Curriculum: Auto Tech I and II

Curricular Unit: Shop Safety procedures

Instructional Unit: A. Identify and apply all personal and work place safety procedures

**Standard Alignments (Section 2)**

<table>
<thead>
<tr>
<th>HECLE: HME.4.A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge: (H/PE) 6,7 (SC) 8</td>
</tr>
<tr>
<td>CCSS: 11-12.SL.1; 11-12.SL.2; 11-12.RST.3; 11-12.RST.4</td>
</tr>
<tr>
<td>NETS: 3b; 4b</td>
</tr>
<tr>
<td>Performance: 2.1, 3.1, 4.1</td>
</tr>
</tbody>
</table>

**Unit (Section 3)**

Learning Targets:

- **Identify general shop safety rules and procedures**
- Utilize safe procedures for handling of tools and equipment
- Identify and use proper placement of floor jacks and jack stands
- Identify and use proper procedures for safe lift operation
- Utilize proper ventilation procedures for working within the lab/shop area
- Identify marked safety areas
- Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment
- Identify the location and use of eye wash stations
- Identify the location of the posted evacuation routes
- Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities
- Identify and wear appropriate clothing for lab/shop activities
- Secure hair and jewelry for lab/shop activities
- Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits

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- Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.)

- Locate and demonstrate knowledge of material safety data sheets (MSDS)

### Instructional Strategies:

- Lecture: how to use chemicals safely
- The teacher will:
  - demonstrate the safe use of:
    - hand tools
    - power tools
  - describe how to use fire protection equipment safely
  - demonstrate the safe use of shop equipment
  - identify and provide access to information involving hybrid electrical systems
    - emphasis on safety including location of disconnect features of specific vehicle high voltage systems
  - assign online unit modules in Electude and Safety and Pollution Prevention Training (SP2)
- Guided practice in safe use of personal protective equipment, specifically:
  - clothing
  - safety glasses
- Dialogue and discussion – small and large group

### Assessments/Evaluations:

- Formative:
  - SP2 – quizzes
  - Electude – quizzes
- Summative:
  - SP2 – tests (must score 100% before shop work allowed)
  - Electude – tests (must score 100% before shop work allowed)
  - Safety practices are observed and evaluated in all work throughout the course

### Sample Assessment Questions:

- What is the purpose of personal protective equipment (PPE)?
  a. To protect the vehicle that is being serviced.
  b. To reduce employee exposure to hazards when other safety measures cannot reduce these risks to acceptable levels.
  c. To completely eliminate hazards that may cause injury to yourself or others.

### Instructional Resources/Tools:

- Safety and Pollution Prevention Training (SP2) http://www.sp2.org/
- Electude online modules – https://monicholscc.electude.com
- Personal protective equipment for demonstration and use
Cross Curricular Connections:

- Health: Apply safety skills during physical activities
- ELA:
  - Technical reading
  - Writing
  - Discussion

Depth of Knowledge (Section 5)

DOK: 3
Curriculum: Auto Tech I and II

Curricular Unit: Automotive tools and equipment and their use

Instructional Unit: B. Properly identify and demonstrate tools and equipment used in the automotive field

### Standard Alignments (Section 2)

<table>
<thead>
<tr>
<th>GLE/CLE: N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge: (CA) 3</td>
</tr>
<tr>
<td>CCSS: 11-12.RST.3; 11-12.RST.4</td>
</tr>
<tr>
<td>NETS: 6a-c</td>
</tr>
<tr>
<td>Performance: 3.2, 3.7</td>
</tr>
</tbody>
</table>

### Unit (Section 3)

#### Learning Targets:
- Identify tools and their usage in automotive applications
- Identify standard and metric designation
- Demonstrate safe handling and use of appropriate tools
- Demonstrate proper cleaning, storage, and maintenance of tools and equipment
- Demonstrate proper use of precision measuring tools (i.e., micrometer, dial-indicator, dial-caliper)

#### Instructional Strategies:
- The teacher will:
  - introduce tools and model their usage in automotive applications
  - lecture/discuss standard v. metric designation
- The teacher and students will model:
  - safe handling and use of appropriate tools
  - proper:
    - cleaning, storage, and maintenance of tools and equipment
    - use of precision measuring tools, specifically:
      - micrometer
      - dial-indicator
      - dial-caliper
- Students will complete relevant live work when available

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**Assessments/Evaluations:**

- Electude online assessment:
  - Formative: quizzes
  - Summative: tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

**Sample Assessment Questions:**

- A screwdriver consists of a shank with a tip on one end that corresponds to the shape of the head of a bolt or screw. The other end is usually cast into a plastic handle.
  
  What can you use a screwdriver for?
  
  a. To quickly loosen and tighten screws.
  b. To pry parts away from one another.
  c. To firmly tighten screws.

**Instructional Resources/Tools:**

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to industry for each unit
- Electude online modules – [https://monicholssc.electude.com](https://monicholssc.electude.com)

**Cross Curricular Connections:**

- ELA:
  - Technical reading
  - Writing
  - Discussion

---

**Depth of Knowledge (Section 5)**

DOK: 2
Curriculum: Auto Tech I and II

Curricular Unit: Preparing a Vehicle for Service

Instructional Unit: C. Identify the proper procedure for preparing a vehicle for service

<table>
<thead>
<tr>
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<tbody>
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<td>GLE/CLE: N/A</td>
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<tr>
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<tbody>
<tr>
<td>Learning Targets:</td>
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<tr>
<td>• Identify information needed and the service requested on a repair order</td>
</tr>
<tr>
<td>• Identify purpose and demonstrate proper use of fender covers, mats</td>
</tr>
<tr>
<td>• <strong>Demonstrate use of the three C’s (concern, cause, and correction)</strong></td>
</tr>
<tr>
<td>• Review vehicle service history</td>
</tr>
<tr>
<td>• Complete a work order to include customer information, vehicle identifying information, customer concerns, related service history, cause, and correction</td>
</tr>
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</table>

| Instructional Strategies:|
| • Students will: |
| • identify information needed and the service requested on a repair order. |
| • identify purpose and demonstrate proper use of fender covers, mats. |
| • demonstrate use of the three C’s (concern, cause, and correction). |
| • review vehicle service history. |
| • complete: |
| • a work order to include customer information, vehicle identifying information, customer concerns, related service history, cause, and correction |
| • relevant live work when available |

| Assessments/Evaluations:|
| • Electude online assessment |
| • Students will model/demonstrate proper procedures introduced in the unit |
| • Techniques introduced in the unit are observed and evaluated daily |
| • Unit competencies are assessed in all summative projects |

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### Sample Assessment Questions:

- A customer brings his/her car in for service. You notice a scratch on the right front fender. What should you do?
  - A. Say nothing; the customer most likely knows the fender is scratched.
  - B. Point the scratch out to your supervisor and make a notation on the repair order before you begin working on the car.
  - C. Point the scratch out to the customer when she returns to pick-up her car after repairs are made.

### Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to industry for each unit
- Electude online modules – [https://monicholscc.electude.com](https://monicholscc.electude.com)

### Cross Curricular Connections:

- ELA:
  - Technical reading
  - Writing
  - Discussion

### Depth of Knowledge (Section 5)

**DOK: 2**
Curriculum: Auto Tech I and II

Curricular: Preparing a Vehicle for a Customer

Instructional Unit: D. Finalizing service and returning a vehicle to a customer

Standard Alignments (Section 2)

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Unit (Section 3)

<table>
<thead>
<tr>
<th>Learning Targets:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Ensure the vehicle is prepared to return to a customer per school/company policy (floor mats, steering wheel cover, etc.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Instructional Strategies:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The teacher will lecture/discuss on preparing a vehicle to return to a customer</td>
</tr>
<tr>
<td>• Students will complete relevant live work when available</td>
</tr>
</tbody>
</table>

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<td>• Students will model/demonstrate proper procedures introduced in the unit</td>
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<td>• Unit competencies are assessed in all summative projects</td>
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<table>
<thead>
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<th>Sample Assessment Questions:</th>
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<tr>
<td>• You’re cleaning the vehicle carpets after servicing and find some loose change under the driver’s seat. What do you do?</td>
</tr>
<tr>
<td>A. Pick-up the loose change and place where the customer can find it; for example, in a front cup holder or center compartment.</td>
</tr>
<tr>
<td>B. Vacuum the loose change and retrieve it later.</td>
</tr>
<tr>
<td>C. The customer will never know, so keep the money for yourself</td>
</tr>
</tbody>
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<tr>
<td>• Electude online modules – <a href="https://monicholscc.electude.com">https://monicholscc.electude.com</a></td>
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</table>

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Cross Curricular Connections:

- ELA:
  - Technical reading
  - Writing
  - Discussion

Depth of Knowledge (Section 5)

DOK: 1
Curriculum: Auto Tech I and II

Curricular: Electrical/Electronic Systems General

Instructional Unit: E. Diagnose and repair general electrical systems

Standard Alignments (Section 2)

<table>
<thead>
<tr>
<th>GLE/CLE: SC1.1.Ec (Physical Science)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge: (MA) 1,2 (SC) 1</td>
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<tr>
<td>CCSS: 11-12.RST.3; 11-12.RST.4; N-Q.1; N-Q.3; A-CED.4</td>
</tr>
<tr>
<td>NETS: 6a-c</td>
</tr>
<tr>
<td>Performance: 3.2, 3.4, 4.1</td>
</tr>
</tbody>
</table>

Unit (Section 3)

Learning Targets:

- **Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins**

- **Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law)**

- Use wiring diagrams to trace electrical/electronic circuits

- Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow, and resistance

- Demonstrate knowledge of the causes and effects form shorts, grounds, opens, and resistance problems in electrical/electronic circuits

- Check operation of electrical circuits with a test light

- Check operation of electrical circuits with fused jumper wires

- Measure key-off battery drain (parasitic draw)

- Inspect and test fusible links, circuit breakers, and fuses; determine necessary action

- Perform solder repair of electrical wiring

- Replace electrical connectors and terminal ends

Instructional Strategies:

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
  - Students will complete relevant live work when available

Board Approved 8-3-15
Assessments/Evaluations:

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

Sample Assessment Questions:

- What is another term for electromotive force?
  A. Potential voltage
  B. Magnetic difference
  C. Potential difference

Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – [https://monicholscc.electude.com](https://monicholscc.electude.com)

Cross Curricular Connections:

- Math:
  - Number sense
  - Using formulas
- ELA:
  - Technical reading
  - Writing
  - Discussion
- Science: Understanding matter and energy

**Depth of Knowledge (Section 5)**

DOK: 4
Curriculum: Auto Tech I and II

Curricular: Battery Service

Instructional Unit: F. Diagnose and service vehicle batteries

**Standard Alignments (Section 2)**

<table>
<thead>
<tr>
<th>GLE/CLE: SC1.2.A (Concept only)</th>
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<tbody>
<tr>
<td>Knowledge: (CA) 3 (SC) 1</td>
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<td>CCSS: 11-12.RST.3; 11-12.RST.4</td>
</tr>
<tr>
<td>NETS: 6a-c</td>
</tr>
<tr>
<td>Performance: 3.1, 3.2, 3.7</td>
</tr>
</tbody>
</table>

**Unit (Section 3)**

Learning Targets:

- Perform battery state-of-charge test; determine necessary action
- Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action
- Maintain or restore electronic memory functions
- Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs
- Perform slow/fast battery charge according to manufacturer's recommendations
- Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply
- Identify high-voltage circuits of electric or hybrid electric vehicles and related safety precautions
- Identify electronic modules, security systems, radios, and other accessories that require re-initialization or code entry after reconnecting vehicle battery
- Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures

Instructional Strategies:

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
  - Students will complete relevant live work when available

Board Approved 8-3-15
Assessments/Evaluations:

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

Sample Assessment Questions:

- Where in the car can the lead-acid battery be located?
  - A. In the engine compartment.
  - B. In the trunk.
  - C. In the vehicle interior.

Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – https://monicholscc.electude.com

Cross Curricular Connections:

- ELA:
  - Technical reading
  - Writing
  - Discussion
- Science: Understanding energy

**Depth of Knowledge (Section 5)**

DOK: 3
Curriculum: Auto Tech I and II

Curricular: Starting System

Instructional Unit: G. Diagnose and service vehicle starter systems

**Standard Alignments (Section 2)**

| GLE/CLE: SC1.1.Ec (Physical Science) |
| Knowledge: (MA) 1,2  (SC) 1          |
| CCSS: 11-12.RST.3; 11-12.RST.4; N-Q.1; N-Q.3; A-CED.4 |
| NETS: 6a-c                           |
| Performance: 3.2, 3.4, 4.1           |

**Unit (Section 3)**

Learning Targets:

- Perform starter current draw test; determine necessary action
- Perform starter circuit voltage drop test; determine necessary action
- Inspect and test starter relays and solenoids; determine necessary action
- Remove and install the starter in a vehicle
- Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action

Instructional Strategies:

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

Assessments/Evaluations:

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

Sample Assessment Questions:

- What is the function of a starter motor?
  - A. Cranks the combustion engine during starting.
  - B. Charges the battery in a short period of time.
  - C. Provides electrical consumers with current.
**Instructional Resources/Tools:**

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – [https://monicholscc.electude.com](https://monicholscc.electude.com)

**Cross Curricular Connections:**

- Math:
  - Number sense
  - Using formulas
- ELA:
  - Technical reading
  - Writing
  - Discussion
- Science: Understanding matter and energy

**Depth of Knowledge (Section 5)**

DOK: 3
Curriculum: Auto Tech I and II

Curricular: Charging Systems

Instructional Unit: H. Diagnose and repair the automotive charging systems

**Standard Alignments (Section 2)**

| GLE/CLE: SC1.1.Ec (Physical Science) |
| Knowledge: (MA) 1,2 (SC) 1 |
| CCSS: 11-12.RST.3; 11-12.RST.4; N-Q.1; N-Q.3; A-CED.4 |
| NETS: 6a-c |
| Performance: 3.2, 3.4, 4.1 |

**Unit (Section 3)**

**Learning Targets:**
- Perform a charging system output test; determine necessary action
- Inspect, adjust, or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment
- Remove, inspect, and re-install a generator (alternator)
- Perform charging circuit voltage drop tests; determine necessary action

**Instructional Strategies:**
- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

**Assessments/Evaluations:**
- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

**Sample Assessment Questions:**
- What are the functions of the charging system?
  A. Store reserve energy to crank the engine during start-up.
  B. Provide necessary current for electrical consumers.
  C. Build-up a reserve of electrical energy.
Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – [https://monicholscc.electude.com](https://monicholscc.electude.com)

Cross Curricular Connections:

- Math:
  - Number sense
  - Using formulas
- ELA:
  - Technical reading
  - Writing
  - Discussion
- Science: Understanding matter and energy

Depth of Knowledge (Section 5)

DOK: 3
Curriculum: Auto Tech I and II

Curricular: Lighting Systems

Instructional Unit: I. Diagnose and repair automotive lighting systems

**Standard Alignments (Section 2)**

<table>
<thead>
<tr>
<th>GLE/CLE: SC1.1.Ec (Physical Science)</th>
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<tr>
<td>Performance: 3.2, 3.4, 4.1</td>
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</tbody>
</table>

**Unit (Section 3)**

**Learning Targets:**

- Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed
- Aim headlights
- Identify system voltage and safety precautions associated with high-intensity discharge headlights

**Instructional Strategies:**

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

**Assessments/Evaluations:**

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

**Sample Assessment Questions:**

- Which type of lamp is shown by the number 2?
  A. Fluorescent bulb
  B. Standard incandescent bulb
  C. Halogen bulb
  D. LED bulb

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Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – [https://monicholscc.electude.com](https://monicholscc.electude.com)

Cross Curricular Connections:

- Math:
  - Number sense
  - Using formulas
- ELA:
  - Technical reading
  - Writing
  - Discussion
- Science: Understanding matter and energy

**Depth of Knowledge (Section 5)**

DOK: 3
Curriculum: Auto Tech I and II

Curricular: Electrical Accessories

Instructional Unit: J. Diagnose and repair automotive electrical accessories

**Standard Alignments (Section 2)**

<table>
<thead>
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<td>NETS: 6a-c</td>
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<td>Performance: 3.2, 3.7</td>
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</table>

**Unit (Section 3)**

**Learning Targets:**

- Disable and enable airbag system for vehicle service; verify indicator lamp operation
- Remove and reinstall a door panel
- Describe the operation of keyless entry/remote-start systems
- Verify operation of instrument panel gauges and warning/indicators lights; reset maintenance indicators
- Verify windshield wiper and washer operation; replace wiper blades

**Instructional Strategies:**

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

**Assessments/Evaluations:**

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

**Sample Assessment Questions:**

- Why are there arrows on the acceleration sensor?
  - A. The arrow indicates where the acceleration sensor must be installed.
  - B. The arrows must always be installed in the transverse direction.
  - C. The arrows must always be installed in the longitudinal direction.
  - D. The sensor measures acceleration along this axis.
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**Depth of Knowledge (Section 5)**

<table>
<thead>
<tr>
<th>DOK: 2</th>
</tr>
</thead>
</table>
Curriculum: Auto Tech I and II

Curricular: General Suspension and Steering Systems

Instructional Unit: K. Analyzing and identifying general steering and suspension systems

### Standard Alignments (Section 2)

**GLE/CLE:** N/A  
**Knowledge:** (CA) 3 (MA) 1  
**CCSS:** 11-12.RST.3; 11-12.RST.4; N.Q.1  
**NETS:** 6a-c  
**Performance:** 3.2, 3.7

### Unit (Section 3)

**Learning Targets:**

- Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins
- **Identify and interpret suspension and steering system concerns; determine necessary action**

**Instructional Strategies:**

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

**Assessments/Evaluations:**

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

**Sample Assessment Questions:**

- Which unit is used when specifying a vehicle's height, length and width?  
  a. Centimeters  
  b. Kilometers  
  c. Millimeters  
  d. Meters

Board Approved 8-3-15
Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – https://monicholscc.electude.com

Cross Curricular Connections:

- ELA:
  - Technical reading
  - Writing
  - Discussion
- Math: Number sense

**Depth of Knowledge (Section 5)**

DOK: 2
Curriculum: Auto Tech I and II

Curricular: Related Suspension and Steering Service

Instructional Unit: L. Understanding angles and preparing for alignment

**Standard Alignments (Section 2)**

<table>
<thead>
<tr>
<th>GLE/CLE: N/A</th>
<th>Knowledge: (CA) 3 (MA) 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCSS: 11-12.RST.3; 11-12.RST.4; N-Q.1; N-Q.3</td>
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<tr>
<td>NETS: 6a-c</td>
<td></td>
</tr>
<tr>
<td>Performance: 3.2-3.4</td>
<td></td>
</tr>
</tbody>
</table>

**Unit (Section 3)**

Learning Targets:

- Inspect rack and pinion steering gear, inner tie rod ends (sockets), and bellows boots
- Determine proper power steering fluid type; inspect fluid level and condition
- Flush, fill, and bleed power steering system
- Inspect for power steering fluid leakage; determine necessary action
- Remove, inspect, replace, and adjust power steering pump drive belt
- Inspect and replace power steering hoses and fittings
- Inspect pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper
- Inspect tie rod ends (sockets), tie rod sleeves, and clamps
- Inspect upper and lower control arms, bushings, and shafts
- Inspect and replace rebound and jounce bumpers
- Inspect track bar, strut rods/radius arms, and related mounts and bushings
- Inspect upper and lower ball joints (with or without wear indicators)
- Inspect suspension system coil springs and spring insulators (silencers)
- Inspect suspension system torsion bars and mounts
- Inspect and replace front stabilizer bar (sway bar) bushings, brackets, and links
- Inspect strut cartridge or assembly

Board Approved 8-3-15
- Inspect front strut bearing and mount
- Inspect rear suspension system lateral links/arms (track bars) and control (trailing) arms
- Inspect rear suspension system leaf spring(s), spring insulators (silencers), shackles, brackets, bushings, center pins/bolts, and mounts
- Inspect, remove, and replace shock absorbers; inspect mounts and bushings
- Inspect electric power-assisted steering
- Identify hybrid vehicle power steering system electrical circuits and safety precautions
- Describe the function of the power steering pressure switch

### Instructional Strategies:

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

### Assessments/Evaluations:

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

### Sample Assessment Questions:

- How is an angle made?
  a. By two circles.
  b. By two points.
  c. By two lines that converge at a single point.
  d. By two lines of the same length.

### Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – [https://monicholscc.electude.com](https://monicholscc.electude.com)
Cross Curricular Connections:
- **ELA:**
  - Technical reading
  - Writing
  - Discussion
- **Math:**
  - Number sense
  - Angle measure

**Depth of Knowledge (Section 5)**

| DOK: 3 |
Curriculum: Auto Tech I and II

Curricular: Wheel Alignment

Instructional Unit: M. Analyze and perform wheel alignments

**Standard Alignments (Section 2)**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Knowledge: (CA) 3 (MA) 4</td>
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<td>CCSS: 11-12.RST.3; 11-12.RST.4; N-Q.1; N-Q.3</td>
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<tr>
<td>NETS: 6a-c</td>
</tr>
<tr>
<td>Performance: 3.2-3.4</td>
</tr>
</tbody>
</table>

**Unit (Section 3)**

**Learning Targets:**

- Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine necessary action
- Perform pre-alignment inspection and measure vehicle ride height; determine necessary action
- **Prepare vehicle for wheel alignment on alignment machine; perform four-wheel alignment by checking and adjusting front and rear wheel caster, camber; and toe as required; center steering wheel**
- Check toe-out-on-turns (turning radius); determine necessary action
- Check SAI (steering axis inclination) and included angle; determine necessary action
- Check rear wheel thrust angle; determine necessary action
- Check for front wheel setback; determine necessary action
- Check front and/or rear cradle (subframe) alignment; determine necessary action
- Reset steering angle sensor

**Instructional Strategies:**

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

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Assessments/Evaluations:

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

Sample Assessment Questions:

- What is the name for the lines drawn through the center of the vehicle and the left front wheel?
  A. Course lines
  B. Center lines
  C. Vectors
  D. Stub lines

Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – https://monicholssc.electude.com

Cross Curricular Connections:

- ELA:
  - Technical reading
  - Writing
  - Discussion
- Math:
  - Number sense
  - Angle measure

Depth of Knowledge (Section 5)

DOK: 3
Curriculum: Auto Tech I and II

Curricular: Wheels and Tires

Instructional Unit: N. Inspect, service, and repair wheels and tires

**Standard Alignments (Section 2)**

<table>
<thead>
<tr>
<th>GLE/CLE:</th>
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</tr>
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<tbody>
<tr>
<td>Knowledge:</td>
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<tr>
<td>CCSS:</td>
<td>11-12.RST.3; 11-12.RST.4</td>
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<td>NETS:</td>
<td>6a-c</td>
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<tr>
<td>Performance:</td>
<td>3.2, 3.7</td>
</tr>
</tbody>
</table>

**Unit (Section 3)**

**Learning Targets:**

- Inspect tire condition; identify tire wear patterns; check for correct size and application (load and speed ratings) and adjust air pressure; determine necessary action
- Rotate tires according to manufacturer's recommendations
- Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic)
- Dismount, inspect, and remount tire on a wheel equipped with tire pressure monitoring system sensor
- Inspect tire and wheel assembly for air loss; perform necessary action
- Repair tire using an internal patch
- Identify and test tire pressure monitoring systems (indirect and direct) for operation; verify operation of instrument panel lamps
- Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system

**Instructional Strategies:**

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

Board Approved 8-3-15
Assessments/Evaluations

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

Sample Assessment Questions:

- Assess these statements regarding tubeless and tube-type tires:
  A. A tube-type tire is airtight, because the tire bead seals it to the rim.
  B. A tube-type tire is used more often.
  C. A tubeless tire has an airtight inner lining.
  D. A tubeless tire does not have an inner tube.

Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – https://monicholscc.electude.com

Cross Curricular Connections:

- ELA:
  - Technical reading
  - Writing
  - Discussion

**Depth of Knowledge** (Section 5)

DOK: 2

Board Approved 8-3-15
Curriculum: Auto Tech I and II

Curricular: Engine Repair General Knowledge

Instructional Unit: O. Analyze basic principles of engines and repair

**Standard Alignments (Section 2)**

<table>
<thead>
<tr>
<th>GLE/CLE: N/A</th>
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<tbody>
<tr>
<td>Knowledge: (CA) 3</td>
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<tr>
<td>CCSS: 11-12.RST.3; 11-12.RST.4</td>
</tr>
<tr>
<td>NETS: 6a-c</td>
</tr>
<tr>
<td>Performance: 1.1, 1.2, 3.1</td>
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</tbody>
</table>

**Unit (Section 3)**

**Learning Targets:**

- Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins
- Verify operation of the instrument panel engine warning indicators
- Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action
- Install engine covers using gaskets, seals, and sealers as required
- Remove and replace timing belt; verify correct camshaft timing
- **Perform common fastener and thread repair, to include: removing broken bolt, restoring internal and external threads, and repairing internal threads with a thread insert**
- Identify hybrid vehicle internal combustion engine service precautions

**Instructional Strategies:**

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

**Assessments/Evaluations:**

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

Board Approved 8-3-15
### Sample Assessment Questions:

- Both engines are 6 cylinder engines. What distinguishes a VR engine from an in-line engine?
  - A. A VR engine is shorter than an in-line engine.
  - B. A VR engine is significantly taller than an in-line engine.
  - C. A VR engine is heavier than an in-line engine.

### Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – [https://monicholscc.electude.com](https://monicholscc.electude.com)

### Cross Curricular Connections:

- ELA:
  - Technical reading
  - Writing
  - Discussion

### Depth of Knowledge (Section 5)

DOK: 2
Curriculum: Auto Tech I and II

Curricular: Cylinder Head and Valve Train

Instructional Unit: P. Basic knowledge and design of cylinder heads

**Standard Alignments (Section 2)**

| GLE/CLE: N/A  |
| Knowledge: (CA) 3 |
| CCSS: 11-12.RST.3; 11-12.RST.4 |
| NETS: 6a-c |
| Performance: 3.1, 3.2 |

**Unit (Section 3)**

**Learning Targets:**

- Remove cylinder head; inspect gasket condition; install cylinder head and gasket; tighten according to manufacturer's specifications and procedures
- Clean and visually inspect a cylinder head for cracks; check gasket surface areas for warpage and surface finish; check passage condition
- Inspect pushrods, rocker arms, rocker arm pivots and shafts for wear, bending, cracks, looseness, and blocked oil passages (orifices); determine necessary action
- Adjust valves (mechanical or hydraulic lifters)
- Inspect and replace a camshaft and drive belt/chain; includes checking drive gear wear and backlash, end play, sprocket and chain wear, overhead cam drive sprocket(s), drive belt(s), belt tension, tensioners, camshaft reluctor ring/tone-wheel, and valve timing components; verify correct camshaft timing
- Establish camshaft position sensor indexing

**Instructional Strategies:**

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

**Assessments/Evaluations:**

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

Board Approved 8-3-15
### Sample Assessment Questions:

- Which materials can a cylinder head be made of?
  - A. Cast iron
  - B. Bronze
  - C. Magnesium alloy
  - D. Plastic
  - E. Steel
  - F. Aluminum alloy

### Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – [https://monicholscc.electude.com](https://monicholscc.electude.com)

### Cross Curricular Connections:

- ELA:
  - Technical reading
  - Writing
  - Discussion

### Depth of Knowledge (Section 5)

DOK: 2
Curriculum: Auto Tech I and II

Curricular: Lubrication and Cooling Systems

Instructional Unit: Q. Analyze and repair lubrication and cooling systems

**Standard Alignments (Section 2)**

<table>
<thead>
<tr>
<th>GLE/CLE: N/A</th>
<th>Knowledge: (CA) 3</th>
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</thead>
<tbody>
<tr>
<td>CCSS: 11-12.RST.3; 11-12.RST.4</td>
<td>NETS: 6a-c</td>
</tr>
<tr>
<td>Performance: 3.2, 3.7</td>
<td></td>
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</tbody>
</table>

**Unit (Section 3)**

**Learning Targets:**

- Perform cooling system pressure and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, and heater core; determine necessary action
- Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment
- Remove, inspect, and replace thermostat and gasket/seal
- Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required
- Perform engine oil and filter change

**Instructional Strategies:**

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

**Assessments/Evaluations:**

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

Board Approved 8-3-15
Sample Assessment Questions:

- 33% of the total energy is lost via the exhaust. What does exhaust loss mean?
  A. The heat in the exhaust gases which dissipates to the outside air.
  B. The heat which is lost to the cooling system.
  C. The heat which the engine radiates.

Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – [https://monicholscc.electude.com](https://monicholscc.electude.com)

Cross Curricular Connections:

- ELA:
  - Technical reading
  - Writing
  - Discussion

**Depth of Knowledge (Section 5)**

DOK: 2
Curriculum: Auto Tech I and II

Curricular: Engine Performance General Knowledge

Instructional Unit: R. Knowledge and repair of engine performance

**Standard Alignments (Section 2)**

| GLE/CLE: N/A |
| Knowledge: (CA) 3 |
| CCSS: 11-12.RST.3; 11-12.RST.4; 11-12.RST.9 |
| NETS: 3b; 6a |
| Performance: 1.1, 1.2, 3.1 |

**Unit (Section 3)**

Learning Targets:

- Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins
- Perform engine absolute (vacuum/boost) manifold pressure test; determine necessary action
- Perform cylinder power balance test; determine necessary action
- Perform cylinder cranking and running compression test; determine necessary action
- Perform cylinder leakage test; determine necessary action
- Verify engine operating temperature
- Remove and replace spark plugs; inspect secondary ignition components for wear and damage

Instructional Strategies:

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
  - Students will complete relevant live work when available

Assessments/Evaluations:

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

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Sample Assessment Questions:

- What is true regarding the intake stroke?
  A. The intake valve opens.
  B. The combusted gases flow out of the cylinder.
  C. The exhaust valve is closed.
  D. The air/fuel mixture flows into the cylinder.
  E. The fuel/air mixture is compressed.

Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – [https://monicholscc.electude.com](https://monicholscc.electude.com)

Cross Curricular Connections:

- ELA:
  - Technical reading
  - Writing
  - Discussion

**Depth of Knowledge (Section 5)**

DOK: 2
Curriculum: Auto Tech I and II

Curricular: Computerized Engine Controls

Instructional Unit: S. Knowledge and repair of computerized engine controls

**Standard Alignments (Section 2)**

<table>
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<tbody>
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<td>CCSS: 11-12.SL.2; 11-12.L.4; 11-12.RST.4</td>
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<tr>
<td>NETS: 4a,b; 6a</td>
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<tr>
<td>Performance: 1.2, 1.6, 3.2</td>
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</tbody>
</table>

**Unit (Section 3)**

**Learning Targets:**

- **Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable**
- Access and use service information to perform step-by-step (troubleshooting) diagnosis
- Perform active tests of actuators using a scan tool; determine necessary action
- Describe the importance of operating all OBDII monitors for repair verification

**Instructional Strategies:**

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

**Assessments/Evaluations:**

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

**Sample Assessment Questions:**

- Look at the table. What type of resistor is in the engine temperature sensor?
  - A. PTC resistor
  - B. Variable resistor
  - C. NTC resistor

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Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – https://monicholscc.electude.com

Cross Curricular Connections:

- ELA:
  - Technical reading
  - Writing
  - Discussion

**Depth of Knowledge (Section 5)**

DOK: 3
Curriculum: Auto Tech I and II

Curricular: Fuel, Air Induction, and Exhaust Systems

Instructional Unit: T. Knowledge and repair of fuel, air induction and exhaust systems

Standard Alignments (Section 2)

<table>
<thead>
<tr>
<th>GLE/CLE: N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge: (CA) 3</td>
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<tr>
<td>CCSS: 11-12.RST.3; 11-12.RST.4; 11-12.RST.9</td>
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<tr>
<td>NETS: 4a,b; 6a</td>
</tr>
<tr>
<td>Performance: 3.1-3.3</td>
</tr>
</tbody>
</table>

Unit (Section 3)

Learning Targets:

- Replace fuel filter(s)
- Inspect, service, or replace air filters, filter housings, and intake duct work
- Inspect the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; determine necessary action
- Inspect the condition of exhaust system hangers, brackets, clamps, and heat shields; repair or replace as needed
- Check and refill diesel exhaust fluid (DEF)

Instructional Strategies:

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

Assessments/Evaluations:

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects
Sample Assessment Questions:

- Why is turbocharging used?
  A. To reduce the mechanical load on the engine.
  B. To improve cylinder filling.
  C. To reduce cylinder filling.

Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – [https://monicholscc.electude.com](https://monicholscc.electude.com)

Cross Curricular Connections:

- ELA:
  - Technical reading
  - Writing
  - Discussion

**Depth of Knowledge (Section 5)**

DOK: 2
Curriculum: Auto Tech I and II

Curricular: Emission Control Systems

Instructional Unit: U. Knowledge and repair of emission control systems

**Standard Alignments (Section 2)**

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<td>NETS</td>
<td>4b; 6c,d</td>
</tr>
<tr>
<td>Performance</td>
<td>3.1, 3.5, 3.7</td>
</tr>
</tbody>
</table>

**Unit (Section 3)**

**Learning Targets:**

- Diagnose oil leaks, emissions, and drivability concerns caused by the positive crankcase ventilation (PCV) system; determine necessary action
- Inspect, test, and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action
- Diagnose emissions and drivability concerns caused by the exhaust gas recirculation (EGR) system; determine necessary action
- Inspect, test, service, and replace components of the EGR system including tubing, exhaust passages, vacuum/pressure controls, filters, and hoses; perform necessary action
- Inspect and test electrical/electronically-operated components and circuits of air injection systems; perform necessary action
- Inspect and test catalytic converter efficiency
- Inspect and test components and hoses of the evaporative emissions control system; perform necessary action
- Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action

**Instructional Strategies:**

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
  - Students will complete relevant live work when available

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### Assessments/Evaluations:

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

### Sample Assessment Questions:

- What mixture is brought together in a combustion engine? (Choose 2)
  - A. Fuel
  - B. Air
  - C. Water

### Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – [https://monicholscc.electude.com](https://monicholscc.electude.com)

### Cross Curricular Connections:

- **ELA:**
  - Technical reading
  - Writing
  - Discussion
- **Science:** Environmental impact of human activity

### Depth of Knowledge (Section 5)

**DOK: 3**
Curriculum: Auto Tech I and II

Curricular: Brakes General Knowledge

Instructional Unit: V. Knowledge and repair of brake systems

**Standard Alignments (Section 2)**

<table>
<thead>
<tr>
<th>GLE/CLE: N/A</th>
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<tr>
<td>Knowledge: (CA) 3</td>
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<td>CCSS: 11-12.RST.3; 11-12.RST.4; 11-12.RST.8</td>
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<td>NETS: 4a; 6a,b</td>
</tr>
<tr>
<td>Performance: 1.2, 3.1, 3.2</td>
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</tbody>
</table>

**Unit (Section 3)**

**Learning Targets:**

- Identify and interpret brake system concerns; determine necessary action
- Research applicable vehicle and service information, vehicle service story, service precautions, and technical service bulletins
- Describe procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS)
- Install wheel and torque nuts

**Instructional Strategies:**

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

**Assessments/Evaluations:**

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

**Sample Assessment Questions:**

- How is the parking brake operated on this vehicle? [illustration included]
  A. Hydraulically
  B. Electrically
  C. Mechanically

Board Approved 8-3-15
Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – [https://monicholscc.electude.com](https://monicholscc.electude.com)

Cross Curricular Connections:

- ELA:
  - Technical reading
  - Writing
  - Discussion

**Depth of Knowledge (Section 5)**

DOK: 3

Board Approved 8-3-15
Curriculum: Auto Tech

Curricular: Hydraulic System

Instructional Unit: W. Knowledge and repair of Hydraulic systems

### Standard Alignments (Section 2)

| GLE/CLE: N/A                              |
| Knowledge: (CA) 3                       |
| CCSS: 11-12.RST.3; 11-12.RST.4; 11-12.RST.9 |
| NETS: 3b; 6a                            |
| Performance: 1.1, 1.2, 3.1              |

### Unit (Section 3)

#### Learning Targets:

- Measure brake pedal height, travel, and free play (as applicable); determine necessary action
- Check the master cylinder for external leaks and proper operation
- Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging, wear, loose fittings and supports; determine necessary action
- Select, handle, store, and fill brake fluids to proper level
- Identify the components of a brake warning light system
- Bleed and/or flush the brake system
- Test brake fluid for contamination

#### Instructional Strategies:

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

#### Assessments/Evaluations:

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

Board Approved 8-3-15
Sample Assessment Questions:

- The piston on the left is in a higher position that the one on the right. Why is this?
  A. The weight on the left is greater than the one on the right, so the fluid level in the right column rises.
  B. As a result of the greater weight on the right, more fluid is forced to the left.
  C. The piston on the right is larger than the one on the left, so the fluid level in the left column rises.

Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – https://monicholscc.electude.com

Cross Curricular Connections:

- ELA:
  - Technical reading
  - Writing
  - Discussion

**Depth of Knowledge (Section 5)**

DOK: 2
Curriculum: Auto Tech I and II

Curricular: Drum Brakes

Instructional Unit: X. Knowledge and repair of drum brake systems

**Standard Alignments (Section 2)**

| GLE/CLE: N/A | Knowledge: (CA) 3 |
| CCSS: 11-12.RST.3; 11-12.RST.4; 11-12.RST.9 | NETS: 3b; 6a |
| Performance: 1.1, 1.2, 3.1 |

**Unit (Section 3)**

**Learning Targets:**

- Remove, clean, inspect, and measure the brake drum diameter; determine necessary action
- Refinish a brake drum and measure the final drum diameter; compare with specifications
- Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble
- Inspect wheel cylinders for leaks and proper operation; remove and replace as needed
- Pre-adjust brake shoes and the parking brake; install brake drums or drum/hub assemblies and wheel bearings; make final checks and adjustments

**Instructional Strategies:**

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

**Assessments/Evaluations:**

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

Board Approved 8-3-15
Sample Assessment Questions:

- Look at this simplex braking system. [illustration included] What is the name for this type of brake cylinder(s)?
  A. Double single-action brake cylinder.
  B. Single double-action brake cylinder.
  C. Single mono-action brake cylinder.
  D. Double mono-action brake cylinder.

Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – [https://monicholscc.electude.com](https://monicholscc.electude.com)

Cross Curricular Connections:

- ELA:
  - Technical reading
  - Writing
  - Discussion

### Depth of Knowledge (Section 5)

**DOK: 2**
Curriculum: Auto Tech

Curricular: Disc Brakes

Instructional Unit: Y. Knowledge and repair of disc brake systems

**Standard Alignments (Section 2)**

| GLE/CLE: SC2.1.B (Physical Science) |
| Knowledge: (CA) 3 (SC) 2             |
| CCSS: 11-12.RST.3; 11-12.RST.4       |
| NETS: 6a-c                           |
| Performance: 1.4, 2.7, 3.1           |

**Unit (Section 3)**

Learning Targets:

- Remove and clean caliper assembly; inspect for leaks and damage/wear to caliper housing; determine necessary action
- Clean and inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action
- Remove, inspect, and replace pads and retaining hardware; determine necessary action
- Lubricate and reinstall caliper, pads, and related hardware; seat pads and inspect for leaks
- Clean and inspect rotor, measure rotor thickness, thickness variation, and lateral run-out; determine necessary action
- Remove and reinstall rotor
- Refinish the rotor on a vehicle; measure final rotor thickness and compare with specifications
- Refinish the rotor off of a vehicle; measure final rotor thickness and compare with specifications
- Retract and re-adjust caliper piston on an integral parking brake system
- Check the brake pad wear indicator; determine necessary action
- Describe the importance of operating a vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendations

Board Approved 8-3-15
**Instructional Strategies:**

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

**Assessments/Evaluations:**

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

**Sample Assessment Questions:**

- How are the brake pads released from the brake disc after the brake pedal is released?
  A. By the rubber square-cut seal around the brake piston.
  B. The brake disc pushes the brake pads back.
  C. By vacuum created in the braking system.
  D. By a spring behind the brake piston.

**Instructional Resources/Tools:**

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – [https://monicholscc.electude.com](https://monicholscc.electude.com)

**Cross Curricular Connections:**

- ELA:
  - Technical reading
  - Writing
  - Discussion
- Science: Understanding force and motion

**Depth of Knowledge (Section 5)**

DOK: 3
Curriculum: Auto Tech I and II

Curricular: Power-Assist Units

Instructional Unit: Z01. Knowledge and repair of brake power-assist units

**Standard Alignments (Section 2)**

| GLE/CLE: N/A |
| Knowledge: (CA) 3 |
| CCSS: 11-12.RST.3; 11-12.RST.4; 11-12.RST.9 |
| NETS: 3b; 6a |
| Performance: 1.1, 1.2, 3.1 |

**Unit (Section 3)**

**Learning Targets:**

- Check brake pedal travel with, and without, engine running to verify proper power booster operation
- Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster
- Inspect vacuum-type power booster unit for leaks; inspect the check-valve for proper operation; determine necessary action
- Inspect and test hydraulically-assisted power brake system for leaks and proper operation; determine necessary action
- Measure and adjust master cylinder pushrod length

**Instructional Strategies:**

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

**Assessments/Evaluations:**

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects
**Sample Assessment Questions:**

- Assess each of the following statements concerning a brake booster on a vehicle with a diesel engine: [T/F]
  - The diesel engine operates with a surplus of air (no throttle plate to create vacuum). Therefore, the master cylinder operates at a positive pressure.
  - The brake booster is connected to the intake manifold.
  - On a diesel engine, the brake booster is connected to a vacuum pump

**Instructional Resources/Tools:**

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – [https://monicholscc.electude.com](https://monicholscc.electude.com)

**Cross Curricular Connections:**

- **ELA:**
  - Technical reading
  - Writing
  - Discussion

**Depth of Knowledge (Section 5)**

DOK: 2
Curriculum: Auto Tech I and II

Curricular: Wheel Bearings, Parking Brakes, and Electrical Brake Systems

Instructional Unit: Z02. Knowledge and repair of wheel bearing, parking brakes and electrical brake systems

**Standard Alignments (Section 2)**

| GLE/CLE: N/A |
| Knowledge: (CA) 3 |
| CCSS: 11-12.RST.3; 11-12.RST.4; 11-12.RST.9 |
| NETS: 3b; 6a |
| Performance: 1.1, 1.2, 3.1 |

**Unit (Section 3)**

**Learning Targets:**

- Remove, clean, inspect, repack, and install wheel bearings; replace seals; install hub and adjust bearings
- Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed
- Check parking brake operation and parking brake indicator light system operation; determine necessary action
- Check the operation of a brake stop light system
- Replace wheel bearing and race
- Inspect and replace wheel studs

**Instructional Strategies:**

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

**Assessments/Evaluations:**

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

Board Approved 8-3-15
Sample Assessment Questions:

- What is the problem with the brake hose in the diagram? [illustration included]
  A. The brake hose is worn from rubbing against suspension components.
  B. There's a bulge in the brake hose.
  C. The brake hose is twisted.
  D. The brake hose is leaking at the coupling.
  E. The brake hose is cracked.

Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – https://monicholscc.electude.com

Cross Curricular Connections:

- ELA:
  - Technical reading
  - Writing
  - Discussion

Depth of Knowledge (Section 5)

DOK: 2
Curriculum: Auto Tech I and II

Curricular: Electronic Brakes, and Traction and Stability Control Systems

Instructional Unit: Z03. Knowledge and repair of Electronic Brakes, and Traction and Stability Control Systems

**Standard Alignments (Section 2)**

<table>
<thead>
<tr>
<th>GLE/CLE: N/A</th>
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<tr>
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<tr>
<td>CCSS: 11-12.SL.2; 11-12.RST.1; 11-12.RST.9</td>
</tr>
<tr>
<td>NETS: 3a,c; 6d</td>
</tr>
<tr>
<td>Performance: 1.1, 1.6, 4.1</td>
</tr>
</tbody>
</table>

**Unit (Section 3)**

**Learning Targets:**

- Identify and inspect electronic brake control system components; determine necessary action
- Identify traction control/vehicle stability control system components
- Describe the operation of a regenerative braking system

**Instructional Strategies:**

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
  - Students will complete relevant live work when available

**Assessments/Evaluations:**

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative project

**Sample Assessment Questions:**

- What is the purpose of the MRE wheel sensor?
  A. To measure force.
  B. To measure the acceleration and deceleration of the wheel.
  C. To measure tire pressure.
  D. To measure the wheel speed.

Board Approved 8-3-15
### Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – [https://monicholscc.electude.com](https://monicholscc.electude.com)

### Cross Curricular Connections:

- **ELA:**
  - Technical reading
  - Writing
  - Discussion

### Depth of Knowledge (Section 5)

DOK: 3

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Board Approved 8-3-15
Curriculum: Auto Tech I and II

Curricular: Automatic Transmission and Transaxle

Instructional Unit: Z04. Knowledge and repair of automatic transmissions and transaxles

<table>
<thead>
<tr>
<th>Standard Alignments (Section 2)</th>
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<tbody>
<tr>
<td>GLE/CLE: N/A</td>
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<tr>
<td>Knowledge: (CA) 3</td>
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<td>CCSS: 11-12.SL.2; 11-12.RST.4; 11-12.RST.9</td>
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<tr>
<td>NETS: 3c; 4a,b</td>
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<td>Performance: 1.1, 3.2, 3.3</td>
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<tr>
<th>Unit (Section 3)</th>
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<tbody>
<tr>
<td>Learning Targets:</td>
</tr>
<tr>
<td>• Research applicable vehicle and service information, fluid types, vehicle service history, service precautions, and technical service bulletins</td>
</tr>
<tr>
<td>• Check the fluid level in a transmission or a transaxle equipped with a dip-stick</td>
</tr>
<tr>
<td>• Check the fluid level in a transmission or a transaxle not equipped with a dip-stick</td>
</tr>
<tr>
<td>• Check the transmission fluid condition; check for leaks</td>
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<td>• Techniques introduced in the unit are observed and evaluated daily</td>
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<tr>
<td>• Unit competencies are assessed in all summative projects/evaluations</td>
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</table>

<table>
<thead>
<tr>
<th>Sample Assessment Questions:</th>
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<tbody>
<tr>
<td>• Which main part of the automatic transmission is this? [illustration included]</td>
</tr>
<tr>
<td>A. Pressure switch block</td>
</tr>
<tr>
<td>B. Hydraulic valve body</td>
</tr>
<tr>
<td>C. Return valve block</td>
</tr>
</tbody>
</table>

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**Instructional Resources/Tools:**

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – [https://monicholscc.electude.com](https://monicholscc.electude.com)

**Cross Curriculuar Connections:**

- **ELA:**
  - Technical reading
  - Writing
  - Discussion

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**Depth of Knowledge (Section 5)**

DOK: 3
Curriculum: Auto Tech I and II

Curricular: In-Vehicle Transmission/Transaxle

Instructional Unit: Z05. Perform transmission repair on a vehicle

**Standard Alignments (Section 2)**

| GLE/CLE: N/A                                      |
| Knowledge: (CA) 3                                |
| CCSS: 11-12.RST.3; 11-12.RST.4; 11-12.RST.9      |
| NETS: 3b; 6a                                      |
| Performance: 1.1, 1.2, 3.1                       |

**Unit (Section 3)**

**Learning Targets:**

- Inspect, adjust, and replace external manual valve shift linkage, transmission range sensor/switch, and park/neutral position switch
- Inspect for leakage at external seal, gaskets, and bushings
- Inspect, replace, and align power train mounts
- Drain and replace fluid and filter(s)

**Instructional Strategies:**

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

**Assessments/Evaluations:**

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

**Sample Assessment Questions:**

- What is a characteristic of an automatic transmission?
  - A. This type of transmission puts higher, less gradual load on the power train.
  - B. The available gear ratios are selected automatically.
  - C. This type of transmission saves fuel.
### Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – [https://monicholscc.electude.com](https://monicholscc.electude.com)

### Cross Curricular Connections:

- **ELA:**
  - Technical reading
  - Writing
  - Discussion

### Depth of Knowledge  (Section 5)

| DOK: 2 |
Curriculum: Auto Tech I and II

Curricular: Vehicle Transmission and Transaxle

Instructional Unit: Z06. Analyze off-vehicle transmission and transaxle operation and repair

**Standard Alignments (Section 2)**

| GLE/CLE: N/A |
| Knowledge: (CA) 3 |
| CCSS: 11-12.SL.2; 11-12.RST.1; 11-12.RST.9 |
| NETS: 3a,c; 6d |
| Performance: 1.1, 1.6, 4.1 |

**Unit (Section 3)**

**Learning Targets:**

- Describe the operational characteristics of a continuously variable transmission (CVT)
- Describe the operational characteristics of a hybrid vehicle drive train

**Instructional Strategies:**

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

**Assessments/Evaluations:**

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

**Sample Assessment Questions:**

- The vehicle accelerates, from a standstill to 30 km/h. Assess these statements: [T/F]
  A. The electric motor drives the wheels.
  B. The generator is charging the HV battery.
  C. The combustion engine is not running.
  D. The energy for the electric motor is taken from the high-voltage battery.

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Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – https://monicholscc.electude.com

Cross Curricular Connections:

- ELA:
  - Technical reading
  - Writing
  - Discussion

**Depth of Knowledge (Section 5)**

DOK: 3
Curriculum: Auto Tech I and II

Curricular: Manual Drive Train and Axles General

Instructional Unit: Z07. Repairing/maintaining manual transmissions

**Standard Alignments (Section 2)**

<table>
<thead>
<tr>
<th>GLE/CLE: N/A</th>
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<tbody>
<tr>
<td>Knowledge: (CA) 3</td>
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<td>CCSS: 11-12.RST.3; 11-12.RST.4; 11-12.RST.9</td>
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</tbody>
</table>

**Unit (Section 3)**

Learning Targets:

- Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins
- Drain and refill a manual transmission/transaxle and final drive unit
- **Check fluid condition; check for leaks**

Instructional Strategies:

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
- Students will complete relevant live work when available

Assessments/Evaluations:

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

Sample Assessment Questions:

- What do you call a group of gears that are in mesh with each other?
  - A. Gear train
  - B. A gear combination
  - C. Gear plan
  - D. Gear system

Board Approved 8-3-15
Instructional Resources/Tools:

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – https://monicholscc.electude.com

Cross Curricular Connections:

- ELA:
  - Technical reading
  - Writing
  - Discussion

**Depth of Knowledge (Section 5)**

DOK: 3
Curriculum: Auto Tech I and II

Curricular: Clutches

Instructional Unit: Z08. Knowledge and repair of clutches

**Standard Alignments (Section 2)**

<table>
<thead>
<tr>
<th>GLE/CLE: N/A</th>
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<tr>
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<tr>
<td>NETS: 3b; 6a</td>
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<tr>
<td>Performance: 1.1, 1.2, 3.1</td>
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</table>

**Unit (Section 3)**

**Learning Targets:**

- Check and adjust clutch master cylinder fluid level
- Check for system leaks

**Instructional Strategies:**

- The teacher will:
  - assign Electude modules
  - model repair tasks
  - provide guided practice of repair tasks
  - Students will complete relevant live work when available

**Assessments/Evaluations:**

- Electude online assessment:
  - Formative – quizzes
  - Summative – tests
- Students will model/demonstrate proper procedures introduced in the unit
- Techniques introduced in the unit are observed and evaluated daily
- Unit competencies are assessed in all summative projects

**Sample Assessment Questions:**

- What should you keep in mind when replacing a flywheel?
  - A. That the number one piston is positioned on the firing stroke.
  - B. That you install it the same direction as the original.
  - C. That you first heat up the flywheel so it fits over and then clamps onto the crankshaft after it cools.

**Instructional Resources/Tools:**

- Students have individual toolboxes assigned to them as well as a well-stocked tool room including hand and power tools
- Shop equipment related to the industry for each unit
- Electude online modules – [https://monicholsccelectude.com](https://monicholsccelectude.com)

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</tr>
</tbody>
</table>

**Depth of Knowledge (Section 5)**

DOK: 2
Curriculum: Embedded Math (Auto Tech)

Curricular Unit: Math in Auto Tech

Instructional Unit: Z09. Apply math skills required in the industry

**Standard Alignments (Section 2)**

<table>
<thead>
<tr>
<th>GLE/CLE: N/A</th>
<th>Knowledge: (MA) 1,2,4,5</th>
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<tbody>
<tr>
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<tr>
<td>NETS: 1a; 4b</td>
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<td>Performance: 1.10, 3.3</td>
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**Unit (Section 3)**

<table>
<thead>
<tr>
<th>Learning Targets:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Apply and extend previous understandings of adding/subtracting/multiplying/dividing of whole numbers to solve practical problems</td>
</tr>
<tr>
<td>• Apply and extend previous understandings of adding/subtracting/multiplying/dividing of fractions to solve practical problems</td>
</tr>
<tr>
<td>• Apply and extend previous understandings of adding/subtracting/multiplying/dividing of decimals to solve practical problems</td>
</tr>
<tr>
<td>• Apply and extend previous understandings of ratios, proportions, and percents to solve practical problems</td>
</tr>
<tr>
<td>• Use a variety of tools and methods to solve and design problems (i.e., standard/metric ruler, architect/engineer scale, t-square, voltmeter, ammeter, ohmmeter, Vernier caliper, micrometer, hydrometer, …)</td>
</tr>
<tr>
<td>• Convert and apply measurements to solve real-life and mathematical problems</td>
</tr>
<tr>
<td>• Recognize the basic shapes (2D and 3D) used in the industry and apply basic geometry to measure them</td>
</tr>
<tr>
<td>• Use and apply formulas to solve real-life and mathematical problems (e.g., Pythagorean Theorem, Ohm’s Law, Watt’s Law, Volume, Area, Torque, Power, Air Mass,… )</td>
</tr>
<tr>
<td>• Solve power and root equations as they apply to real-life and mathematical problems</td>
</tr>
<tr>
<td>• COMPASS Test-Prep: Practice Algebra COMPASS test-prep targets ranging from Pre-Algebra through College Algebra</td>
</tr>
</tbody>
</table>

Board Approved 8-3-15
Instructional Strategies:

• The teacher will:
  • use classroom instruction and/or demonstrations to introduce or revisit targets required to practice the competency at hand
  • model appropriate work required to complete the task
  • direct students to appropriate resources when needed
  • provide:
    • examples of good vs. poor work
    • feedback during and at the conclusion of the assignment
    • small learning group opportunities when applicable

Assessments/Evaluations:

• Formative:
  • Projects/activities
  • Constructions
  • Worksheets
  • Quizzes
  • Games
• Summative – Term exam: Comprehensive of both the relevant math and the COMPASS test-prep targets practiced

Sample Assessment Questions:

\[ F_1 \times r_1 = F_2 \times r_2 \]

\[ F_1 = \text{force on brake pedal (N)} \]
\[ F_2 = \text{force in brake master cylinder (N)} \]
\[ r = \text{lever of the force} \]

Calculate the force (\( F_2 \)) that is exerted on the piston of the brake master cylinder if:

\[ F_1 = 400 \text{ N} \]
\[ r_1 = 220 \text{ mm} \]
\[ r_2 = 40 \text{ mm} \]

Instructional Resources/Tools:

• Textbooks/workbooks:
  • *Practical Problems in Mathematics for Automotive Technicians, 3rd Edition*, Moore, 1985
• Internet Sources (examples):
  • Ruler game: [http://www.rulergame.net/](http://www.rulergame.net/)
  • Electude online assessment: [http://monicholscc.electude.com/](http://monicholscc.electude.com/)
• Supplies and tools, such as:
  • Vernier calipers
  • rulers
  • scales
  • t-squares
  • drafting boards
  • triangles
  • compasses
  • protractors
• Technology tools, such as a(n):
  • SMART Board
  • iPad
  • laptop
  • scanner
  • student desktop
  • printer

Cross Curricular Connections:

• Auto Collision

Depth of Knowledge  (Section 5)

DOK: 3