Maine Department of Education Career and Technical Education CTE Intersections with College and Career Readiness Standards-English Language Arts with Auto Body; CIP: 47.0603

Non-Structural Analysis and Damage Repair (NATEF)

Non-Structural Analysis and Damage Repair Framework, Duties, and Tasks	English Language Arts Standards (CCSS)	Criteria for Demonstration of Proficiency (possible but not required; must be determined at the District level)	Maine Learning Results – Guiding Principles And Career and Education Development (optional)
A. Preparation			
 Review damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan Inspect, remove, label, store, and reinstall exterior trim and moldings. Inspect, remove, label, store, and reinstall interior trim and components. Inspect, remove, label, store, and reinstall body panels and components that may interfere with or be damaged during repair. Inspect, remove, label, store, and reinstall vehicle mechanical and electrical components that may interfere with or be damaged during repair. 	 RST.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. WHST.1: Write arguments focused on <i>discipline-specific</i> <i>content</i>. WHST.2: Write informative/ explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. WHST.4: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. 	 Generate written reports Oral presentation Document written repair plan Written test Research paper 	

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 6. Protect panels, glass, interior parts, and other vehicles adjacent to the repair area. 7. Soap and water wash entire vehicle; complete pre-repair inspection checklist. 8. Prepare damaged area using water-based and solvent-based cleaners. 9. Remove corrosion protection, under-coatings, sealers, and other protective coatings as necessary to perform repairs. 10. Inspect, remove, and reinstall repairable plastics and other components for off-vehicle repair. 	 WHST.5: Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. WHST.7: Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. WHST.9: Draw evidence from informational texts to support analysis, reflection, and research. 		
	2 through 8 and 10 RST.3: Follow precisely a complex multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks;		

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	analyze the specific results based on explanations in the text. RST.10: By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently.		
B. Outer Body Panel Repairs, Replace	ements, and Adjustments		
 Determine the extent of direct and indirect/hidden damage and direction of impact; develop and document a repair plan. Inspect, remove and replace bolted, bonded, and welded steel panel or panel assemblies. Determine the extent of damage to aluminum body panels; repair or replace. Inspect, remove, replace, and align hood, hood hinges, and hood latch. Inspect, remove, replace, and align deck lid, lid hinges, and lid 	 RST.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. WHST.1: Write arguments focused on <i>discipline-specific</i> <i>content</i>. WHST.2: Write informative/ explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. 	 Document written reports Written test Oral presentation Research presentation Rubric guided performance evaluating 	

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 latch. 6. Inspect, remove, replace, and align doors, latches, hinges, and related hardware. 7. Inspect, remove, replace and align tailgates, hatches, liftgates and sliding doors. 8. Inspect, remove, replace, and align bumper bars, covers, reinforcement, guards, isolators, and mounting hardware. 9. Inspect, remove, replace and align fenders, and related panels. 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. 11. Weld damaged or torn steel body panels; repair broken welds. 12. Restore corrosion protection. 13. Replace door skins. 14. Restore sound deadeners and foam materials. 	 WHST.4: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. WHST.5: Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. WHST.7: Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. WHST.9: Draw evidence from informational texts to support analysis, reflection, and research. 		
	3. RST.9: Synthesize information		

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 15. Perform panel bonding and weld bonding. 16. Diagnose and repair water leaks, dust leaks, and wind noise. 17. Identify one-time use fasteners. 	from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.		
	 4 through 10 RST.3: Follow precisely a complex multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.10: By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently. 		
	 16. and 17 RST.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent 		

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	understanding of a process, phenomenon, or concept, resolving conflicting information when possible. SL.2: Integrate and evaluate information presented in diverse media and formats, including visually, quan- titatively, and orally.		
C. Metal Finishing and Body Fillin	g	<u> </u>	
 Remove paint from the damaged area of a body panel. Locate and repair surface irregularities on a damaged body panel. Demonstrate hammer and dolly techniques. Heat shrink stretched panel areas to proper contour. Cold shrink stretched panel areas to proper contour. Prepare and apply body filler. Identify different types of body fillers. Rough sand body filler to 	 RST.3: Follow precisely a complex multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.10: By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently. SL.2: Integrate and evaluate information presented in 	 Performance evaluation Written test Third party assessment Research manufacturer's technical manual Oral presentation Module quizzes 	

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contour; finish sand. 9. Determine the proper metal finishing techniques for aluminum. 10. Determine proper application of body filler to aluminum.	diverse media and formats, including visually, quan- titatively, and orally.		
	2. RST.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.		
	 3. RST.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. SL.4: Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience. 		

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	 RST.7: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. RST.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. 		
	 9. and 10 RST.3: Follow precisely a complex multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.7: Integrate and evaluate multiple sources of information presented in 		

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D. Moveable Glass and Hardware	diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. RST.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. SL.2: Integrate and evaluate information presented in diverse media and formats, including visually, quan- titatively, and orally.		
 Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanisms, and related controls. Inspect, adjust, repair, remove, reinstall or replace weather-stripping. 	1 through 5 RST.3: Follow precisely a complex multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.	 Research technical manual Performance evaluation Written test Module quizzes 	

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 3. Inspect, repair or replace, and adjust removable power operated roof panel and hinges, latches, guides, handles, retainer, and controls of sunroofs. 4. Inspect, remove, reinstall, and align convertible top and related mechanisms. 5. Initialize electrical components as needed. 	 RST.7: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. RST.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. RST.10: By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently. SL.2: Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally. 		

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E. Metal Welding and Cutting			
 Identify weldable and non- weldable substrates used in vehicle construction. Weld and cut high-strength steel and other steels. Weld and cut aluminum. Determine the correct GMAW (MIG) welder type, electrode/wire type, diameter, and gas to be used in a specific welding situation. 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. Store, handle, and install high- pressure gas cylinders. Determine work clamp (ground) location and attach. Use the proper angle of the gun to the joint and direction of gun travel for the type of weld 	 RST.7: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. RST.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. RST.10: By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently. SL.2: Integrate and evaluate information presented in diverse media and formats, including visually, quan- 	 Written test Module quizzes Research presentation Oral presentation Performance evaluation 	

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 being made in the flat, horizontal, vertical, and overhead positions. 9. Protect adjacent panels, glass, vehicle interior, etc. from welding and cutting operations. 10. Protect computers and other electronic control modules during welding procedures. 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. 12. Determine the joint type (butt weld with backing, lap, etc.) for weld being made. 13. Determine the type of weld (continuous, stitch weld, plug, etc.) for each specific welding operation. 14. Perform the following welds: continuous, plug, butt weld with and without backing, fillet, etc. 15. Perform visual and destructive tests on each weld 	titatively, and orally. 4 and 5 RST.3: Follow precisely a complex multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11- 12 texts and topics. RST.7: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. RST.9: Synthesize information from a range of sources (e.g., texts, experiments,		

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type. 16. Identify the causes of various welding defects; make necessary adjustments. 17. Identify cause of contact tip burn-back and failure of wire to feed; make necessary adjustments. 18. Identify cutting process for different substrates and locations; perform cutting operation. 19. Identify different methods of attaching non-structural components (squeeze type resistant spot welds (STRSW), riveting, non-structural adhesive, silicon bronze, etc.).	 simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. RST.10: By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently. SL.2: Integrate and evaluate information presented in diverse media and formats, including visually, quan- titatively, and orally. 6. RST.3: Follow precisely a complex multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.4: Determine the meaning of symbols, key terms, and other domain-specific words and 		

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	 phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics. RST.7: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. RST.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. RST.10: By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently. 		
	SL.2: Integrate and evaluate information presented in diverse media and formats,		

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	including visually, quan- titatively, and orally.		
	7. RST.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.		
	 8. RST.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. SL.4: Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience. 		

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	 9 through 11 RST.3: Follow precisely a complex multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.10: By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently. 		
	12 and 13 RST.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.		
	14 and 15 RST.3: Follow precisely a complex multi-step procedure when		

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	 carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. SL.4: Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience. 		
	 16 and 17 RST.3: Follow precisely a complex multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, 		

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	phenomenon, or concept, resolving conflicting information when possible. RST.10: By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently.		
	 18 RST.3: Follow precisely a complex multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. RST.10: By the end of grade 12, read and comprehend 		

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	 science/technical texts in the grades 11-12 text complexity band independently and proficiently. SL.4: Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience. 19. RST.3: Follow precisely a complex multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results 		Development (optional)
	based on explanations in the text. RST.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11- 12 texts and topics.		

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	 RST.7: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. RST.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. RST.10: By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently. SL.4: Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to 		

Non-Structural Analysis and Damage Repair Framework, Duties, and Tasks	English Language Arts Standards (CCSS) task, purpose, and audience.	Criteria for Demonstration of Proficiency (possible but not required; must be determined at the District level)	Maine Learning Results – Guiding Principles And Career and Education Development (optional)
F. Plastics and Adhesives			
 Identify the types of plastics; determine repairability. Clean and prepare the surface of plastic parts; identify the types of plastic repair procedures. Repair rigid, semi-rigid, or flexible plastic panels. Remove or repair damaged areas from rigid exterior composite panels. Replace bonded rigid exterior composite body panels; straighten or align panel supports. 	 1 and 2 RST.3: Follow precisely a complex multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. RST.10: By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently. 5. RST.3: Follow precisely a complex multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the 	 Written test Research presentation on technical manuals Performance evaluations Third party assessment Module quizzes 	

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	 RST.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics. RST.7: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. RST.9: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. RST.10: By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently. 		

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	SL.2: Integrate and evaluate information presented in diverse media and formats, including visually, quan- titatively, and orally.		