Automotive Collision Repair III

Course # 1002

Credits 12.5

April 2018

I. Course Description:

Since inception Passaic County Technical Institute's Automotive Collision Repair program has strived to meet the ever-changing industry standards. Recently we have partnered with the Automotive Service Excellence Education Foundation. Their main objective is …"to uphold high quality standards of excellence in automotive service" (ASE Alliance 2018). PCTI's School of Auto Collision Repair has incorporated ASE/NATEF standards and I-CAR industry training to meet the demands and challenges of repairing the modern automobile. NATEF Standards set our path and I-CAR Crosswalk enhances and aligns our current curriculum to meet changing industry demands.

Our curriculum is a series of individual training modules, which allow instructors the freedom to choose segments that best fit our students' needs. This approach offers an in-depth coverage of both conventional and innovative collision repair technologies and processes. The program features knowledge-based training and performance-based testing, with an increased emphasis on hands-on tasks. Being current with the most updated repair techniques and methods affords PCTI the ability to remain at the forefront of collision training. At PCTI we remain proactive with our training but also realize we need to react immediately to any changes in industry vehicle design technology.

I-CAR and ASE are industry recognized leaders in training and testing, respectively. Our students prepare for testing in ASE categories B2 and B3, and receive industry-recognized certificates upon completion. Participation in PCTI's program ensures students have completed the prerequisites required for future testing/certification they may choose. Preparing for I-CAR testing and having ASE certificates in two collision areas is a great resume builder and increases the student's employability when he or she enters the workforce. This is also an added savings for the future employer's training expense.

PCTI is excited about the potential we have to produce world class experts in the auto collision field. Upon graduation, the skills and training we instill in our students provide a competitive edge as they enter the workforce of today's global market place. Below is a synopsis of the available modules that are part of our challenging, rigorous, dynamic, and comprehensive curriculum for this level: Review of Collision Repair Introduction; Safety Review; Vehicle Construction; Welding & Cutting; Nonstructural Panel Repair II; Bolted Nonstructural Part Replacement II; Welded & Bonded Repair II; Plastic Repair; Glass II; Electrical Systems; Restraint Systems; Refinishing Tools & Equipment II; Refinishing Materials II; Painting Mixing & Reducing; Spray Technique; Surface Preparation; Color Matching; Paint Application; Detailing II.

II. Unit Planners:

Content Area:	Collision Repair Tech III	Grade(s)	11
Unit Plan Title:	Review of Collision Repair Introduction		
NJSLS/CCTC Standard(s) Addressed in this unit			
8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks. 9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance. 9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces. 9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM. 9.3.ST-ET.5 Apply knowledge in STEM to solve problems 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills. CRP3. Attend to personal health and financial well-being. CRP4. Communicate clearly and effectively and with reason. CRP5. Consider the environmental, social and economic impacts of decisions. CRP6. Demonstrate creativity and innovation. CRP7. Employ valid and reliable research strategies. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.			

CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Essential Questions (3-5)

What are some typical steps in the collision repair process?
What are the various types of body shop ownership?
What are the various types of jobs available in the collision repair industry?
What are the educational qualifications needed for a career in the collision repair industry?
What are the different vehicle classifications?
What are the materials used to construct the automotive body?
What are the major assemblies of an automotive body; and what is the vehicle production process?
What are vehicle safety ratings?

Anchor Text

Auto Collision Repair and Refinishing 2nd edition, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL, ISBN# 978-1-63126-400-9

Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

DAMAGE ANALYSIS, ESTIMATING AND CUSTOMER SERVICE TASK LIST		
B. Estimating		
11. Select and price OEM parts; verify availability, compatibility, and condition.	HP-G	
12. Select and price alternative/optional OEM parts; verify availability, compatibility and condition.	HP-G	
13. Select and price aftermarket parts; verify availability, compatibility, and condition.	HP-G	
14. Select and price recyclable/used parts; verify availability, compatibility and condition.	HP-G	
15. Select and price remanufactured, rebuilt, and reconditioned parts; verify availability, compatibility and condition.	HP-G	

Formative & Summative Assessments
Formative: Quizzes Task sheets completion Goodheart-Willcox on-line assessments Homework Summative: Tests both written and performance
Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)
SP-2 Online safety course. www.SP2.org/site/page/automotive
Suggested Time Frame: **1 week**

Content Area:	**Collision Repair Tech III**	**Grade(s)**	**11**
Unit Plan Title:	**Safety Review**		
NJSLS/CCTC Standard(s) Addressed in this unit			
8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks. 9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance. 9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces. 9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM. 9.3.ST-ET.5 Apply knowledge in STEM to solve problems 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.			

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
CRP1. Act as a responsible and contributing citizen and employee.
CRP2. Apply appropriate academic and technical skills.
CRP3. Attend to personal health and financial well-being.
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Essential Questions (3-5)

What are the hazards that may be encountered in the collision repair shop?
What is the proper procedure to use protective gear in the collision shop?
What are the safe working practices associated with the various tasks preformed in the collision repair shop?
What are the hazardous wastes generated in the collision repair shop?
What means can be used to minimize the amount of waste generated in the collision repair shop?
How is the waste of the auto collision repair shop regulated by government?

Anchor Text

Auto Collision Repair and Refinishing 2nd edition, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL, ISBN# 978-1-63126-400-9

Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR		

(BODY COMPONENTS)		
II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS)		
E. Metal Welding and Cutting		
6. Store, handle, and install high-pressure gas cylinders.	HP-I	
10. Protect computers and other electronic control modules during welding procedures.	HP-I	
F. Plastics and Adhesives		
PAINTING AND REFINISHING		
IV. PAINTING AND REFINISHING		
A. Safety Precautions		
5. Select and use a 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	
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	

Formative & Summative Assessments

Formative:

- Quizzes
- Task sheets completion
- Goodheart-Willcox on-line assessments
- Homework

Summative:

- Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Suggested Time Frame:	1 week

Content Area:	Collision Repair Tech III	Grade(s)	11
Unit Plan Title:	Vehicle Construction		

NJSLS/CCTC Standard(s) Addressed in this unit

8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.
9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.
9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.
9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM.
9.3.ST-ET.5 Apply knowledge in STEM to solve problems
3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
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CRP2. Apply appropriate academic and technical skills.
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CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
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CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.

CRP12. Work productively in teams while using cultural global competence.

Essential Questions (3-5)

What are the different types of vehicle classifications?
What materials are commonly used in the construction of body of the automobile?
What are the major assemblies of the automotive body?
How would you summarize the vehicle production process?
What are vehicle safety ratings?

Anchor Text

Auto Collision Repair and Refinishing 2nd edition, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL, ISBN# 978-1-63126-400-9

Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR		
PAINTING AND REFINISHING		
IV. PAINTING AND REFINISHING		
B. Surface Preparation		
24. Identify metal parts to be refinished; determine the materials needed preparation, and refinishing procedures.	HP-I	
D. Paint Mixing, Matching, and Applying		
15. Identify alternative color formula to achieve a blendable match.	HP-I	

Formative & Summative Assessments

Formative:

- Quizzes
- Task sheets completion
- Goodheart-Willcox on-line assessments
- Homework

Summative: Tests both written and performance
Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)
SP-2 Online safety course. www.SP2.org/site/page/automotive
Suggested Time Frame: **1 week**

Content Area:	**Collision Repair Tech III**	**Grade(s)**	**11**
Unit Plan Title:	**Welding & Cutting**		
NJSLS/CCTC Standard(s) Addressed in this unit			
8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks. 9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance. 9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces. 9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM. 9.3.ST-ET.5 Apply knowledge in STEM to solve problems 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills.			

CRP3. Attend to personal health and financial well-being.
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Essential Questions (3-5)

What safety precautions are required for welding?
What are commonly used welds in the collision repair shop?
What are the different types of joints encountered during panel repair and replacement?
How is a MIG welding machine set up, the welding variables and how to control them, and how to make various welds using the MIG welding machine?
What is the difference between aluminum and steel welding?
What are the two types of resistance spot welding; and when is each one used?
How are plasma cutters and a cutting torch used?

Anchor Text

Auto Collision Repair and Refinishing 2nd edition, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL, ISBN# 978-1-63126-400-9

Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR		
II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS)		
E. Metal Welding and Cutting		

2. Weld and cut high-strength steel and other steels.	HP-I	
4. Determine the correct GMAW (MIG) welder type, electrode/wire type, diameter, and gas to be used in a specific welding situation.	HP-I	
5. Set up and adjust the GMAW (MIG) welder to "tune" for proper electrode stickout, voltage, polarity, flow rate, and wire-feed speed required for the substrate being welded.	HP-I	
6. Store, handle, and install high-pressure gas cylinders.	HP-I	
8. Use the proper angle of the gun to the joint and direction of gun travel for the type of weld being made in the flat, horizontal, vertical, and overhead positions.	HP-I	
10. Protect computers and other electronic control modules during welding procedures.	HP-I	
11. Clean and prepare the metal to be welded, assure good metal fit-up, apply weld-through primer if necessary, clamp or tack as required.	HP-I	
12. Determine the joint type (butt weld with backing, lap, etc.) for weld being made.	HP-I	
13. Determine the type of weld (continuous, stitch weld, plug, etc.) for each specific welding operation.	HP-I	
14. Perform the following welds: continuous, plug, butt weld with and without backing, fillet, etc.	HP-I	
15. Perform visual and destructive tests on each weld type.	HP-I	
16. Identify the causes of various welding defects; make necessary adjustments.	HP-I	
17. Identify cause of contact tip burn-back and failure of wire to feed; make necessary adjustments.	HP-I	
18. Identify cutting process for different substrates and locations; perform cutting operation.	HP-I	
PAINTING AND REFINISHING		
IV. PAINTING AND REFINISHING		
A. Safety Precautions		
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	

Formative & Summative Assessments

Formative:

Quizzes
Task sheets completion
Goodheart-Willcox on-line assessments
Homework

Summative:

Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)
SP-2 Online safety course. www.SP2.org/site/page/automotive

Suggested Time Frame:	**3 week**

Content Area:	**Collision Repair Tech III**	**Grade(s)**	**11**
Unit Plan Title:		**Nonstructural Panel Repair II**	

NJSLS/CCTC Standard(s) Addressed in this unit

8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.

9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.

9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.

9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM.

9.3.ST-ET.5 Apply knowledge in STEM to solve problems

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
CRP1. Act as a responsible and contributing citizen and employee.
CRP2. Apply appropriate academic and technical skills.
CRP3. Attend to personal health and financial well-being.
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Essential Questions (3-5)

What are the steps in the individual panel repair process?
What is the procedure to rough out specific types of nonstructural damage?
How does one use body filler to restore a panel contour?
How does one accomplish the metal finishing process?
What are the considerations that must be taken into account when repairing aluminum panels?

Anchor Text

Auto Collision Repair and Refinishing 2nd edition, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL, ISBN# 978-1-63126-400-9

Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR		

II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS)		
A. Preparation		
1. Review damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan.	HP-I	
2. Inspect, remove, label, store, and reinstall exterior trim and moldings.	HP-I	
5. Inspect, remove, label, store, and reinstall vehicle mechanical and electrical components that may interfere with or be damaged during repair.	HP-G	
II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS)		
B. Outer Body Panel Repairs, Replacements, and Adjustments		
1. Determine the extent of direct and indirect/hidden damage and direction of impact; develop and document a repair plan.	HP-I	
DAMAGE ANALYSIS, ESTIMATING AND CUSTOMER SERVICE TASK LIST		
A. Damage Analysis		
12. Identify type and condition of finish; determine if refinishing is required.	HP-I	

Formative & Summative Assessments

Formative:

- Quizzes
- Task sheets completion
- Goodheart-Willcox on-line assessments
- Homework

Summative:

- Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Suggested Time Frame:	**2 week**

Content Area:	Collision Repair Tech III	Grade(s)	11
Unit Plan Title:	Bolted Nonstructural Part Replacement II		

NJSLS/CCTC Standard(s) Addressed in this unit

8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.
9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.
9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.
9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM.
9.3.ST-ET.5 Apply knowledge in STEM to solve problems
3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
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CRP6. Demonstrate creativity and innovation.
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CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Essential Questions (3-5)

What are the parts of bolted panel assemblies and what are sources to obtain parts?
What are the procedures in applying basic skills used in bolted part replacement?
How are damaged bolted parts removed?
How are bolted parts installed and aligned?

Anchor Text

Auto Collision Repair and Refinishing 2nd edition, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL, ISBN# 978-1-63126-400-9

Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR	
II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS)	
A. Preparation	
3. Inspect, remove, label, store, and reinstall interior trim and components.	HP-I
4. Inspect, remove, label, store, and reinstall body panels and components that may interfere with or be damaged during repair.	HP-I
II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS)	
B. Outer Body Panel Repairs, Replacements, and Adjustments	
1. Determine the extent of direct and indirect/hidden damage and direction of impact; develop and document a repair plan.	HP-I
4. Inspect, remove, replace, and align hood, hood hinges, and hood latch.	HP-I
5. Inspect, remove, replace, and align deck lid, lid hinges, and lid latch.	HP-I
6. Inspect, remove, replace, and align doors, latches, hinges, and related hardware.	HP-I
7. Inspect, remove, replace and align tailgates, hatches, liftgates and sliding doors.	HP-G
8. Inspect, remove, replace, and align bumper bars, covers, reinforcement, guards, isolators, and mounting hardware.	HP-I
9. Inspect, remove, replace and align fenders, and related panels.	HP-I

DAMAGE ANALYSIS, ESTIMATING AND CUSTOMER SERVICE TASK LIST		
A Damage Analysis		
10. Perform visual inspection of non-structural components and members.	HP-I	
B. Estimating		
11. Select and price OEM parts; verify availability, compatibility, and condition.	HP-G	
12. Select and price alternative/optional OEM parts; verify availability, compatibility and condition.	HP-G	
13. Select and price aftermarket parts; verify availability, compatibility, and condition.	HP-G	
14. Select and price recyclable/used parts; verify availability, compatibility and condition.	HP-G	
15. Select and price remanufactured, rebuilt, and reconditioned parts; verify availability, compatibility and condition.	HP-G	

Formative & Summative Assessments

Formative:

- Quizzes
- Task sheets completion
- Goodheart-Willcox on-line assessments
- Homework

Summative:

- Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Suggested Time Frame:	**3 week**

Content Area:	Collision Repair Tech III	Grade(s)	11
Unit Plan Title:	Welded & Bonded Repair II		

NJSLS/CCTC Standard(s) Addressed in this unit

8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.
9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.
9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.
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3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
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CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.

CRP12. Work productively in teams while using cultural global competence.

Essential Questions (3-5)

What are the steps involved in replacing welded and bonded nonstructural panels?
How does one analyze damage that requires panel replacement?
How are spot welds located and removed?
What are various panel joining techniques?
What are the procedures for replacing specific welded and bonded nonstructural panels?

Anchor Text

Auto Collision Repair and Refinishing 2nd edition, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL, ISBN# 978-1-63126-400-9

Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR		
II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS)		
A. Preparation		
3. Inspect, remove, label, store, and reinstall interior trim and components.	HP-I	
4. Inspect, remove, label, store, and reinstall body panels and components that may interfere with or be damaged during repair.	HP-I	
5. Inspect, remove, label, store, and reinstall vehicle mechanical and electrical components that may interfere with or be damaged during repair.	HP-G	
II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS)		
B. Outer Body Panel Repairs, Replacements, and Adjustments		
1. Determine the extent of direct and indirect/hidden damage and direction of impact; develop and document a repair plan.	HP-I	
11. Weld damaged or torn steel body panels; repair broken welds.	HP-G	
II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS)		

E. Metal Welding and Cutting		
11. Clean and prepare the metal to be welded, assure good metal fit-up, apply weld-through primer if necessary, clamp or tack as required.	HP-I	
12. Determine the joint type (butt weld with backing, lap, etc.) for weld being made.	HP-I	
DAMAGE ANALYSIS, ESTIMATING AND CUSTOMER SERVICE TASK LIST		
A. Damage Analysis		
10. Perform visual inspection of non-structural components and members.	HP-I	

Formative & Summative Assessments

Formative:

- Quizzes
- Task sheets completion
- Goodheart-Willcox on-line assessments
- Homework

Summative:

- Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Suggested Time Frame:	**3 week**

Content Area:	**Collision Repair Tech III**	**Grade(s)**	**11**
Unit Plan Title:	**Plastic Repair**		
NJSLS/CCTC Standard(s) Addressed in this unit			

8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.
9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.
9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.
9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM.
9.3.ST-ET.5 Apply knowledge in STEM to solve problems
3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
CRP1. Act as a responsible and contributing citizen and employee.
CRP2. Apply appropriate academic and technical skills.
CRP3. Attend to personal health and financial well-being.
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Essential Questions (3-5)

What types of plastics are used in the auto industry and how are the plastics classified?
What are the tools and materials used in plastic repair?
What are the basic steps followed in plastic repair?
What are the procedures for repairing specific types of plastic damage?

Anchor Text

Auto Collision Repair and Refinishing 2nd edition, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL, ISBN# 978-1-63126-400-9

Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS)		
F. Plastics and Adhesives		
10. Inspect, remove, and reinstall repairable plastics and other components for off-vehicle repair.	HP-I	

Formative & Summative Assessments

Formative:

- Quizzes
- Task sheets completion
- Goodheart-Willcox on-line assessments
- Homework

Summative:

- Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Suggested Time Frame:	**2 week**

Content Area:	Collision Repair Tech III	Grade(s)	11
Unit Plan Title:	Glass II		

NJSLS/CCTC Standard(s) Addressed in this unit

8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.
9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.
9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.
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9.3.ST-ET.5 Apply knowledge in STEM to solve problems
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3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
CRP1. Act as a responsible and contributing citizen and employee.
CRP2. Apply appropriate academic and technical skills.
CRP3. Attend to personal health and financial well-being.
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Essential Questions (3-5)

What types of glass are found on vehicles?

What are the specialized tools and materials used in glass service?
What is the proper procedure for removing and replacing movable glass?
What is the proper procedure to remove and replace fixed glass?

Anchor Text

Auto Collision Repair and Refinishing 2nd edition, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL, ISBN# 978-1-63126-400-9

Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR		
(BODY COMPONENTS)		
II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS)		
D. Moveable Glass and Hardware		
2. Inspect, adjust, repair, remove, reinstall or replace weather-stripping.	HP-G	

Formative & Summative Assessments

Formative:

- Quizzes
- Task sheets completion
- Goodheart-Willcox on-line assessments
- Homework

Summative:

- Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Suggested Time Frame:	**1 week**

Content Area:	**Collision Repair Tech III**	**Grade(s)**	**11**
Unit Plan Title:	**Electrical Systems**		

NJSLS/CCTC Standard(s) Addressed in this unit

8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.
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MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
CRP1. Act as a responsible and contributing citizen and employee.
CRP2. Apply appropriate academic and technical skills.
CRP3. Attend to personal health and financial well-being.
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CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.

CRP11. Use technology to enhance productivity.

CRP12. Work productively in teams while using cultural global competence.

Essential Questions (3-5)

What are the components of the electrical system?
How does current flow?
How are electrical system problems diagnosed?
How are electrical system components removed and replaced?

Anchor Text

Auto Collision Repair and Refinishing 2nd edition, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL, ISBN# 978-1-63126-400-9

Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR		
(BODY COMPONENTS)		
II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS)		
D. Moveable Glass and Hardware		
2. Inspect, adjust, repair, remove, reinstall or replace weather-stripping.	HP-G	
5. Initialize electrical components as needed.	HP-G	

Formative & Summative Assessments

Formative:

- Quizzes
- Task sheets completion
- Goodheart-Willcox on-line assessments
- Homework

Summative:

Tests both written and performance
Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)
SP-2 Online safety course. www.SP2.org/site/page/automotive

Suggested Time Frame:	**2 week**

Content Area:	**Collision Repair Tech III**	**Grade(s)**	**11**
Unit Plan Title:	**Restraint Systems**		

NJSLS/CCTC Standard(s) Addressed in this unit

8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.
9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.
9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.
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MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
CRP1. Act as a responsible and contributing citizen and employee.

CRP2. Apply appropriate academic and technical skills.
CRP3. Attend to personal health and financial well-being.
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CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Essential Questions (3-5)

What are the various types of restraint systems and their components in vehicles?
What are the differences and functions of active and passive restraints systems in vehicles?
What are the two types of air bag systems?
What is the function of the different impact sensors?
How are restraint system problems diagnosed?
What are the restraint system components and how are they replaced?
What are the safety procedures and inherent dangers of servicing restraint systems?

Anchor Text

Auto Collision Repair and Refinishing 2nd edition, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL, ISBN# 978-1-63126-400-9

Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

7. Inspect, remove, replace and align tailgates, hatches, liftgates and sliding doors.	HP-G	
DAMAGE ANALYSIS, ESTIMATING AND CUSTOMER SERVICE TASK LIST		
A .Damage Analysis		

14. Identify safety systems physical damage.	HP-G	
15. Identify interior component damage.	HP-I	
B. Estimating		
4. Identify safety systems; determine replacement items.	HP-G	

Formative & Summative Assessments

Formative:

- Quizzes
- Task sheets completion
- Goodheart-Willcox on-line assessments
- Homework

Summative:

- Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Suggested Time Frame:	**2 week**

Content Area:	**Collision Repair Tech III**	**Grade(s)**	**11**
Unit Plan Title:	**Refinishing Tools & Equipment II**		
NJSLS/CCTC Standard(s) Addressed in this unit			

8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.
9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.
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3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
CRP1. Act as a responsible and contributing citizen and employee.
CRP2. Apply appropriate academic and technical skills.
CRP3. Attend to personal health and financial well-being.
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Essential Questions (3-5)

What are the hand and power tools used in refinishing operations?
What are the various types of spray guns?
How would you describe the various types of spray booths (cross-draft, semi-downdraft, and downdraft)?
What pieces of equipment are used during refinishing operations?

What are the parts of a compressed air system?

Anchor Text

Auto Collision Repair and Refinishing 2nd edition, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL, ISBN# 978-1-63126-400-9

Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

PAINTING AND REFINISHING		
IV. PAINTING AND REFINISHING		
C. Spray Gun and Related Equipment Operation		
1. Inspect, clean, and determine condition of spray guns and related equipment (air hoses, regulators, air lines, air source, and spray environment).	HP-I	
4. Demonstrate an understanding of the operation of pressure spray equipment.	HP-G	
D. Paint Mixing, Matching, and Applying		
12. Identify and mix paint using a formula.	HP-I	
E. Paint Defects - Causes and Cures		
20. Identify finish damage caused by bird droppings, tree sap, and other natural causes; correct the condition.	HP-G	

Formative & Summative Assessments

Formative:

- Quizzes
- Task sheets completion
- Goodheart-Willcox on-line assessments

Homework Summative: Tests both written and performance
Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)
SP-2 Online safety course. www.SP2.org/site/page/automotive

Suggested Time Frame:	**3 week**

Content Area:	**Collision Repair Tech III**	**Grade(s)**	**11**
Unit Plan Title:	**Refinishing Materials II**		

NJSLS/CCTC Standard(s) Addressed in this unit
8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks. 9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance. 9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces. 9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM. 9.3.ST-ET.5 Apply knowledge in STEM to solve problems 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. CRP1. Act as a responsible and contributing citizen and employee.

CRP2. Apply appropriate academic and technical skills.
CRP3. Attend to personal health and financial well-being.
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Essential Questions (3-5)

What is the difference between thermoplastic paint and thermoset paint?
What types of paint are commonly used to refinish vehicles?
What are the components of paint?
What is meant by crosslinking and pot life?
When are the uses of primer, surfacer, sealer, basecoat, clearcoat, single-stage, and tri-coat?
What types of sandpaper are used in refinishing?

Anchor Text

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Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

PAINTING AND REFINISHING		
IV. PAINTING AND REFINISHING		
B. Surface Preparation		
7. Apply suitable metal treatment or primer in accordance with total product systems.	HP-I	

9. Mix primer, primer-surfacer or primer-sealer.	HP-I	
16. Clean area to be refinished using a final cleaning solution.	HP-I	
17. Remove, with a tack rag, any dust or lint particles from the area to be refinished.	HP-I	
24. Identify metal parts to be refinished; determine the materials needed, preparation, and refinishing procedures.	HP-I	
D. Paint Mixing, Matching, and Applying		
13. Identify poor hiding colors; determine necessary action.	HP-G	
16. Identify the materials equipment, and preparation differences between solvent and waterborne technologies.	HP-G	
E. Paint Defects - Causes and Cures		
20. Identify finish damage caused by bird droppings, tree sap, and other natural causes; correct the condition.	HP-G	
21. Identify finish damage caused by airborne contaminants (acids, soot, rail dust, and other industrial-related causes); correct the condition.	HP-G	
23. Identify chalking (oxidation); determine the cause(s) and correct the condition.	HP-G	

Formative & Summative Assessments

Formative:

- Quizzes
- Task sheets completion
- Goodheart-Willcox on-line assessments
- Homework

Summative:

- Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Suggested Time Frame:	**2 week**

Content Area:	**Collision Repair Tech III**	**Grade(s)**	**11**
Unit Plan Title:	**Painting Mixing & Reducing**		

NJSLS/CCTC Standard(s) Addressed in this unit

8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.
9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.
9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.
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3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
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CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Essential Questions (3-5)

Where is the paint code found on the vehicle?
How is the paint code used to obtain the paint number?
Why is stirring thoroughly tints so important?
How is a color mixed?
How is paint reduced by volume, percentage, and weight?

Anchor Text

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Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

PAINTING AND REFINISHING		
IV. PAINTING AND REFINISHING		
D. Paint Mixing, Matching, and Applying		
1. Identify color code by manufacturer's vehicle information label.	HP-I	
2. Shake, stir, reduce, catalyze/activate, and strain refinish materials.	HP-I	

Formative & Summative Assessments

Formative:

Quizzes
Task sheets completion
Goodheart-Willcox on-line assessments
Homework

Summative:

Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Suggested Time Frame:	**2 week**

Content Area:	**Collision Repair Tech III**	**Grade(s)**	**11**
Unit Plan Title:	**Spray Technique**		

NJSLS/CCTC Standard(s) Addressed in this unit

8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.

9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.

9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.

9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM.

9.3.ST-ET.5 Apply knowledge in STEM to solve problems

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
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CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Essential Questions (3-5)

What are the skills needed to spray paint including: hand/eye coordination, flexibility, rhythm, and the ability to detect and correct flaws while painting?
How is a spray gun set up for spray pattern size, material, and air pressure?
What are some of the spray gun handling variables including body position, fan orientation, distance, speed, overlap, and triggering?
What are the types of coats used when painting panels; and what are the proper procedures for spraying various types of panels?
What is meant by the term "to walk the side of a vehicle"?

Anchor Text

Auto Collision Repair and Refinishing 2nd edition, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL, ISBN# 978-1-63126-400-9

Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

PAINTING AND REFINISHING		

IV. PAINTING AND REFINISHING		
C. Spray Gun and Related Equipment Operation		
1. Inspect, clean, and determine condition of spray guns and related equipment (air hoses, regulators, air lines, air source, and spray environment).	HP-I	
2. Select spray gun setup (fluid needle, nozzle, and cap) for product being applied.	HP-I	
3. Test and adjust spray gun using fluid, air and pattern control valves.	HP-I	
D. Paint Mixing, Matching, and Applying		
16. Identify the materials equipment, and preparation differences between solvent and waterborne technologies.	HP-G	

Formative & Summative Assessments

Formative:

- Quizzes
- Task sheets completion
- Goodheart-Willcox on-line assessments
- Homework

Summative:

- Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Suggested Time Frame:	**1 week**

Content Area:	Collision Repair Tech II	Grade(s)	10
Unit Plan Title:	Surface Preparation		

NJSLS/CCTC Standard(s) Addressed in this unit

8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.
9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.
9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.
9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM.
9.3.ST-ET.5 Apply knowledge in STEM to solve problems
3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
CRP1. Act as a responsible and contributing citizen and employee.
CRP2. Apply appropriate academic and technical skills.
CRP3. Attend to personal health and financial well-being.
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Essential Questions (3-5)

What is the importance of proper surface preparation?

How is a panel cleaned prior to surface preparation?
What are the various paint removal processes?
How is primer and paint masked?
What are the steps in preparing the following: scratch, body filler, bear metal, weld, rust, repaint, blend, melt, trim, and aluminum?

Anchor Text

Auto Collision Repair and Refinishing 2nd edition, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL, ISBN# 978-1-63126-400-9

Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

PAINTING AND REFINISHING		
IV. PAINTING AND REFINISHING		
B. Surface Preparation		
1. Inspect, remove, store, and replace exterior trim and components necessary for proper surface preparation.	HP-I	
4. Strip paint to bare substrate (paint removal).	HP-I	
5. Dry or wet sand areas to be refinished.	HP-I	
7. Apply suitable metal treatment or primer in accordance with total product systems.	HP-I	
9. Mix primer, primer-surfacer or primer-sealer.	HP-I	
11. Apply primer onto surface of repaired area.	HP-I	
16. Clean area to be refinished using a final cleaning solution.	HP-I	
17. Remove, with a tack rag, any dust or lint particles from the area to be refinished.	HP-I	
24. Identify metal parts to be refinished; determine the materials needed, preparation, and refinishing procedures.	HP-I	
E. Paint Defects - Causes and Cures		
15. Identify poor adhesion; determine the cause(s) and correct the condition.	HP-G	
16. Identify paint cracking (shrinking, splitting, crowsfeet or line-checking, micro-checking, etc.); determine the cause(s) and correct the condition.	HP-G	

19. Identify water spotting; determine the cause(s) and correct the condition.	HP-G		
20. Identify finish damage caused by bird droppings, tree sap, and other natural causes; correct the condition.	HP-G		
23. Identify chalking (oxidation); determine the cause(s) and correct the condition.	HP-G		
DAMAGE ANALYSIS, ESTIMATING AND CUSTOMER SERVICE TASK LIST			
A. Damage Analysis			
12. Identify type and condition of finish; determine if refinishing is required.	HP-I	HP-I	

Formative & Summative Assessments

Formative:

- Quizzes
- Task sheets completion
- Goodheart-Willcox on-line assessments
- Homework

Summative:

- Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Suggested Time Frame:	**2 week**

Content Area:	**Collision Repair Tech III**	**Grade(s)**	**11**

Unit Plan Title:	Color Matching

NJSLS/CCTC Standard(s) Addressed in this unit

8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.
9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.
9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.
9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM.
9.3.ST-ET.5 Apply knowledge in STEM to solve problems
3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
CRP1. Act as a responsible and contributing citizen and employee.
CRP2. Apply appropriate academic and technical skills.
CRP3. Attend to personal health and financial well-being.
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Essential Questions (3-5)

How does wavelength absorption determine color?
Why do colors appear different under various light sources?

What are the qualities of a color: hue, value, and chroma?
How do you view a color properly?
How do you plot a color?
How is a comparison panel made?
What does a spectrophotometer do?
How do spraying factors change colors?
How do you tint a color?

Anchor Text

Auto Collision Repair and Refinishing 2nd edition, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL, ISBN# 978-1-63126-400-9

Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

PAINTING AND REFINISHING		
IV. PAINTING AND REFINISHING		
D. Paint Mixing, Matching, and Applying		
4. Apply selected product on test or let-down panel; check for color match.	HP-I	

Formative & Summative Assessments

Formative:

- Quizzes
- Task sheets completion
- Goodheart-Willcox on-line assessments
- Homework

Summative:

- Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)	
SP-2 Online safety course. www.SP2.org/site/page/automotive	
Suggested Time Frame:	**1 week**

Content Area:	Collision Repair Tech III	Grade(s)	11
Unit Plan Title:	**Paint Application**		
NJSLS/CCTC Standard(s) Addressed in this unit			

8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.
9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance.
9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and Mathematics (STEM) workplaces.
9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM.
9.3.ST-ET.5 Apply knowledge in STEM to solve problems
3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

CRP1. Act as a responsible and contributing citizen and employee.
CRP2. Apply appropriate academic and technical skills.
CRP3. Attend to personal health and financial well-being.
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP6. Demonstrate creativity and innovation.
CRP7. Employ valid and reliable research strategies.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9. Model integrity, ethical leadership and effective management.
CRP10. Plan education and career paths aligned to personal goals.
CRP11. Use technology to enhance productivity.
CRP12. Work productively in teams while using cultural global competence.

Essential Questions (3-5)

What are the different levels of surface preparation?
What are the various sources of contamination?
What and how do you spray single-stage paint, basecoat/clearcoat paint, tricoat paint?
What is meant by the term "hiding"?
How a blend and a melt is made?
What are and how does one correct common refinish problems**?**

Anchor Text

Auto Collision Repair and Refinishing 2nd edition, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL, ISBN# 978-1-63126-400-9

Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

PAINTING AND REFINISHING		
IV. PAINTING AND REFINISHING		
A. Safety Precautions		

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	
13. Identify poor hiding colors; determine necessary action.	HP-G	
15. Identify alternative color formula to achieve a blendable match.	HP-I	
16. Identify the materials equipment, and preparation differences between solvent and waterborne technologies.	HP-G	
IV. PAINTING AND REFINISHING		
E. Paint Defects - Causes and Cures		
1. Identify blistering (raising of the paint surface, air entrapment); determine the cause(s) and correct the condition.	HP-G	
2. Identify a dry spray appearance in the paint surface; determine the cause(s) and correct the condition.	HP-I	
3. Identify the presence of fish-eyes (crater-like openings) in the finish; determine the cause(s) and correct the condition.	HP-I	
4. Identify lifting; determine the cause(s) and correct the condition.	HP-G	
5. Identify clouding (mottling and streaking in metallic finishes); determine the cause(s) and correct the condition.	HP-I	
6. Identify orange peel; determine the cause(s) and correct the condition.	HP-I	
8. Identify solvent popping in freshly painted surface; determine the cause(s) and correct the condition.	HP-G	
10. Identify sanding marks or sandscratch swelling; determine the cause(s) and correct the condition.	HP-I	
13. Identify tape tracking; determine the cause(s) and correct the condition.	HP-G	
15. Identify poor adhesion; determine the cause(s) and correct the condition.	HP-G	
16. Identify paint cracking (shrinking, splitting, crowsfeet or line-checking, micro-checking, etc.); determine the cause(s) and correct the condition.	HP-G	

18. Identify dirt or dust in the paint surface; determine the cause(s) and correct the condition.	HP-I	
19. Identify water spotting; determine the cause(s) and correct the condition.	HP-G	
21. Identify finish damage caused by airborne contaminants (acids, soot, rail dust, and other industrial-related causes); correct the condition.	HP-G	
25. Identify pin-holing; determine the cause(s) and correct the condition.	HP-G	

Formative & Summative Assessments

Formative:

- Quizzes
- Task sheets completion
- Goodheart-Willcox on-line assessments
- Homework

Summative:

- Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Suggested Time Frame:	**2 week**

Content Area:	**Collision Repair Tech III**	**Grade(s)**	**11**
Unit Plan Title:	**Detailing II**		

NJSLS/CCTC Standard(s) Addressed in this unit
8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks. 9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance. 9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces. 9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM. 9.3.ST-ET.5 Apply knowledge in STEM to solve problems 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills. CRP3. Attend to personal health and financial well-being. CRP4. Communicate clearly and effectively and with reason. CRP5. Consider the environmental, social and economic impacts of decisions. CRP6. Demonstrate creativity and innovation. CRP7. Employ valid and reliable research strategies. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP9. Model integrity, ethical leadership and effective management. CRP10. Plan education and career paths aligned to personal goals. CRP11. Use technology to enhance productivity. CRP12. Work productively in teams while using cultural global competence.
Essential Questions (3-5)
How do you identify and remove the following paint defects: runs, dirt, orange peel, single-stage fade, scratches, and acid rain damage? How is a buffer properly used for compounding, polishing, and glazing? What is the procedure for installing stripe tape and moldings?

How are stripes painted; and what is the procedure for installing decals?
How is the process of color sanding (both wet and dry) best demonstrated?
How is a vehicle detailed, clean up of overspray and the removal of oxidation accomplished?
How is the process of paintless dent repair completed?

Anchor Text

Auto Collision Repair and Refinishing 2nd edition, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL, ISBN# 978-1-63126-400-9

Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR		
II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS)		
A. Preparation		
2. Inspect, remove, label, store, and reinstall exterior trim and moldings.	HP-I	
PAINTING AND REFINISHING		
IV. PAINTING AND REFINISHING		
B. Surface Preparation		
1. Inspect, remove, store, and replace exterior trim and components necessary for proper surface preparation.	HP-I	
E. Paint Defects - Causes and Cures		
6. Identify orange peel; determine the cause(s) and correct the condition.	HP-I	
8. Identify solvent popping in freshly painted surface; determine the cause(s) and correct the condition.	HP-G	
10. Identify sanding marks or sandscratch swelling; determine the cause(s) and correct the condition.	HP-I	
18. Identify dirt or dust in the paint surface; determine the cause(s) and correct the condition.	HP-I	

20. Identify finish damage caused by bird droppings, tree sap, and other natural causes; correct the condition.	HP-G	
21. Identify finish damage caused by airborne contaminants (acids, soot, rail dust, and other industrial-related causes); correct the condition.	HP-G	
DAMAGE ANALYSIS, ESTIMATING AND CUSTOMER SERVICE TASK LIST		
A. Damage Analysis		
1. Position the vehicle for inspection.	HP-G	

Formative & Summative Assessments

Formative:

- Quizzes
- Task sheets completion
- Goodheart-Willcox on-line assessments
- Homework

Summative:

- Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Suggested Time Frame:	**1 week**

Content Area:	**Collision Repair Tech III**	**Grade(s)**	**11**
Unit Plan Title:	**Estimating II**		

NJSLS/CCTC Standard(s) Addressed in this unit
8.1.5. E.1a Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks. 9.3. ST.1 Apply engineering skills in a project that requires project management, process control and quality assurance. 9.3.ST.3 Describe the following safety, health, and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces. 9.3ST-ET.3 Apply processes and concepts for the use of technological tools in STEM. 9.3.ST-ET.5 Apply knowledge in STEM to solve problems 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. CRP1. Act as a responsible and contributing citizen and employee. CRP2. Apply appropriate academic and technical skills. CRP3. Attend to personal health and financial well-being. CRP4. Communicate clearly and effectively and with reason. CRP5. Consider the environmental, social and economic impacts of decisions. CRP6. Demonstrate creativity and innovation. CRP7. Employ valid and reliable research strategies. CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP9. Model integrity, ethical leadership and effective management. CRP10. Plan education and career paths aligned to personal goals. CRP11. Use technology to enhance productivity. CRP12. Work productively in teams while using cultural global competence.
Essential Questions (3-5)
Why is good customer relations important? What is it important to understand the terminology used in estimate writing? How should a vehicle be checked for damage?

What are the sources for parts?
How do you determine what is included and not included in labor allowances?
How are judgment times calculated?
What are the parts of handwritten and computer-generated estimates?

Anchor Text

Auto Collision Repair and Refinishing 2nd edition, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL, ISBN# 978-1-63126-400-9

Short & Informational Texts (3-5)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Expected Proficiencies of the Unit

DAMAGE ANALYSIS, ESTIMATING AND CUSTOMER SERVICE TASK LIST		
2. Prepare vehicle for inspection by providing access to damaged areas.	HP-G	
3. Analyze damage to determine appropriate methods for overall repairs.	HP-I	
5. Gather details of the incident/accident necessary to determine the full extent of vehicle damage.	HP-G	
6. Identify and record pre-existing damage.	HP-I	
7. Identify and record prior repairs.	HP-G	
10. Perform visual inspection of non-structural components and members.	HP-I	
11. Determine parts, components, material type(s) and procedures necessary for a proper repair.	HP-I	
12. Identify type and condition of finish; determine if refinishing is required.	HP-I	
14. Identify safety systems physical damage.	HP-G	
15. Identify interior component damage.	HP-I	
16. Identify damage to add-on accessories and modifications.	HP-G	
B. Estimating		
4. Identify safety systems; determine replacement items.	HP-G	
5. Apply appropriate estimating and parts nomenclature (terminology).	HP-I	

7. Utilize estimating guide procedure pages.	HP-I	
8. Apply estimating guide footnotes and headnotes as needed.	HP-I	
9. Estimate labor value for operations requiring judgment.	HP-G	
10. Select appropriate labor value for each operation (structural, non-structural, mechanical, and refinish).	HP-I	
11. Select and price OEM parts; verify availability, compatibility, and condition.	HP-G	
12. Select and price alternative/optional OEM parts; verify availability, compatibility and condition.	HP-G	
13. Select and price aftermarket parts; verify availability, compatibility, and condition.	HP-G	
14. Select and price recyclable/used parts; verify availability, compatibility and condition.	HP-G	
15. Select and price remanufactured, rebuilt, and reconditioned parts; verify availability, compatibility and condition.	HP-G	
16. Determine price and source of necessary sublet operations.	HP-G	
17. Determine labor value, prices, charges, allowances, or fees for non-included operations and miscellaneous items.	HP-G	
18. Recognize and apply overlap deductions, included operations, and additions.	HP-I	
19. Determine additional material and charges.	HP-G	
20. Determine refinishing material and charges.	HP-I	
21. Apply math skills to establish charges and totals.	HP-I	
22. Interpret computer-assisted and manually written estimates; verify the information is current.	HP-I	
23. Identify procedural differences between computer-assisted systems and manually written estimates.	HP-G	
24. Identify procedures to restore corrosion protection; establish labor values, and material charges.	HP-G	
25. Determine the cost effectiveness of the repair and determine the approximate vehicle retail, and repair value.	HP-G	
26. Recognize the differences in estimation procedures when using different information provider systems.	HP-G	

27. Verify accuracy of estimate compared to the actual repair and replacement operations.	HP-G	
C. Vehicle Construction and Parts Identification		
D. Customer Relations and Sales Skills		
2. Listen to customer/client; collect information and identify customers/client's concerns, needs and expectations.	HP-I	
5. Deal with angry customer/client	HP-I	
7. Recognize basic claims handling procedures; explain to customer/client.	HP-G	
9. Provide and review warranty information.	HP-I	
10. Provide and review technical and consumer protection information.	HP-G	
11. Estimate and explain duration of out-of-service time.	HP-G	
12. Apply negotiation skills to obtain a mutual agreement.	HP-G	
13. Interpret and explain manual or computer-assisted estimate to customer/client.	HP-I	

Formative & Summative Assessments

Formative:

- Quizzes
- Task sheets completion
- Goodheart-Willcox on-line assessments
- Homework

Summative:

- Tests both written and performance

Resources (websites, Canvas, LMS, Google Classroom, documents, etc.)

SP-2 Online safety course. www.SP2.org/site/page/automotive

Suggested Time Frame:	**3 week**

III. Methods of Student Evaluation:

Assessment can be divided into two general categories: formal (graded) and informal/classroom-based (both graded and ungraded). The key to effectively assessing a student's mastery of skills is to match the assessment method to the learning objective.

Formal Assessments

- Evaluation
- Class participation
- Creative assignments
- Homework and classwork assignments
- Reports and presentations
- Research methodology
- Technological applications
- Unit tests
- Various speaking and listening assignments
- Multiple choice exams
- Quizzes (announced and unannounced)
- Formal lab reports
- Scientific journal reviews
- Projects
- Short answer and problem solving tests
- Tests and quizzes on blackboard
- Case Study analysis

Informal Assessments

- Instructor's observations of note-taking, and organization of notebooks and assignments
- Cooperative learning activities, including labs
- Creative project assignments

- Laboratory behavior
- Observing citizenship and appropriate social responses
- Instructor's observations of time management skills

IV. Instructional Strategies:

The Automotive Collision Department incorporates an Experiential Learning Environment simulating a modern automotive dealership. Teacher examples of work ethics and habits, cooperative learning and teacher evaluation accent classroom lessons. Lectures are reinforced with the use of web-based automotive curricula; smartboards, modern testing and diagnostic equipment, vehicle components and actual vehicles supplement and enhance classroom instruction. Reinforcement of lessons are complemented with active student participation in a functioning automotive repair lab. Students are expected to demonstrate proficiency of associated NATEF Task lists as well as effective communication skills incorporating applied academics such as science, technology, language arts, analytical and math skills as tasks are completed.

V. Scope and Sequence:

Review of Collision Repair Introduction;

Safety Review;

Vehicle Construction;

Welding & Cutting;

Nonstructural Panel Repair II;

Bolted Nonstructural Part Replacement II;

Welded & Bonded Repair II;

Plastic Repair;

Glass II;

Electrical Systems;

Restraint Systems;

Refinishing Tools & Equipment II;

Refinishing Materials II;

Painting Mixing & Reducing; Spray Technique;

Surface Preparation;

Color Matching;

Paint Application;

Detailing II;

V. Complete List of Textbooks,

Auto Collision Repair and Refinishing 2nd edition, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL, 2017, ISBN# 978-1-63126-400-9

***Student Digital Materials-Online Learning Suite (OLS)* of Auto Collision Repair and Finishing, Michael Crandell, The Goodheart-Willcox Company Inc. Tinley Park, IL 2017, ISBN# 978-63126-404-7**

***SP-2* Online safety course. www.SP2.org/site/page/automotive**

***Fender Bender* (monthly magazine)**

***Body Shop Business* (online monthly magazine)**

***Ratchet and Wrench* (weekly magazine)**

***Motor Age Training Self-Study Guides for ASE Certification, Collision Repair/Refinish Series B3 Non-Structural Analysis & Damage Repair,* 2010.**

***Motor Age Training Self-Study Guides for ASE Certification, Collision Repair/Refinish Series B2 Painting & Refinishing,* 2008.**

https://www.youtube.com/watch?v=qQtroDoX8fc 3 M Plastic Repair

https://www.youtube.com/watch?v=gxq5vi-0yxg Bumper Tab Repair

https://sp2.org/site/

http://www.howstuffworks.com/

https://www.youtube.com/watch?v=vEyE8PibVDs Stud Gun

https://www.youtube.com/watch?v=lzBGZaS1apw Basic Mig Welding and Set Up

https://www.youtube.com/watch?v=mm5IZBJKv-M	Mig Welding Instructional
https://www.youtube.com/watch?v=DXv1EX3YQcg	Proper Technique to Mix Body Filter
https://www.youtube.com/watch?v=1sP9Ty0jQy8	Part 1 Body Filler Mixing, Spreading Applying and Proper Use of Sandpaper
https://www.youtube.com/watch?v=kJjT6eyBhag	Part 2 Filler Mixing Sanding and Applying
https://www.youtube.com/watch?v=JIMaFG3y-o8	Part 3 Filler Mixing Sanding and Applying
https://www.youtube.com/watch?v=muYweiYpcuM	Hammer and Dolly Basics
https://www.youtube.com/watch?v=ijgwCwnKZUM	Hammer and Dolly Techniques
https://www.youtube.com/watch?v=Zbhm-wL7s-s	Proper Masking Techniques
https://www.youtube.com/watch?v=Y8YzPL_wsGg	Masking Best Practices
https://www.youtube.com/watch?v=pea2GR3rADE	Wet Sanding and Polishing
https://www.youtube.com/watch?v=T3_C3W3z_lA	Measuring and Pulling a Vehicle

VII. Student Handout

. Course Description:

Since inception Passaic County Technical Institute's Automotive Collision Repair program has strived to meet the ever-changing industry standards. Recently we have partnered with the Automotive Service Excellence Education Foundation. Their main objective is …"to uphold high quality standards of excellence in automotive service" (ASE Alliance 2018). PCTI's School of Auto Collision Repair has incorporated ASE/NATEF standards and I-CAR industry training to meet the demands and challenges of repairing the modern automobile. NATEF Standards set our path and I-CAR Crosswalk enhances and aligns our current curriculum to meet changing industry demands.

Our curriculum is a series of individual training modules, which allow instructors the freedom to choose segments that best fit our students' needs. This approach offers an in-depth coverage of both conventional and innovative collision repair technologies and processes. The program features knowledge-based training and performance-based testing, with an increased emphasis on hands-on tasks. Being current with the most updated repair techniques and methods affords PCTI the ability to remain at the forefront of collision training. At PCTI we remain proactive with our training but also realize we need to react immediately to any changes in industry vehicle design technology.

I-CAR and ASE are industry recognized leaders in training and testing, respectively. Our students prepare for testing in ASE categories B2 and B3, and receive industry-recognized certificates upon completion. Participation in PCTI's program ensures students have completed the prerequisites required for future testing/certification they may choose. Preparing for I-CAR testing and having ASE certificates in two collision areas is a great resume builder and increases the student's employability when he or she enters the workforce. This is also an added savings for the future employer's training expense.

PCTI is excited about the potential we have to produce world class experts in the auto collision field. Upon graduation, the skills and training we instill in our students provide a competitive edge as they enter the workforce of today's global market place. Below is a synopsis of the available modules that are part of our challenging, rigorous, dynamic, and comprehensive curriculum for this level:

VIII. Appendix

PCTI Student Competency Checklist

NATEF Auto Collision Repair and Refinishing Hands-on Competency Checklist

Student Name: _____ Date: _____
Instructor: _____

Suggested Level of Competency Ratings:

5 Mastered competency. Able to perform all elements of the task successfully and independently without supervision.

4 Satisfactory performance of task. Acceptable performance of all elements of task with mastery of some elements.

3 Capable of performing task adequately, but some elements need improvement.

2 Satisfactory performance of some elements of task and unsatisfactory performance of some elements of task.

1 Unsatisfactory performance of task.

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS) **A. Preparation**					

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
1. Review damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan.	HP-I		1,6,9,21	III	
2. Inspect, remove, label, store, and reinstall exterior trim and moldings.	HP-I		2	III	
3. Inspect, remove, label, store, and reinstall interior trim and components.	HP-I		3	III	
4. Inspect, remove, label, store, and reinstall body panels and components that may interfere with or be damaged during repair.	HP-I		4,5	III	
5. Inspect, remove, label, store, and reinstall vehicle mechanical and electrical components that may interfere with or be damaged during repair.	HP-G		5,101	III	
6. Protect panels, glass, interior parts, and other vehicles adjacent to the repair area.	HP-I		5	I	
7. Soap and water wash entire vehicle; complete pre-repair inspection checklist.	HP-I		88	I	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
8. Prepare damaged area using water-based and solvent-based cleaners.	HP-I		48	II	
9. Remove corrosion protection, undercoatings, sealers, and other protective coatings as necessary to perform repairs.	HP-I		7	II	
10. Inspect, remove, and reinstall repairable plastics and other components for off-vehicle repair.	HP-I		31,15	III	
II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS) **B. Outer Body Panel Repairs, Replacements, and Adjustments**					
1. Determine the extent of direct and indirect/hidden damage and direction of impact; develop and document a repair plan.	HP-I		6,9,92	III	
2. Inspect, remove, and replace bolted, bonded, and welded steel panel or panel assemblies.	HP-G		6,96,112	IV	
3. Determine the extent of damage to aluminum body panels; repair or replace.	HP-G		21	II	
4. Inspect, remove, replace, and align hood, hood hinges, and hood latch.	HP-I		10,11	III	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
5. Inspect, remove, replace, and align deck lid, lid hinges, and lid latch.	HP-I		12	III	
6. Inspect, remove, replace, and align doors, latches, hinges, and related hardware.	HP-I		3,9,13,14	III	
7. Inspect, remove, replace, and align tailgates, hatches, liftgates, and sliding doors.	HP-G		3,12,14	III	
8. Inspect, remove, replace, and align bumper bars, covers, reinforcement, guards, isolators, and mounting hardware.	HP-I		15,16	III	
9. Inspect, remove, replace, and align fenders and related panels.	HP-I		8,17,18	III	
10. Straighten contours of damaged panels to a suitable condition for body filling or metal finishing using power tools, hand tools, and weld-on pulling attachments.	HP-I		19,20,21,22 23,24,25	I	
11. Weld damaged or torn steel body panels; repair broken welds.	HP-G		102,107,110	III	
12. Restore corrosion protection.	HP-I		90	II	
13. Replace door skins.	HP-G		Shop work order	IV	
14. Restore sound deadeners and foam materials.	HP-G		90	II	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
15. Perform panel bonding and weld bonding.	HP-G		97,101,105,109	III	
16. Diagnose and repair water leaks, dust leaks, and wind noise.	HP-G		Shop work order	IV	
17. Identify one-time use fasteners.	HP-G		2,3,4,8,10,12	II	
II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS) **C. Metal Finishing and Body Filling**					
1. Remove paint from the damaged area of a body panel.	HP-I		19	I	
2. Locate and repair surface irregularities on a damaged body panel.	HP-I		21	I	
3. Demonstrate hammer and dolly techniques.	HP-I		22	I	
4. Heat-shrink stretched panel areas to proper contour.	HP-I		26	II	
5. Cold shrink stretched panel areas to proper contour.	HP-I		28	I	
6. Mix and apply body filler.	HP-I		20	I	
7. Identify different types of body fillers.	HP-G		20	I	
8. Rough sand body filler to contour; finish sand.	HP-I		20	I	
9. Determine the proper metal finishing techniques for aluminum.	HP-G		21,22,23, 24,25,26,27	II	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
10. Determine proper application of body filler to aluminum.	HP-G		20	II	
II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS) **D. Moveable Glass and Hardware**					
1. Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanisms, and related controls.	HP-I		29, Shop work order	IV	
2. Inspect, adjust, repair, remove, reinstall, or replace weather-stripping.	HP-G		29	III	
3. Inspect, repair or replace, and adjust removable power operated roof panel and hinges, latches, guides, handles, retainer, and controls of sunroofs.	HP-G		Shop work order	IV	
4. Inspect, remove, reinstall, and align convertible top and related mechanisms.	HP-G		30	IV	
5. Initialize electrical components as needed.	HP-G		Shop work order	III	
II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS) **E. Metal Welding and Cutting**					
1. Identify weldable and non-weldable substrates used in vehicle construction.	HP-I		96	II	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
2. Weld and cut high-strength steel and other steels.	HP-I		110,112	III	
3. Weld and cut aluminum.	HP-G		111	IV	
4. Determine the correct GMAW (MIG) welder type, electrode/wire type, diameter, and gas to be used in a specific welding situation.	HP-I		97,98	III	
5. Set up and adjust the GMAW (MIG) welder to "tune" for proper electrode stickout, voltage, polarity, flow rate, and wire-feed speed required for the substrate being welded.	HP-I		99, 100	III	
6. Store, handle, and install high-pressure gas cylinders.	HP-I		98	III	
7. Determine work clamp (ground) location and attach.	HP-I		97,99,101, 108,110	II	
8. Use the proper angle of the gun to the joint and direction of gun travel for the type of weld being made in the flat, horizontal, vertical, and overhead positions.	HP-I		103,104,105, 108	III	
9. Protect adjacent panels, glass, vehicle interior, etc. from welding and cutting operations.	HP-I		5	I	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
10. Protect computers and other electronic control modules during welding procedures.	HP-I		101	III	
11. Clean and prepare the metal to be welded, assure good metal fit-up, apply weld-through primer if necessary, clamp or tack as required.	HP-I		110	III	
12. Determine the joint type (butt weld with backing, lap, etc.) for weld being made.	HP-I		94,103,107	III	
13. Determine the type of weld (continuous, stitch weld, plug, etc.) for each specific welding operation.	HP-I		103,104,104	III	
14. Perform the following welds: continuous, plug, butt weld with and without backing, fillet, etc.	HP-I		107	III	
15. Perform visual and destructive tests on each weld type.	HP-I		109	III	
16. Identify the causes of various welding defects; make necessary adjustments.	HP-I		108	III	
17. Identify cause of contact tip burn-back and failure of wire to feed; make necessary adjustments.	HP-I		99,100	III	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
18. Identify cutting process for different substrates and locations; perform cutting operation.	HP-I		94,112	III	
19. Identify different methods of attaching non-structural components (squeeze-type resistant spot welds (STRSW), riveting, non-structural adhesive, silicon bronze, etc.).	HP-G		Shop work order	IV	
II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR (BODY COMPONENTS) **F. Plastics and Adhesives**					
1. Identify the types of plastics; determine repairability.	HP-I		31	II	
2. Clean and prepare the surface of plastic parts; identify the types of plastic repair procedures.	HP-I		59	II	
3. Repair rigid, semi-rigid, or flexible plastic panels.	HP-I		312,33,34,35,36, 37,38,39,59	II	
4. Remove or repair damaged areas from rigid exterior composite panels.	HP-G		33,39, 40,59	II	
5. Replace bonded rigid exterior composite body panels; straighten or align panel supports.	HP-G		33, Shop work order	IV	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
IV. PAINTING AND REFINISHING **A. Safety Precautions**					
1. Identify and take necessary precautions with hazardous operations and materials according to federal, state, and local regulations.	HP-I		46, www.SP2.org	I	
2. Identify safety and personal health hazards according to OSHA guidelines and the "Right to Know Law".	HP-I		www.SP2.org	I	
3. Inspect spray environment and equipment to ensure compliance with federal, state, and local regulations, and for safety and cleanliness hazards.	HP-I			II	
4. Select and use a 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		44, www.SP2.org	I	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
5. Select and use a 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		45	III	
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		42,43,44, 45,46	III	
IV. PAINTING AND REFINISHING **B. Surface Preparation**					
1. Inspect, remove, store, and replace exterior trim and components necessary for proper surface preparation.	HP-I		47	III	
2. Soap and water wash entire vehicle; use appropriate cleaner to remove contaminants.	HP-I		88	I	
3. Inspect and identify type of finish, surface condition, and film thickness; develop and	HP-I		48	IV	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
document a plan for refinishing using a total product system.					
4. Strip paint to bare substrate (paint removal).	HP-I		49	III	
5. Dry or wet sand areas to be refinished.	HP-I		48,50,54	III	
6. Featheredge areas to be refinished.	HP-I		49,50	II	
7. Apply suitable metal treatment or primer in accordance with total product systems.	HP-I		51	III	
8. Mask and protect other areas that will not be refinished.	HP-I		52	II	
9. Mix primer, primer-surfacer, or primer-sealer.	HP-I		53	III	
10. Identify a complimentary color or shade of undercoat to improve coverage.	HP-G		Shop work order	IV	
11. Apply primer onto surface of repaired area.	HP-I		51,52	III	
12. Apply two-component finishing filler to minor surface imperfections.	HP-I		51	II	
13. Block sand area to which primer-surfacer has been applied.	HP-I		54	II	
14. Dry sand area to which finishing filler has been applied.	HP-I		20	II	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
15. Remove dust from area to be refinished, including cracks or moldings of adjacent areas.	HP-I		55	II	
16. Clean area to be refinished using a final cleaning solution.	HP-I		56	III	
17. Remove, with a tack rag, any dust or lint particles from the area to be refinished.	HP-I		56	III	
18. Apply suitable sealer to the area being refinished.	HP-I		52,57	IV	
19. Scuff sand to remove nibs or imperfections from a sealer.	HP-I		56	IV	
20. Apply stone chip resistant coating.	HP-G		Shop work order	IV	
21. Restore caulking and seam sealers to repaired areas.	HP-G		Shop work order	IV	
22. Prepare adjacent panels for blending.	HP-I		58,74	IV	
23. Identify the types of rigid, semi-rigid, or flexible plastic parts to be refinished; determine the materials needed, preparation, and refinishing procedures.	HP-I		59,75	III	
24. Identify metal parts to be refinished; determine the materials needed, preparation, and refinishing procedures.	HP-G		31,60	III	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
IV. PAINTING AND REFINISHING C. Spray Gun and Related Equipment Operation					
1. Inspect, clean, and determine condition of spray guns and related equipment (air hoses, regulators, air lines, air source, and spray environment).	HP-I		61	III	
2. Select spray gun setup (fluid needle, nozzle, and cap) for product being applied.	HP-I		62	III	
3. Test and adjust spray gun using fluid, air, and pattern control valves.	HP-I		63,64,65,66	III	
4. Demonstrate an understanding of the operation of pressure spray equipment.	HP-G		Shop work order	III	
IV. PAINTING AND REFINISHING D. Paint Mixing, Matching, and Applying					
1. Identify color code by manufacturer's vehicle information label.	HP-I		67,77,78	III	
2. Shake, stir, reduce, catalyze/activate, and strain refinish materials.	HP-I		76	III	
3. Apply finish using appropriate spray techniques (gun arc, angle, distance, travel speed, and spray pattern overlap) for the finish being applied.	HP-I		71	IV	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
4. Apply selected product on test and let-down panel; check for color match.	HP-I		72	III	
5. Apply single stage topcoat.	HP-I		73	IV	
6. Apply basecoat/clearcoat for panel blending and panel refinishing.	HP-I		71,74	IV	
7. Apply basecoat/clearcoat for overall refinishing.	HP-G		71	IV	
8. Remove nibs or imperfections from basecoat.	HP-I		81	IV	
9. Refinish rigid or semi-rigid plastic parts.	HP-G		75	IV	
10. Refinish flexible plastic parts.	HP-I		75	IV	
11. Apply multistage coats for panel blending and overall refinishing.	HP-G		Shop work order	IV	
12. Identify and mix paint using a formula.	HP-I		78	III	
13. Identify poor hiding colors; determine necessary action.	HP-G		72	III	
14. Tint color using formula to achieve a blendable match.	HP-I		72	IV	
15. Identify alternative color formula to achieve a blendable match.	HP-I		77	III	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
16. Identify the materials, equipment, and preparation differences between solvent and waterborne technologies.			Shop work order	III	
IV. PAINTING AND REFINISHING **E. Paint Defects—Causes and Cures**					
1. Identify blistering (raising of the paint surface, air entrapment); determine the cause(s) and correct the condition.	HP-G		48	III	
2. Identify a dry spray appearance in the paint surface; determine the cause(s) and correct the condition.	HP-G		48	III	
3. Identify the presence of fish-eyes (crater-like openings) in the finish; determine the cause(s) and correct the condition.	HP-G		48,73	III	
4. Identify lifting; determine the cause(s) and correct the condition.	HP-I		79	III	
5. Identify clouding (mottling and streaking in metallic finishes); determine the cause(s) and correct the condition.	HP-I		73,80	III	
6. Identify orange peel; determine the cause(s) and correct the condition.	HP-I		85 Shop work order	III	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
7. Identify overspray; determine the cause(s) and correct the condition.	HP-I		88	II	
8. Identify solvent popping in freshly painted surface; determine the cause(s) and correct the condition.	HP-G		Shop work order	III	
9. Identify sags and runs in paint surface; determine the cause(s) and correct the condition.	HP-I		81,82,83,88	II	
10. Identify sanding marks or sandscratch swelling; determine the cause(s) and correct the condition.	HP-G		48	III	
11. Identify contour mapping/edge mapping while finish is drying; determine the cause(s) and correct the condition.	HP-G		54	IV	
12. Identify color difference (off-shade); determine the cause(s) and correct the condition.	HP-G		77,78	IV	
13. Identify tape tracking; determine the cause(s) and correct the condition.	HP-G		Shop work order	III	
14. Identify low gloss condition; determine the cause(s) and correct the condition.	HP-G		73	IV	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
15. Identify poor adhesion; determine the cause(s) and correct the condition.	HP-G		Shop work order	III	
16. Identify paint cracking (shrinking, splitting, crow's-feet or line-checking, micro-checking, etc.); determine the cause(s) and correct the condition.	HP-G		48	III	
17. Identify corrosion; determine the cause(s) and correct the condition.	HP-G		48	II	
18. Identify dirt or dust in the paint surface; determine the cause(s) and correct the condition.	HP-I		84	III	
19. Identify water spotting; determine the cause(s) and correct the condition.	HP-G		48	III	
20. Identify finish damage caused by bird droppings, tree sap, and other natural causes; correct the condition.	HP-G		48	III	
21. Identify finish damage caused by airborne contaminants (acids, soot, rail dust, and other industrial-related causes); correct the condition.	HP-G		48	III	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
22. Identify die-back conditions (dulling of the paint film showing haziness); determine the cause(s) and correct the condition.	HP-G		48	IV	
23. Identify chalking (oxidation); determine the cause(s) and correct the condition.	HP-G		48	III	
24. Identify bleed-through (staining); determine the cause(s) and correct the condition.	HP-G		73	IV	
25. Identify pin-holing; determine the cause(s) and correct the condition.	HP-G		73	III	
26. Identify buffing-related imperfections (swirl marks, wheel burns); correct the condition.	HP-I		86	IV	
27. Identify pigment flotation (color change through film build); determine the cause(s) and correct the condition.	HP-G		71,72	IV	
IV. PAINTING AND REFINISHING **F. Final Detail**					
1. Apply decals, transfers, tapes, woodgrains, pinstripes (painted and taped), etc.	HP-G		87	IV	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
2. Sand, buff, and polish fresh or existing finish to remove defects as required.	HP-I		82,84,85	IV	
3. Clean interior, exterior, and glass.	HP-I		88	II	
4. Clean body openings (doorjambs and edges, etc.).	HP-I		88	II	
5. Remove overspray.	HP-I		85,86,88	II	
6. Perform vehicle cleanup; complete quality control using a checklist.	HP-I		48,88	III	
V. DAMAGE ANALYSIS, ESTIMATING, AND CUSTOMER SERVICE **A. Damage Analysis**					
1. Position the vehicle for inspection.	HP-G		1,6	III	
2. Prepare vehicle for inspection by providing access to damaged areas.	HP-G		2,8	III	
3. Analyze damage to determine appropriate methods for overall repairs.	HP-I		9,95	III	
4. Determine the direction, point(s) of impact, and extent of direct, indirect, and inertia damage.	HP-G		25	II	
5. Gather details of the incident/accident necessary to determine the full extent of vehicle damage.	HP-G		6,9,92	III	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
6. Identify and record pre-existing damage.	HP-I		6	III	
7. Identify and record prior repairs.	HP-G		6	III	
8. Perform visual inspection of structural components and members	HP-G		92	IV	
9. Identify structural damage using measuring tools and equipment.	HP-I		89,92	IV	
10. Perform visual inspection of non-structural components and members.	HP-I		95	III	
11. Determine parts, components, material type(s), and procedures necessary for a proper repair.	HP-I		1,6	III	
12. Identify type and condition of finish; determine if refinishing is required.	HP-I		47	III	
13. Identify suspension, electrical, and mechanical component physical damage.	HP-G		Shop work order	IV	
14. Identify safety systems physical damage.	HP-G		6	III	
15. Identify interior component damage.	HP-I		6	III	
16. Identify damage to add-on accessories and modifications.	HP-G		6	III	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
17. Identify single (one time) use components.	HP-G		2,3,4,6,8,10, 12, 13,14,15,16,17,18	II	
V. DAMAGE ANALYSIS, ESTIMATING, AND CUSTOMER SERVICE **B. Estimating**					
1. Determine and record customer/vehicle owner information.	HP-I		1,Shop work order	II	
2. Identify and record vehicle identification number (VIN) information, including nation of origin, make, model, restraint system, body type, production date, engine type, and assembly plant.	HP-I		1, Shop work order	II	
3. Identify and record vehicle options, including trim level, paint code, transmission, accessories, and modifications.	HP-I		1, Shop work order	II	
4. Identify safety systems; determine replacement items.	HP-G		6, Shop work order	III	
5. Apply appropriate estimating and parts nomenclature (terminology).	HP-I		1 Shop work order,	III	
6. Determine and apply appropriate estimating sequence.	HP-I		Shop work order	II	
7. Utilize estimating guide procedure pages.	HP-I		Shop work order	III	
8. Apply estimating guide footnotes and headnotes as	HP-I		Shop work order	III	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
needed.					
9. Estimate labor value for operations requiring judgment.	HP-G		Shop work order	III	
10. Select appropriate labor value for each operation (structural, non-structural, mechanical, and refinish).	HP-G		Shop work order	III	
11. Select and price OEM parts; verify availability, compatibility, and condition.	HP-G		Shop work order	III	
12. Select and price alternative/optional OEM parts; verify availability, compatibility, and condition.	HP-G		Shop work order	III	
13. Select and price aftermarket parts; verify availability, compatibility, and condition.	HP-G		Shop work order	III	
14. Select and price recyclable/used parts; verify availability, compatibility, and condition.	HP-G		Shop work order	III	
15. Select and price remanufactured, rebuilt, and reconditioned parts; verify availability, compatibility and condition.	HP-G		Shop work order	III	
16. Determine price and source of necessary sublet operations.	HP-G		Shop work order	III	
17. Determine labor value,	HP-G		Shop work order	III	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
prices, charges, allowances, or fees for non-included operations and miscellaneous items.					
18. Recognize and apply overlap deductions, included operations, and additions.	HP-I		Shop work order	III	
19. Determine additional material and charges.	HP-G		1, Shop work order	III	
20. Determine refinishing material and charges.	HP-I		1, Shop work order	III	
21. Apply math skills to establish charges and totals.	HP-I		1, Shop work order	III	
22. Interpret computer-assisted and manually written estimates; verify the information is current.	HP-I		1, Shop work order	III	
23. Identify procedural differences between computer-assisted systems and manually written estimates.	HP-G		Shop work order	III	
24. Identify procedures to restore corrosion protection; establish labor values, and material charges.	HP-G		Shop work order	III	
25. Determine the cost effectiveness of the repair and determine the approximate vehicle retail, and repair value.	HP-G		1, Shop work order	III	
26. Recognize the differences in estimation procedures when	HP-G		Shop work order	III	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
using different information provider systems.					
27. Verify accuracy of estimate compared to the actual repair and replacement operations.	HP-G		1, Shop work order	III	
V. DAMAGE ANALYSIS, ESTIMATING, AND CUSTOMER SERVICE **C. Vehicle Construction and Parts Identification**					
1. Identify type of vehicle construction (space frame, unibody, body-over-frame).	HP-G			II	
2. Recognize the different damage characteristics of space frame, unibody, and body-over-frame vehicles.	HP-G			II	
3. Identify impact energy absorbing components.	HP-G			II	
4. Identify steel types; determine repairability.	HP-G			II	
5. Identify aluminum/magnesium components; determine repairability.	HP-G			II	
6. Identify plastic/composite components; determine repairability.	HP-G			II	
7. Identify vehicle glass components and repair/replacement procedures.	HP-G			II	
8. Identify add-on accessories.	HP-G			II	
V. DAMAGE ANALYSIS, ESTIMATING, AND CUSTOMER SERVICE					

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
D. Customer Relations and Sales Skills					
1. Acknowledge and/or greet customer/client.	HP-I			II	
2. Listen to customer/client; collect information and identify customer's/client's concerns, needs, and expectations.	HP-I		1	III	
3. Establish cooperative attitude with customer/client.	HP-I		36, Shop work order	II	
4. Identify yourself to customer/client; offer assistance.	HP-I		36, Shop work order	II	
5. Deal with angry customer/client.	HP-I		Shop work order	III	
6. Identify customer/client preferred communication method; follow up to keep customer/client informed about parts and the repair process.	HP-G		36, Shop work order	II	
7. Recognize basic claims handling procedures; explain to customer/client.	HP-G		Shop work order	III	
8. Project positive attitude and professional appearance.	HP-I		Shop work order	II	
9. Provide and review warranty information.	HP-I		Shop work order	III	
10. Provide and review technical and consumer protection information.	HP-G		Shop work order	III	
11. Estimate and explain duration	HP-G		Shop work order	III	

Task Number and Description	Priority	Level of Competency (1–5)	NATEF Job Sheet(JB#), Work Order or Test	Grade Level	Notes
of out-of-service time.					
12. Apply negotiation skills to obtain a mutual agreement.	HP-G		Shop work order	III	
13. Interpret and explain manual or computer-assisted estimate to customer/client.	HP-I		Shop work order	III	