

## COLLISION REPAIR: PAINTING AND REFINISHING

### COURSE DESCRIPTION

*Painting and Refinishing* is a course that prepares students to use plastics and adhesives in the repair and refinish processes and to apply automotive paint to a vehicle. Students learn to diagnose automotive paint finish problems and to perform the appropriate manufacturer-required techniques and processes to refinish the affected area or the complete vehicle. Course content provides the student with training in mixing, matching, and applying paint and finish to vehicles. Course content includes the application of plastics and adhesives in the repair and refinish processes. The course prepares students for entry level employment and advanced training in collision repair technology, and post-secondary education. Students completing *Painting and Refinishing* are eligible to take the ASE written examination for Painting and Refinishing.

**Recommended:** Transportation Core, Non-Structural, Structural, Algebra I; Physical Science or Principles of Technology I (may be concurrent)

**Requirements:** A minimum of 300 hours must be dedicated to Painting and Refinishing to maintain NATEF certification.

**Recommended Credits:** Non-NATEF programs – 3 credits  
NATEF programs – Option for 4 credits

**Recommended Grade Level(s):** 11 or 12

**Number of Competencies in Course:** Non-NATEF Certified Programs - 77  
(HP-I) High Priority Individual

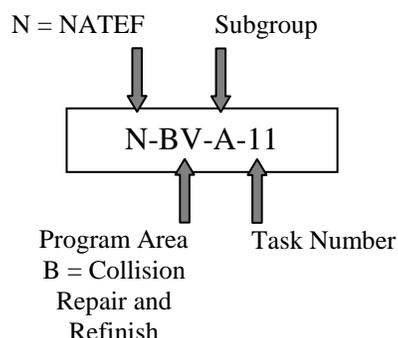
NATEF Certified Programs - 107

NATEF minimums:

HP-I – 95% (High Priority Individual)

HP-G – 90% (High Priority Group)

**Notes:** Course is aligned with NATEF tasks list for Painting and Refinishing. Items have been organized based on requirements of the state-required course description format. NATEF tasks are referenced with the corresponding Performance Standards. Codes are as follows:



## **COLLISION REPAIR: PAINTING AND REFINISHING**

### **STANDARDS**

- 1.0** Students will perform safety examinations and maintain safety records.
- 2.0** Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.
- 3.0** Students will integrate reading, writing, math, and science skills and understand the impact of academic achievement in the workplace.
- 4.0** Students will follow proper procedures for safety precautions in painting and refinishing.
- 5.0** Students will follow proper procedures for surface preparation.
- 6.0** Students will properly demonstrate use of spray gun and related equipment operation.
- 7.0** Students will properly mix, match, and apply paint and finish.
- 8.0** Students will properly identify paint defects.
- 9.0** Students will demonstrate proper procedures for Final Detail.

## **COLLISION REPAIR: PAINTING AND REFINISHING**

### **STANDARD 1.0**

Students will perform safety examinations and maintain safety records.

### **LEARNING EXPECTATIONS**

The student will:

- 1.1** Demonstrate a positive attitude regarding safety practices and issues.
- 1.2** Use and inspect personal protective equipment.
- 1.3** Inspect, maintain, and employ safe operating procedures with tools and equipment, such as hand and power tools, ladders, scaffolding, and lifting equipment.
- 1.4** Demonstrate continuous awareness of potential hazards to self and others and respond appropriately.
- 1.5** Assume responsibilities under HazCom (Hazard Communication) regulations.
- 1.6** Adhere to responsibilities, regulations, and Occupational Safety & Health Administration (OSHA) policies to protect coworkers and bystanders from hazards.
- 1.7** Adhere to responsibilities, regulations, and Occupational Safety & Health Administration (OSHA) policies regarding reporting of accidents and observed hazards, and regarding emergency response procedures.
- 1.8** Demonstrate appropriate related safety procedures.
- 1.9** Pass with 100 % accuracy a written examination relating to safety issues
- 1.10** Pass with 100% accuracy a performance examination relating to safety.
- 1.11** Maintain a portfolio record of written safety examinations and equipment examinations for which the student has passed an operational checkout by the instructor.

### **PERFORMANCE INDICATORS: EVIDENCE STANDARD IS MET**

The student:

- 1.1A** Is attentive during safety discussions.
- 1.1B** Actively seeks information about safe procedures.
- 1.1C** Responds positively to instruction, advice, and correction regarding safety issues.
- 1.1D** Does not deliberately create or increase hazards, such as by horseplay, practical jokes, or creating distractions.
- 1.1E** Reports to school or work physically ready to perform to professional standards, such as rested, or not impaired by medications, drugs, alcohol, etc.
- 1.2** Selects, inspects, and uses the correct personal protective equipment for the assigned task.
- 1.3A** Inspects power tools for intact guards, shields, insulation, and other protective devices.
- 1.3B** Inspects extension cords for the presence of a functional ground connection, prior to use.
- 1.3C** Operates and maintains tools in accordance with manufacturer's instructions and as required by regulation or company policy.
- 1.4A** Is observant of personnel and activities in the vicinity of the work area.
- 1.4B** Warns nearby personnel, prior to starting potentially hazardous actions.
- 1.5A** When asked to use a new hazardous material, retrieves MSDSs (material safety data sheets), and identifies the health hazards associated with the new material.

- 1.5B** Reports hazards found on the job site to the supervisor.
- 1.6A** Erects shields, barriers, and signage to protect coworkers and bystanders prior to starting potentially hazardous tasks.
- 1.6B** Provides and activates adequate ventilation equipment as required by the task.
- 1.7A** Reports all injuries to self to the immediate supervisor.
- 1.7B** Reports observed unguarded hazards to their immediate supervisor.
- 1.8A** Complies with personal assignments regarding emergency assignments.
- 1.9A** Passes with 100% accuracy a written examination relating specifically to content area.
- 1.10A** Passes with 100% accuracy a performance examination relating specifically to welding tools, equipment and supplies.
- 1.11A** Maintains a portfolio record of written safety examinations and equipment examinations for which the student has passed an operational checkout by the instructor.

### **SAMPLE PERFORMANCE TASKS**

These are sample projects of the type and scale recommended to address one or more of the learning expectations for this standard. Other projects can be used at the instructor's discretion.

- Conduct a practice drill simulating a hazardous solvent spill in which an emergency action plan is to be implemented.
- Instruct a visitor to obviously approach the vicinity of a student conducting a hazardous activity and note the level of awareness demonstrated by the student.
- For a project requiring the use of ladders and/or scaffolding, note the proper placement and securing procedures followed by students.

### **INTEGRATION LINKAGES**

Language Arts, Mathematics, Technical Algebra, Technical Geometry, Algebra, Geometry  
English IV: Communication for Life, SkillsUSA Technical Championships, American Welding Society (AWS), Guide for Training and Qualification of Entry Level Welder, National Center for Construction Education Research (NCCER), Secretary's Commission on Achieving Necessary Skills (SCANS), Professional Development Program, SkillsUSA

## **COLLISION REPAIR: PAINTING AND REFINISHING**

### **STANDARD 2.0**

Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.

### **LEARNING EXPECTATIONS**

The student will:

- 2.1** Cultivate positive leadership skills.
- 2.2** Participate in the student organization directly related to their program of study as an integral part of classroom instruction.
- 2.3** Assess situations, apply problem-solving techniques and decision-making skills within the school, community, and workplace.
- 2.4** Participate as a team member in a learning environment.
- 2.5** Respect the opinions, customs, and individual differences of others.
- 2.6** Build personal career development by identifying career interests, strengths, and opportunities.

### **PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET**

The student:

- 2.1A** Demonstrates character and leadership using creative-and critical-thinking skills.
- 2.1B** Uses creative thought process by “thinking outside the box.”
- 2.2A** Relates the creed, purposes, motto, and emblem of their student organization, directly related to personal and professional development.
- 2.2B** Plans and conducts meetings and other business according to accepted rules of parliamentary procedure.
- 2.3A** Makes decisions and assumes responsibilities.
- 2.3B** Analyzes a situation and uses the Professional Development Program or career technical student organization materials directly related to the student’s program of study to resolve it.
- 2.3C** Understands the importance of learning new information for both current and future problem solving and decision making.
- 2.4A** Organizes committees and participates in functions.
- 2.4B** Cooperates with peers to select and organize a community service project.
- 2.5A** Researches different customs and individual differences of others.
- 2.5B** Interacts respectfully with individuals of different cultures, gender, and backgrounds.
- 2.5C** Resolves conflicts and differences to maintain a smooth workflow and classroom environment.
- 2.6A** Creates personal career development by identifying career interests, strengths, and opportunities.
- 2.6B** Identifies opportunities for career development and certification requirements.
- 2.6C** Plans personal educational paths based on available courses and current career goals.
- 2.6D** Creates a resumé that reflects student’s skills, abilities, and interests.

## **SAMPLE PERFORMANCE TASKS**

- Create a leadership inventory and use it to conduct a personal assessment.
- Participate in various career technical student organizations' programs and/or competitive events.
- Implement an annual program of work.
- Prepare a meeting agenda for a specific career technical student organization monthly meeting.
- Attend a professional organization meeting.
- Develop a program of study within their career opportunities.
- Participate in the American Spirit Award competition with SkillsUSA.
- Complete *Professional Development Program Level I and Level II*, SkillsUSA.

## **INTEGRATION LINKAGES**

SkillsUSA, *Professional Development Program*; SkillsUSA; Communications and Writing Skills; Teambuilding Skills; Research; Language Arts; Sociology; Psychology; Math; Technical Math; English IV: Communication for Life; Social Studies; Problem Solving; Interpersonal Skills; Employability Skills; Critical-Thinking Skills; Secretary's Commission on Achieving Necessary Skills (SCANS); Chamber of Commerce; Colleges; Universities; Technology Centers; Secretary's Commission on Achieving Necessary Skills (SCANS)

## **COLLISION REPAIR: PAINTING AND REFINISHING**

### **STANDARD 3.0**

Students will integrate reading, writing, math, and science skills and understand the impact of academic achievement in the work place.

### **LEARNING EXPECTATIONS**

The student will:

- 3.1** Assume responsibility for accomplishing classroom assignments and workplace goals within accepted time frames.
- 3.2** Develop advanced study skills.
- 3.3** Demonstrate and use written and verbal communication skills.
- 3.4** Read and understand technical documents such as regulations, manuals, reports, forms, graphs, charts, and tables.
- 3.5** Apply the foundations of mathematical principles such as algebra, geometry, and advanced math to solve problems.
- 3.6** Apply basic scientific principles and methods to solve problems and complete tasks.
- 3.7** Understand computer operations and related applications to input, store, retrieve, and output information as it relates to the course.
- 3.8** Research, recognize, and understand the interactions of the environment and *green* issues as they relate to the course work and to a global economy.

### **PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET**

The student:

- 3.1A** Uses appropriate time management to achieve goals.
- 3.1B** Arrives at school on time each day.
- 3.1C** Completes assignments and meets deadlines.
- 3.2A** Assesses current personal study skills.
- 3.2B** Demonstrates advanced note-taking ability.
- 3.2C** Formulates appropriate study strategies for given tasks.
- 3.3A** Communicates ideas, information, and messages in a logical manner.
- 3.3B** Fills out forms, reports, logs, and documents to comply with class and project requirements.
- 3.4A** Reads and understands technical documents and uses industry jargon, acronyms, and terminology appropriately.
- 3.4B** Recognizes the meaning of specialized words or phrases unique to the career and industry.
- 3.5A** Utilizes computation in adding, subtracting, multiplying, and dividing of whole numbers, fractions, decimals, and percents.
- 3.5B** Chooses the right mathematical method or formula to solve a problem.
- 3.5C** Performs math operations accurately to complete classroom and lab tasks.
- 3.6A** Understands scientific principles critical to the course.
- 3.6B** Applies scientific principles and technology to solve problems and complete tasks.
- 3.6C** Has knowledge of the scientific method (e.g., identifies the problem, collects information, forms opinions, and draws conclusions).
- 3.7A** Uses basic computer hardware (e.g., PCs, printers) and software to perform tasks as required for the course work.

- 3.7B** Understands capabilities of computers and common computer terminology (e.g., program, operating system).
- 3.7C** Applies the appropriate technical solution to complete tasks.
- 3.7D** Inputs data and information accurately for the course requirements.
- 3.8A** Researches and recognizes *green* trends in career area and industry.
- 3.8B** Examines current environmentally-friendly trends.
- 3.8C** Applies sustainability practices by understanding processes that are non-polluting, conserving of energy and natural resources, and economically efficient.

### **SAMPLE PERFORMANCE TASKS**

- Examine and compile different learning styles for portfolios.
- Create calendars containing all activities and obligations for one month. Discusses how to handle conflicting or competing obligations then complete daily and weekly plans showing tasks, priorities, and scheduling.
- Complete self-assessments of study habits.
- Compute precise and exact measurements.
- Explore study strategies for different subjects and tasks then analyze two homework assignments and select the best strategies for completing them.
- Create “life maps” showing necessary steps or “landmarks” along the path to personal, financial, educational, and career goals.
- Take notes during counselor classroom visits and work in small groups to create flow charts of the path options.
- List attitudes that lead to success then rate individually in these areas. Work together to suggest strategies for overcoming the weaknesses identified own and partners’ self-assessments then share with the class the strategies developed.
- Research the Internet and other technology to collect and analyze data concerning climate change.
- Keep a data file of alternative energy sources and the sources’ impact on the environment.
- Develop a recycling project at home or for the school environment.

### **INTEGRATION LINKAGES**

SkillsUSA, *Professional Development Program*; SkillsUSA; Communications and Writing Skills; Teambuilding Skills; Research; Language Arts; Sociology; Psychology; Math; Technical Math; English IV: Communication for Life; Social Studies; Problem Solving; Interpersonal Skills; Employability Skills; Critical-Thinking Skills; Secretary’s Commission on Achieving Necessary Skills (SCANS); Chamber of Commerce; Colleges; Universities; Technology Centers; Secretary’s Commission on Achieving Necessary Skills (SCANS)

## **COLLISION REPAIR: PAINTING AND REFINISHING**

### **STANDARD 4.0**

Students will follow proper procedures for safety precautions in painting and refinishing.

### **LEARNING EXPECTATIONS**

The student will:

- 4.1** Identify and take necessary precautions with hazardous operations and materials according to federal, state, and local regulations. HP-I
- 4.2** Identify safety and personal health hazards according to OSHA guidelines and the “Right To Know Law.” HP-I
- 4.3** Inspect spray environment and equipment to ensure compliance with federal, state, and local regulations, and for safety and cleanliness hazards. HP-I
- 4.4** Select and use a National Institute for Occupational Safety and Health (NIOSH)-approved air purifying respirator. Inspect condition and ensure fit and operation. Perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation. HP-I
- 4.5** Select and use the NIOSH approved supplied air (Fresh Air Make-up) respirator system. Perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation. HP-I
- 4.6** Select and use the proper personal safety equipment for surface preparation, spray gun and related equipment operation, paint mixing, matching and application, paint defects, and detailing (gloves, suits, hoods, eye and ear protection, etc.). HP-I

### **PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET**

The student:

- 4.1** Identifies and takes necessary precautions with hazardous operations and materials according to federal, state, and local regulations.
- 4.2** Identifies safety and personal health hazards according to OSHA guidelines and the “Right To Know Law.”
- 4.3** Inspects spray environment and equipment to ensure compliance with federal, state, and local regulations and for safety and cleanliness hazards.
- 4.4** Selects and uses a NIOSH-approved air purifying respirator. Inspects condition and ensures fit and operation. Performs proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulations.
- 4.5** Selects and uses the NIOSH approved supplied air (Fresh Air Make-up) respirator system. Performs proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulations.
- 4.6** Selects and uses the proper personal safety equipment for surface preparation, spray gun and related equipment operation, paint mixing, matching and application, paint defects, and detailing (gloves, suits, hoods, eye and ear protection, etc.).

### **SAMPLE PERFORMANCE TASKS**

- Follows safety precautions for painting and refinishing.
- Maintains spray equipment and environment.
- Always uses proper respirator.
- Practices personal safety.

### **INTEGRATION LINKAGES**

Math, Science, Chemistry, Physics, Communication Skills, Teamwork Skills, Reading Skills, Leadership Skills, Problem Solving and Critical Thinking Skills, Computer Skills, Art and Design, Computer Aided Design, Secretary's Commission on Achieving Necessary Skills (SCANS), National Institute for Automotive Service Excellence (ASE), National Automotive Technician Education Foundation (NATEF), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), SkillsUSA

## **COLLISION REPAIR: PAINTING AND REFINISHING**

### **STANDARD 5.0**

Students will follow proper procedures for surface preparation.

### **LEARNING EXPECTATIONS**

The student will:

- 5.1 Inspect, remove, store, and replace exterior trim and components necessary for proper surface preparation. HP-I
- 5.2 Soap and water wash entire vehicle; use appropriate cleaner to remove contaminants. HP-I
- 5.3 Inspect and identify substrate, type of finish, and surface condition; develop and document a plan for refinishing using a total product system. HP-I
- 5.4 Strip paint to bare substrate (paint removal). HP-I
- 5.5 Dry or wet sand areas to be refinished. HP-I
- 5.6 Featheredge damaged areas to be refinished. HP-I
- 5.7 Apply suitable metal treatment or primer in accordance with total product systems. HP-I
- 5.8 Mask and protect other areas that will not be refinished. HP-I
- 5.9 Mix primer, primer-surfacer, or primer-sealer. HP-I
- 5.10 Apply primer onto surface of repaired area. HP-I
- 5.11 Apply two-component finishing filler to minor surface imperfections. HP-I
- 5.12 Dry or wet sand area to which primer-surfacer has been applied. HP-I
- 5.13 Dry sand area to which two-component finishing filler has been applied. HP-I
- 5.14 Remove dust from area to be refinished, including cracks or moldings of adjacent areas. HP-I
- 5.15 Clean area to be refinished using a final cleaning solution. HP-I
- 5.16 Remove, with a tack rag, any dust or lint particles from the area to be refinished. HP-I
- 5.17 Apply suitable sealer to the area being refinished when sealing is needed or desirable. HP-I
- 5.18 Scuff sand to remove nibs or imperfections from a sealer. HP-I
- 5.19 Apply stone chip resistant coating. HP-G
- 5.20 Restore corrosion-resistant coatings, caulking, and seam sealers to repaired areas. HP-G
- 5.21 Prepare adjacent panels for blending. HP-I
- 5.22 Identify the types of rigid, semi-rigid, or flexible plastic parts to be refinished; determine the materials, preparation, and refinishing procedures. HP-I
- 5.23 Identify aluminum parts to be refinished; determine the materials, preparation, and refinishing procedures. HP-G

### **PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET**

The student:

- 5.1 Inspects, removes, stores, and replaces exterior trim and components necessary for proper surface preparation.
- 5.2 Soap and water washes entire vehicle; uses appropriate cleaner to remove contaminants.
- 5.3 Inspects and identifies substrate, type of finish, and surface condition; develops and documents a plan for refinishing using a total product system.
- 5.4 Strips paint to bare substrate (paint removal).

- 5.5 Dry or wet sands areas to be refinished.
- 5.6 Featheredgeds damaged areas to be refinished.
- 5.7 Applies suitable metal treatment or primer in accordance with total product systems.
- 5.8 Masks and protects other areas that will not be refinished.
- 5.9 Mixes primer, primer-surfacer, or primer-sealer.
- 5.10 Applies primer onto surface of repaired area.
- 5.11 Applies two-component finishing filler to minor surface imperfections.
- 5.12 Dry or wet sands area to which primer-surfacer has been applied.
- 5.13 Dry or wet sands area to which two-component finishing filler has been applied.
- 5.14 Removes dust from area to be refinished, including cracks or moldings of adjacent areas.
- 5.15 Cleans area to be refinished using a final cleaning solution.
- 5.16 Removes, with a tack rag, any dust or lint particles from the area to be refinished.
- 5.17 Applies suitable sealer to the area being refinished when sealing is needed or desirable.
- 5.18 Scuff sands to remove nibs or imperfections from a sealer.
- 5.19 Applies stone chip resistant coating.
- 5.20 Restores corrosion-resistant coatings, caulking, and seam sealers to repaired areas.
- 5.21 Prepares adjacent panels for blending.
- 5.22 Identifies the types of rigid, semi-rigid, or flexible plastic parts to be refinished; determines the materials, preparation, and refinishing procedures.
- 5.23 Identifies aluminum parts to be refinished; determines the materials, preparation, and refinishing procedures.

### **SAMPLE PERFORMANCE TASKS**

- Properly uses trim removal tools.
- Demonstrates proper sanding techniques.
- Properly uses dust masks and respirators.
- Follows safety precautions for painting and refinishing.

### **INTEGRATION LINKAGES**

Math, Science, Chemistry, Physics, Communication Skills, Teamwork Skills, Reading Skills, Leadership Skills, Problem Solving and Critical Thinking Skills, computer Skills, Art and Design, Computer Aided Design, Secretary's Commission on Achieving Necessary Skills (SCANS), National Institute for Automotive Service Excellence, (ASE) National Automotive Technician Education Foundation (NATEF), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), SkillsUSA

## **COLLISION REPAIR: PAINTING AND REFINISHING**

### **STANDARD 6.0**

Students will properly demonstrate use of spray gun and related equipment operation.

### **LEARNING EXPECTATIONS**

The student will:

- 6.1** Inspect, clean, and determine condition of spray guns and related equipment (air hoses, regulators, air lines, air source, and spray environment). HP-I
- 6.2** Check and adjust spray gun operation for HVLP (high volume, low pressure) or compliant spray guns. HP-I
- 6.3** Set-up (fluid needle, nozzle, and cap), test and adjust spray gun using fluid, air, and pattern control valves. HP-I
- 6.4** Demonstrate an understanding of the operation of pressure spray equipment. HP-G

### **PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET**

The student:

- 6.1** Inspects, cleans, and determines condition of spray guns and related equipment (air hoses, regulators, air lines, air source, and spray environment).
- 6.2** Checks and adjusts spray gun operation for HVLP (high volume, low pressure) or compliant spray guns.
- 6.3** Sets-up (fluid needle, nozzle, and cap), tests, and adjusts spray gun using fluid, air, and pattern control valves.
- 6.4** Demonstrates an understanding of the operation of pressure spray equipment.

### **SAMPLE PERFORMANCE TASKS**

- Inspect, clean, and prepare spray guns for painting tasks.
- Adjust spray patterns for HVLP (high volume, low pressure) and LVLP (low volume, low pressure) guns.

### **INTEGRATION LINKAGES**

Math, Science, Chemistry, Physics, Communication Skills, Teamwork Skills, Reading Skills, Leadership Skills, Problem Solving and Critical Thinking Skills, computer Skills, Art and Design, Computer Aided Design, Secretary's Commission on Achieving Necessary Skills (SCANS), National Institute for Automotive Service Excellence, (ASE) National Automotive Technician Education Foundation (NATEF), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), SkillsUSA.

## **COLLISION REPAIR: PAINTING AND REFINISHING**

### **STANDARD 7.0**

Students will properly mix, match, and apply paint.

### **LEARNING EXPECTATIONS**

The student will:

- 7.1 Identify type and color code by manufacturer's vehicle information label. HP-I
- 7.2 Shake, stir, reduce, catalyze/activate, and strain refinish materials. HP-I
- 7.3 Apply finish using appropriate spray techniques (gun arc, gun angle, gun distance, gun speed, and spray pattern overlap) for the finish being applied. HP-I
- 7.4 Apply selected product on test and let-down panel in accordance with manufacturer's recommendations; check for color match. HP-I
- 7.5 Apply single stage topcoat. HP-I
- 7.6 Apply basecoat/clearcoat for panel blending or panel refinishing. HP-I
- 7.7 Apply basecoat/clearcoat for overall refinishing. HP-G
- 7.8 Remove nibs or imperfections from basecoat. HP-I
- 7.9 Refinish rigid or semi-rigid and plastic parts. HP-G
- 7.10 Refinish flexible plastic parts. HP-I
- 7.11 Apply multi-stage coats for panel blending or overall refinishing. HP-G
- 7.12 Identify and mix paint using a formula. HP-I
- 7.13 Identify poor hiding colors; determine necessary action. HP-G
- 7.14 Tint color using formula to achieve a blendable match. HP-I
- 7.15 Identify alternative color formula to achieve a blendable match. HP-I

### **PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET**

The student:

- 7.1 Identifies type and color code by manufacturer's vehicle information label.
- 7.2 Shakes, stirs, reduces, catalyzes/activates, and strains refinish materials.
- 7.3 Applies finish using appropriate spray techniques (gun arc, gun angle, gun distance, gun speed, and spray pattern overlap) for the finish being applied.
- 7.4 Applies selected product on test and let-down panel in accordance with manufacturer's recommendations; checks for color match.
- 7.5 Applies single stage topcoat.
- 7.6 Applies basecoat/clearcoat for panel blending or panel refinishing.
- 7.7 Applies basecoat/clearcoat for overall refinishing.
- 7.8 Removes nibs or imperfections from basecoat.
- 7.9 Refinishes rigid or semi-rigid and plastic parts.
- 7.10 Refinishes flexible plastic parts.
- 7.11 Applies multi-stage coats for panel blending or overall refinishing.
- 7.12 Identifies and mix paint using a formula.
- 7.13 Identifies poor hiding colors; determine necessary action.
- 7.14 Tints color using formula to achieve a blendable match.
- 7.15 Identifies alternative color formula to achieve a blendable match.

## **SAMPLE PERFORMANCE TASKS**

- Identify the paint defect on a vehicle and correct problem.
- Mix paint according to a specified formula.

## **INTEGRATION LINKAGES**

Math, Science, Chemistry, Physics, Communication Skills, Teamwork Skills, Reading Skills, Leadership Skills, Problem Solving and Critical Thinking Skills, computer Skills, Art and Design, Computer Aided Design, Secretary's Commission on Achieving Necessary Skills (SCANS), National Institute for Automotive Service Excellence, (ASE) National Automotive Technician Education Foundation (NATEF), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), SkillsUSA

## **COLLISION REPAIR: PAINTING AND REFINISHING**

### **STANDARD 8.0**

Students will demonstrate how to properly identify paint defects.

### **LEARNING EXPECTATIONS**

The student will:

- 8.1** Identify blistering (raising of the paint surface, air entrapment); determine the cause(s) and correct the condition. HP-G
- 8.2** Identify blushing (milky or hazy formation); determine the cause(s) and correct the condition. HP-G
- 8.3** Identify a dry spray appearance in the paint surface; determine the cause(s) and correct the condition. HP-G
- 8.4** Identify the presence of fish-eyes (crater-like openings) in the finish; determine the cause(s) and correct the condition. HP-I
- 8.5** Identify lifting; determine the cause(s) and correct the condition. HP-G
- 8.6** Identify clouding (mottling and streaking in metallic finishes); determine the cause(s) and correct the condition. HP-I
- 8.7** Identify orange peel; determine the cause(s) and correct the condition. HP-I
- 8.8** Identify overspray; determine the cause(s) and correct the condition. HP-I
- 8.9** Identify solvent popping in freshly painted surface; determine the cause(s) and correct the condition. HP-G
- 8.10** Identify sags and runs in paint surface; determine the cause(s) and correct the condition. HP-I
- 8.11** Identify sanding marks or sandscratch swelling; determine the cause(s) and correct the condition. HP-G
- 8.12** Identify contour mapping/edge mapping while finish is drying; determine the cause(s) and correct the condition. HP-G
- 8.13** Identify color difference (off-shade); determine the cause(s) and correct the condition. HP-G
- 8.14** Identify tape tracking; determine the cause(s) and correct the condition. HP-G
- 8.15** Identify low gloss condition; determine the cause(s) and correct the condition. HP-G
- 8.16** Identify poor adhesion; determine the cause(s) and correct the condition. HP-G
- 8.17** Identify paint cracking (shrinking, splitting, crowsfeet or line-checking, micro-checking, etc.); determine the cause(s) and correct the condition. HP-G
- 8.18** Identify corrosion; determine the cause(s) and correct the condition. HP-G
- 8.19** Identify dirt or dust in the paint surface; determine the cause(s) and correct the condition. HP-I
- 8.20** Identify water spotting; determine the cause(s) and correct the condition. HP-G
- 8.21** Identify finish damage caused by bird droppings, tree sap, and other natural causes; correct the condition. HP-G
- 8.22** Identify finish damage caused by airborne contaminants (acids, soot, rail dust, and other industrial-related causes); correct the condition. HP-G
- 8.23** Identify die-back conditions (dulling of the paint film showing haziness); determine the cause(s) and correct the condition. HP-G

- 8.24 Identify chalking (oxidation); determine the cause(s) and correct the condition. HP-G
- 8.25 Identify bleed-through (staining); determine the cause(s) and correct the condition. HP-G
- 8.26 Identify pin-holing; determine the cause(s) and correct the condition. HP-G
- 8.27 Identify buffing-related imperfections (swirl marks, wheel burns); correct the condition. HP-I
- 8.28 Identify pigment flotation (color change through film build); determine the cause(s) and correct the condition. HP-G

### **PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET**

The student:

- 8.1 Identifies blistering (raising of the paint surface, air entrapment); determines the cause(s) and corrects the condition.
- 8.2 Identifies blushing (milky or hazy formation); determines the cause(s) and corrects the condition.
- 8.3 Identifies a dry spray appearance in the paint surface; determines the cause(s) and corrects the condition.
- 8.4 Identifies the presence of fish-eyes (crater-like openings) in the finish; determines the cause(s) and corrects the condition.
- 8.5 Identifies lifting; determines the cause(s) and corrects the condition.
- 8.6 Identifies clouding (mottling and streaking in metallic finishes); determines the cause(s) and corrects the condition.
- 8.7 Identifies orange peel; determines the cause(s) and corrects the condition.
- 8.8 Identifies overspray; determines the cause(s) and corrects the condition.
- 8.9 Identifies solvent popping in freshly painted surface; determines the cause(s) and corrects the condition.
- 8.10 Identifies sags and runs in paint surface; determines the cause(s) and corrects the condition.
- 8.11 Identifies sanding marks or sandscratch swelling; determines the cause(s) and corrects the condition.
- 8.12 Identifies contour mapping/edge mapping while finish is drying; determines the cause(s) and corrects the condition.
- 8.13 Identifies color difference (off-shade); determines the cause(s) and corrects the condition.
- 8.14 Identifies tape tracking; determines the cause(s) and corrects the condition.
- 8.15 Identifies low gloss condition; determines the cause(s) and corrects the condition.
- 8.16 Identifies poor adhesion; determines the cause(s) and corrects the condition.
- 8.17 Identifies paint cracking (shrinking, splitting, crowsfeet or line-checking, micro-checking, etc.); determines the cause(s) and corrects the condition.
- 8.18 Identifies corrosion; determines the cause(s) and corrects the condition.
- 8.19 Identifies dirt or dust in the paint surface; determines the cause(s) and corrects the condition.
- 8.20 Identifies water spotting; determines the cause(s) and corrects the condition.
- 8.21 Identifies finish damage caused by bird droppings, tree sap, and other natural causes; corrects the condition.
- 8.22 Identifies finish damage caused by airborne contaminants (acids, soot, rail dust, and other industrial-related causes); corrects the condition.
- 8.23 Identifies die-back conditions (dulling of the paint film showing haziness); determines the cause(s) and corrects the condition.

- 8.24** Identifies chalking (oxidation); determines the cause(s) and corrects the condition.
- 8.25** Identifies bleed-through (staining); determines the cause(s) and corrects the condition.
- 8.26** Identifies pin-holing; determines the cause(s) and corrects the condition.
- 8.27** Identifies buffing-related imperfections (swirl marks, wheel burns); corrects the condition.
- 8.28** Identifies pigment flotation (color change through film build); determines the cause(s) and corrects the condition.

### **SAMPLE PERFORMANCE TASKS**

- Identify the paint defect on a vehicle and correct problem.
- Identify the cause of paint defect on a vehicle and correct problem.

### **INTEGRATION LINKAGES**

Math, Science, Chemistry, Physics, Communication Skills, Teamwork Skills, Reading Skills, Leadership Skills, Problem Solving and Critical Thinking Skills, computer Skills, Art and Design, Computer Aided Design, Secretary's Commission on Achieving Necessary Skills (SCANS), National Institute for Automotive Service Excellence, (ASE) National Automotive Technician Education Foundation (NATEF), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), SkillsUSA.

## **COLLISION REPAIR: PAINTING AND REFINISHING**

### **STANDARD 9.0**

Students will demonstrate proper procedures for final detail.

### **LEARNING EXPECTATIONS**

The student will:

- 9.1** Apply decals, transfers, tapes, woodgrains, pinstripes (painted and taped), etc. HP-G
- 9.2** Buff and polish finish to remove defects as required. HP-I
- 9.3** Clean interior, exterior, and glass. HP-I
- 9.4** Clean body openings (door jambs & edges, etc.). HP-I
- 9.5** Remove overspray. HP-I
- 9.6** Perform pre-delivery detail and inspection. HP-I

### **PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET**

The student:

- 9.1** Applies decals, transfers, tapes, woodgrains, pinstripes (painted and taped), etc.
- 9.2** Buffs and polishes finish to remove defects as required.
- 9.3** Cleans interior, exterior, and glass.
- 9.4** Cleans body openings (door jambs & edges, etc.).
- 9.5** Removes overspray.
- 9.6** Performs pre-delivery detail and inspection.

### **SAMPLE PERFORMANCE TASKS**

- Buff, polish, and clean exterior and interior on vehicle.
- Clean body openings and glass.
- Remove overspray and apply decals.

### **INTEGRATION LINKAGES**

Math, Science, Chemistry, Physics, Communication Skills, Teamwork Skills, Reading Skills, Leadership Skills, Problem Solving and Critical Thinking Skills, computer Skills, Art and Design, Computer Aided Design, Secretary's Commission on Achieving Necessary Skills (SCANS), National Institute for Automotive Service Excellence, (ASE) National Automotive Technician Education Foundation (NATEF), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), SkillsUSA

## **COLLISION REPAIR: PAINTING AND REFINISHING**

### **SAMPLING OF AVAILABLE RESOURCES**

*Enhanced Delivery I-Car Curriculum*, I-CAR

*Auto Collision Curriculum Guide*, Instructional Materials Laboratory (IML), University of Missouri

*Professional Automotive Collision Repair*, 2nd Ed, Duffy, Delmar Publishing

*Auto Body Repairing and Refinishing*, Goodheart-Willcox, 2000.

Teacher Web resources:

Math/Science Web Site <http://enc.org>

National Science Teachers Association <http://www.nsta.org/store>

Center for Occupational Research and Development (CORD) <http://www.cord.org/>

Delmar International Thomson Learning <http://www.delmar.com/>

University of Missouri Instructional Materials Lab (IML)  
<http://www.iml.coe.missouri.edu/>

Oklahoma Curriculum Instructional Materials Center (CIMC)  
<http://www.okvotech.org/cimc/home.htm>