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CTE Standards Unpacking
Nonstructural Analysis and Damage Repair

Course: Nonstructural Analysis and Damage Repair
Course Description: Non-Structural Analysis and Damage Repair is for students who wish to obtain in-depth knowledge and skills in procedures for non-structural repairs in preparation for postsecondary training and careers as collision repair technicians. Upon completion of this course, proficient students will be able to analyze non-structural collision damage and write and revise repair plans. Students will read and interpret technical texts to determine, understand, and safely perform appropriate repair techniques and procedures. Standards in this course include preparing vehicles for repair, removing and replacing panels and body components, metal finishing, body filling, removing and replacing moveable glass and hardware, metal welding and cutting, and repair of plastics.
Career Cluster: Transportation, Distribution & Logistics
Prerequisites: Introduction to Auto Body and Estimating 20120
Program of Study Application: Non-Structural Analysis and Damage Repair is an advanced pathway course in the Transportation, Distribution and Logistics career cluster, Automotive Body Collision and Refinishing pathway.

INDICATOR #NA 1: **Students will demonstrate understanding of auto body safety precautions.**		
SUB-INDICATOR 1.1 (Webb Level: 2 Skill/Concept): Demonstrate auto body technology safety practices		
Knowledge (Factual): -Proper personal safety equipment -Federal, state, and local regulations for HAZMAT -Vehicle specific service information, procedures and precautions -Vehicle system hazard types, locations, and recommended procedures needed before completing a repair.	**Understand (Conceptual):** -Consequences of not using personal safety equipment -Consequences of not following safety regulations -Importance of following the procedure in order -Hazard types and safety procedures while working.	**Do (Application):** -Select and use proper personal safety equipment. -Take necessary precautions with hazardous operations and materials. -Locate procedures and precautions that may apply to the vehicle being repaired. -Select and use a National Institute of Occupational Safety and Health (NIOSH)

		approved air purifying respirator.

Benchmarks:
Students will be assessed on their ability to:

- Completion of NATEF (National Automotive Technicians Education Foundation) tasks pertaining to safety.
- OSHA 10 Certification
- Completion of personal safety equipment checklist.
- Completion of federal, state and local regulations checklist pertaining to one area of auto body repair.
- Create an artifact using service information.

Academic Connections

ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):	**Sample Performance Task Aligned to the Academic Standard(s):**
SL4. Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range or formal and informal tasks	Students role play safe practices that can be used in the work area.

INDICATOR #NA 2: **Students will learn and demonstrate preparation for nonstructural repair.**

SUB-INDICATOR 2.1 (Webb Level: 2 Skill/Concept): Analyze and demonstrate processes involved in preparation for nonstructural inspection and repair

Knowledge (Factual):	**Understand (Conceptual):**	**Do (Application):**
-Damage reports -Terminology of vehicle parts -Proper labeling & storage techniques	-Importance of service reports to determine repair -Value of pre-repair, vehicle wash and inspection -Consequences of improper labeling and storage techniques	-Review damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan.

-Protection steps and methods	-Significance of protecting adjacent projects, panels and unrelated items	-Wash entire vehicle; complete pre-repair inspection checklist. -Inspect, remove, label and store damaged parts. -Inspect, remove, label and store parts that may interfere with/or may be damaged during repair. -Protect panels, glass, interior parts, and other vehicles adjacent to the repair area. -Remove corrosion protection, undercoatings, sealers, and other protective coatings as necessary to perform repairs.

Benchmarks:
Students will be assessed on their ability to:

- Complete the NATEF tasks associated with preparation for nonstructural repair.
- Complete correct installation of trim and moldings
- Explain how to install repairable plastics
- Complete pre-repair inspection checklist.

Academic Connections

ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):	**Sample Performance Task Aligned to the Academic Standard(s):**
W.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience	Students will write an explanation on how to install repairable plastics

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INDICATOR #NA 3: **Students will learn and demonstrate procedures for outer body panel repairs, replacements and adjustments.**		
SUB-INDICATOR 3.1 (Webb Level: 2 Skill/Concept): Demonstrate the processes involved in outer body panel repairs, replacements, and adjustments		
Knowledge (Factual): -Terminology -Different types and direction of damage -Alignment of vehicle parts -Corrosion protection when and why	**Understand (Conceptual):** -How type of damage impacts the type of repair -Importance of alignment of outer body panels -Consequences of misalignment -Value of metal properties and order of repair -Why dent must be pulled before panel can be replaced -Significance of corrosion protection	**Do (Application):** -Inspect/locate direct, indirect, or hidden damage and direction of impact -Remove, label and store parts interfering with repair -Manipulate metal to remove dents -Replace necessary panels -Align and adjust to fit jambs and body lines -Restore corrosion protection during and after the repair

Benchmarks:

Students will be assessed on their ability to:

- Complete NATEF task checklist pertaining to outer body panel repairs, replacements and adjustments (e.g., inspect, remove, replace and align fenders, and related panels)
- Complete repair checklist
- Create an artifact that demonstrates the correct use of sound deadeners and foam materials

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Academic Connections	
ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):	**Sample Performance Task Aligned to the Academic Standard(s):**
SL4. Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range or formal and informal tasks	-Students will complete a mock interview with customer and technician to explain repair.
N-VM 6. Use matrices to represent and manipulate data	-Students will create a visual representation of the damage and direction of damage of the vectors.

INDICATOR #NA 4: **Students will perform metal finishing and body filling.**		
SUB-INDICATOR 4.1 (Webb Level: 2 Skill/Concept): Understand and demonstrate the processes involved in metal finishing and body filling		
Knowledge (Factual):	**Understand (Conceptual):**	**Do (Application):**
-Prepping techniques -Operation of specific tools and processes required for metal finishing -Heat & cold shrink -Different types of body fillers and uses -Tools and processes used for filler materials, primers and painting prep -Painting processes	-Value of preparing metal as close to straight/contour as possible before applying fillers -Significance of body-filler types and correct use -Importance of proper application and sanding of body filler/primer before paint is applied -Consequences of correct/incorrect prepping techniques -Enjoyment of a job well done (personal satisfaction)	-Demonstrate hammer and dolly techniques. -Heat shrink stretched panel areas to proper contour. -Remove previous coatings and featheredge -Apply body fillers in ascending, layered steps and sand to original panel dimensions -Identify body filler defects; correct the cause and condition (pinholing, ghosting, staining, over catalyzing, etc.)

		-Apply primers within timed, sequential steps -Wet sand primer -Mask and paint panel

Benchmarks:
Students will be assessed on their ability to:

- Complete NATEF task list, pertaining to metal finishing and body filling.
- Create an artifact that correctly explains body filler defects and repair.

Academic Connections

ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):	**Sample Performance Task Aligned to the Academic Standard(s):**
SL4. Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range or formal and informal tasks	-Explain how to assess the hot and cold shrink
G-CO6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent	-Use geometric terms to describe the repair process and damages to the vehicle

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INDICATOR #NA 5: **Students will demonstrate service procedures for moveable glass and hardware.**		
SUB-INDICATOR 5.1 (Webb Level: 2 Skill/Concept): Understand and demonstrate proper repair procedures for moveable glass and hardware		
Knowledge (Factual): -Terminology -Operation of vehicle parts relating to moveable glass and hardware -Electrical systems	**Understand (Conceptual):** -How mechanical and electrical systems affect overall operation of moveable glass -Value of proper adjustments as important as working components -How proper adjustments hold as much value as working components -Importance of double-checking steps	**Do (Application):** -Verify customer complaint or window operation -Diagnose whether problem is mechanical or electrical -Evaluate electrical system pertaining to window system -Replace necessary components (e.g., electrical or glass) -Perform proper adjustments -Confirm proper repair and/or operation per customer complaint -Return vehicle to service

Benchmarks:

Students will be assessed on their ability to:

- Complete NATEF tasks that pertain to proper repair procedures for moveable glass and hardware (e.g., replace window, regulator, control switch)

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Academic Connections	
ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard): SL4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range or formal and informal tasks	**Sample Performance Task Aligned to the Academic Standard(s):** -Role play the part of technician and customer for glass installation

INDICATOR #NA 6: **Students will demonstrate plastic repair.**		
SUB-INDICATOR 6.1 (Webb Level: 2 Skill/Concept): Understand and demonstrate repair processes and use of adhesives involved in plastic repair		
Knowledge (Factual): -Terminology -Plastic types and repairs specific to them -General plastic repair procedures -Effects of heat on plastics -Straightening techniques	**Understand (Conceptual):** -Importance of correct identification of plastics in order to apply correct repair procedures -Importance of adhesion promoters in plastic repair -Value of order of operations -How plastic repair differs from metal repair -Why many plastic parts require additional support	**Do (Application):** -Identify the types of plastic; determine reparability -Clean and prepare the surface of plastic parts -Remove previous coatings in repair area and featheredge -Grind out plastic in repair area to allow for filler -Apply adhesion promoter if required and filler material -Straighten and smooth out filler; recoat as needed

		-Prep surface, add adhesion promoter and apply primer -Sand primer and prep for paint -While part is in paint department, go back and repair any damaged structural support

Benchmarks:
Students will be assessed on their ability to:

- Complete NATEF tasks that pertain to repair processes and use of adhesives involved in plastic repair.
- Repair rigid, semi-rigid, and flexible plastic panels.
- Remove or repair damaged areas from rigid exterior composite panels.

Academic Connections

ELA Literacy and/or Math Standard (if applicable, Science and/or Social Studies Standard):	**Sample Performance Task Aligned to the Academic Standard(s):**
W7. 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	-Write about types of adhesive used in plastic repair
M-GM3. Apply geometric methods to solve design problems	-Use geometric modeling to determine the amount of adhesive used in repair

Additional Resources
Please list any resources (e.g., websites, teaching guides, etc.) that would help teachers as they plan to teach these new standards.

ASE Education Foundation -- http://www.aseeducation.org/resources