they would relate to specific construction applications.
- Analyze transportation technologies of propelling, structuring, suspending, guiding, controlling and supporting.
- Analyze the concepts of vehicular propulsion, guidance, control, suspension and structural systems while designing and producing specific complex transportation systems.

3.7.12 Technological Devices

a. Apply advanced tools, materials and techniques to answer complex questions.
   - Demonstrate the safe use of complex tools and machines within their specifications.
   - Select and safely apply appropriate tools, materials and processes necessary to solve complex problems that could result in more than one solution.
   - Evaluate and use technological resources to solve complex multi-step problems.

b. Evaluate appropriate instruments and apparatus to accurately measure materials and processes.
   - Apply and evaluate the use of appropriate instruments to accurately measure scientific and technologic phenomena within the error limits of the equipment.
   - Evaluate the appropriate use of different measurement scales (macro and micro).
   - Evaluate the utility and advantages of a variety of absolute and relative measurement scales for their appropriate application.

Career and Tech

13.1.11 Career Awareness and Planning

a. Analyze career options based on student interests, abilities, aptitudes and accomplishments.

b. Analyze how the changing male/female roles relate to career choice.

c. Evaluate opportunities for career preparation.
   - Cooperative education
   - Internship
   - Job Shadowing
   - Part-time Employment
   - Registered apprenticeship
   - School-based Enterprise
   - Volunteerism

d. Justify the selection of a career.

e. Evaluate all opportunities for the transition from secondary to postsecondary education, training or work.
   - Two-year degree
   - Four-year degree
   - Immediate employment
   - Industry training
   - Military training
   - Part-time employment
   - Full-time employment
   - Professional degree
   - Registered apprenticeship
   - Tech Prep

f. Evaluate individual career plan using decision-making skills.

g. Analyze the opportunity cost/benefit of continuous learning.

COURSE DESCRIPTION:

Students in Auto/Collision Technology will develop the knowledge and skill necessary for entry-level employment in the automotive collision repair industry and its many related fields. The nine modules composing this three-year course are aligned to ASE standards.

Learning experiences will be provided as students work on actual vehicles with modern tools that are used in the auto body trade. Because each damaged vehicle presents a different problem, repairers must obtain a broad knowledge of automobile construction and repair techniques, including welding.

Students will experience various operations of collision repair including dent repair, MIG welding, replacement of parts, minor unibody repair, and paint refinishing procedures.

Each year of the three year program, students will study three of the nine modules. Also the safety, tools, and career opportunities areas of module I will be addressed every year.

Professional attitudes will be developed through the SKILLS USA program and activities.

I. Introduction to Auto Collision and Technology
   - A. The Auto Body and The Auto Collision Technology Career
   - B. Measuring and Mixing
   - C. Hand Tools
   - D. Power Tools
   - E. Raising and Supporting Vehicles
   - F. Safety
   - G. Damage Report Principles

II. Welding
   - A. Auto collision welding and MIG welding
   - B. MIG welding equipment and techniques
   - C. Constructing MIG welds

D. Welding aluminum
E. Cutting techniques
F. Resistance spot welding

III. Panel Repair
A. Sheet metal repair and rough out
B. Plastic body filler
C. Panel replacement
D. Plastic repair
E. Bumper
F. Corrosion protection

IV. Painting and Refinishing
A. Equipment and safety
B. Spraying techniques
C. Surface preparation and undercoats
D. Topcoats
E. Basecoat/clear coat and tri-coat repair and refinishing
F. Typical paint problems

V. Exterior and Interior Trim
A. Fasteners
B. Exterior trim
C. Interior trim
D. Supplemental restraint systems
E. Glass

VI. Mechanical Services
A. Engine electrical systems
B. Body electrical systems
C. Engine cooling systems
D. Air conditioning systems
E. Fuel, intake, and exhaust system

VII. Frame and Unibody Construction and Repair
A. Vehicle construction
B. Damage types
C. Measuring systems and damage analysis
D. Frame repair techniques and equipment
E. Replace and section structural parts

VIII. Steering and Suspension
A. Suspension system designs
B. Replace suspension system component
C. Steering system designs
D. Replace steering system components
E. Suspension geometry and wheel alignment
F. Brake system

IX. Detailing
   A. Tools and equipment
   B. Safety
   C. Detailing before collision repair
   D. Detailing after collision repair
   E. Independent detailer
   F. Auto dealership detailer

Specific Educational Objectives to be Taught:

At the completion of this course, the student will be able to—

1. Identify and construct welds using proper equipment and safety procedures.
2. identify and complete most efficient repair procedure for panel repair or replacement.
3. prepare surface and apply undercoat and topcoat using proper painting and refinishing techniques.
4. remove and replace interior and exterior trim, glass, and supplemental restraint system.
5. identify and repair basic electrical and mechanical automotive systems.
6. identify and repair frame and unibody damage.
7. identify and repair steering, suspension, and brake systems.
8. understand and practice detailing procedures.
9. identify proper safety procedures in all aspects of the auto collision field by demonstrating safe practices whenever the student is in the shop.
10. identify career opportunities and the tools, equipment and basic industry procedures.

Formative Assessments:

- Worksheets
- Tests
- Teacher observation of proper procedures

Summative Assessments:

- Final written exam
- NOCTI Test is given in areas of instruction for completers
- Performance evaluation checklist

Required/Approved Textbooks and Materials:

Book Title: Auto Collision Technology (3 ring binder)
Publisher: Instructional Materials Laboratory
ISBN #:
Copyright: 1997
Date of Adoption: (purchased in Summer 2004, not adopted by board at that time)

Safety Component: Students receive instruction in the safety components of auto collision at the outset of each year. Instruction is taken from Unit 6, Module 1, of **Auto Collision Technology**. Students must pass the accompanying module test at 100%.

Class rules and consequences are also share with students at the beginning of each school year. Students are also required to sign a general safety pledge.