

2013-2014

**Arkansas Department of Career Education
Model Framework**

Course Title: Brakes

Career Cluster: Transportation, Distribution & Logistics

Secondary – Skilled and Technical Sciences	
Course Number	494180
CIP Number	47.0604 http://nces.ed.gov/ipeds/cipcode/Default.aspx?v=55)
Grade Level	9-12
Prerequisite	None
Course Type	Core
Teacher Certification	Technical Permit or 5 year standard
CTSO	SKILLS SKILLS
Facility Requirements	http://arkansasfacilities.arkansas.gov/SchoolFacManual.aspx
Industry Certifications	www.natef.org

Course Description

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Program Purpose/Structure

The curriculum content framework Automotive Service Technology supports the course that prepares students for the following career roles, which in turn correspond to the CIP (Classification of Instructional Programs) codes listed above. The courses may be sequenced with a variety of career and technical courses to form a specialization to prepare students for careers and support additional education and training in the protective services industry.

The Transportation cluster of programs prepares students for careers in automotive service and repair, aviation maintenance, diesel equipment maintenance and repair, and small engine repair. Programs within the Transportation cluster are listed as follows:

- Automotive Body Technology — Certified
- Automotive Service Technology — Certified
- Aviation Maintenance Technology
- Diesel Equipment Technology
- Power Equipment Technology
- Career Role CIP Code – 47.0604
- O-NET 49-3023.XX

Laboratory Activities

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Special Notes

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Career and Technical Student Organization (CTSO)

Skills USA

**Arkansas Department of Career Education
Brakes Student Performance Standards**

Course Title: Brakes

Course Code: 494180

Credit: 1

At the completion of this course, the student will be able to:

- 1.0 Identify and Demonstrate Workplace Safety
 - 1.1 Students will be able to identify and demonstrate safe work practices
 - 1.2 Students will be able to practice personal safety
- 2.0 Demonstrate proper usage of Tools and Equipment
 - 2.1 Student will demonstrate knowledge of shop tools and equipment
- 3.0 Develop Employability/Leadership Skills
 - 3.1 Student will demonstrate employability skills
 - 3.2 Student will demonstrate leadership skills
- 4.0 Diagnose and Repair Hydraulic Brake System
 - 4.1 Student will demonstrate initial diagnostic procedures
 - 4.2 Student will demonstrate ability to repair hydraulic brake system
- 5.0 Diagnose and Repair Drum Brake System
 - 5.1 Student will demonstrate initial diagnostic procedures
 - 5.2 Student will demonstrate applicable knowledge of drum brake system
- 6.0 Diagnose and Repair Disc Brake System
 - 6.1 Student will demonstrate applicable knowledge of disc brake system
 - 6.2 Student will demonstrate applicable knowledge of disc brake system
- 7.0 Diagnose and Repair Power Assist Units
 - 7.1 Student will demonstrate initial diagnostic procedures
- 8.0 Diagnose and Repair Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.)
 - 8.1 Student will demonstrate initial diagnostic and repair procedures
- 9.0 Diagnose and Repair Electronic Brakes, and Traction and Stability Control Systems
 - 9.1 Student will demonstrate initial diagnostic and repair procedures
- 10.0 Diagnose and Repair Manual Drive Train and Axles
 - 10.1 Student will demonstrate applicable knowledge of clutch system

- 10.2 Student will demonstrate applicable knowledge of clutch system
- 10.3 Student will demonstrate applicable knowledge of the transmission/transaxle system
- 10.4 Student will demonstrate applicable knowledge of Drive Shaft, Half Shafts, Universal and Constant-Velocity (CV) Joints
- 10.5 Student will demonstrate applicable knowledge of Differential Case Assembly
- 10.6 Student will demonstrate applicable knowledge of Drive Axles
- 10.7 Student will demonstrate applicable knowledge of Four-wheel Drive/All-wheel Drive
- 11.0 Preparing Vehicle
 - 11.1 Student will be able to prepare vehicle for service
 - 11.2 Student will be able to prepare vehicle for customer

Standard 1.0 Identify and Demonstrate Workplace Safety			
Performance Indicator 1.1 Students will be able to identify and demonstrate safe work practices.	• Recommended Application/Activity	CCSS Standards	CCTC Standards
1.1.1 Identify general shop safety rules and procedures.	<ul style="list-style-type: none"> Review and assess understanding of posted shop regulations. (Teacher will post standard expectations of safe shop practices) 	L11-12.4	CRP1
1.1.2 Utilize safe procedures for handling of tools and equipment.	<ul style="list-style-type: none"> Have students demonstrate proficiency with tools and equipment before performing tasks with them. 	L11-12.4	CRP2
1.1.3 Identify and use proper placement of floor jacks and jack stands.	<ul style="list-style-type: none"> Research service information for proper procedure. Demonstrate proficiency in using floor jacks and jack stands before lifting vehicle. 	R11-12.1	CRP11
1.1.4 Identify and use proper procedures for safe lift operation.	<ul style="list-style-type: none"> Locate and understand lift manufacturer safety information on lift tag. Refer to service manual for proper lifting points. Demonstrate proficiency operating lift. 	L11-12.4	CRP11
1.1.5 Utilize proper ventilation procedures for working within the lab/shop area.	<ul style="list-style-type: none"> Locate and identify ventilation system for shop. Identify and demonstrate proper use of ventilation procedure. Have students write paragraph on dangers of asphyxiation. 	W11-12.2	CRP3
1.1.6 Identify marked safety areas.	<ul style="list-style-type: none"> Locate and identify different marked areas in shop. Demonstrate understanding of purpose of marked areas. Have students draw diagram of marked areas in the shop. 	SI11-12.5	CRP2 CRP3
1.1.7 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.	<ul style="list-style-type: none"> Have student identify and locate fire extinguishers in shop. Pass a fire safety test. Have students review evacuation plan and where it is located in the building. 	SL11-12.2	CRP3
Performance Indicator 1.2 Students will be able to practice personal safety.	• Recommended Application/Activity	CCSS Standards	CCTC Standards

1.2.1 Identify the location and use of eye wash stations.	<ul style="list-style-type: none"> Pass a safety procedure test. Have students label eye station on diagram of shop. 	SL11-12.2	CRP3
1.2.2 Identify the location of the posted evacuation routes.	<ul style="list-style-type: none"> Pass a safety procedure test. Have students label location of evacuation route on diagram of shop. 	SL11-12.2	CRP3
1.2.3 Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.	<ul style="list-style-type: none"> Demonstrate the proper usage of personal protective equipment (PPE). (Teacher will post rules posted including consequences of noncompliance). https://www.osha.gov/OshDoc/data_General_Facts/ppe-factsheet.pdf 	SL11-12.2 R11-12.7	CRP3 TD5
1.2.4 Identify and wear appropriate clothing for lab/shop activities.	<ul style="list-style-type: none"> Students will demonstrate appropriate dress before working in shop. (Teacher will post rules posted and logical consequences for noncompliance). 	SL11-12.2 R11-12.7	CRP3
1.2.5 Secure hair and jewelry for lab/shop activities.	<ul style="list-style-type: none"> Identify hair and jewelry hazards. Have students find safety violation with other students. 	SL11-12.2 R11-12.7	CRP3 CRP4
1.2.6 Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.	<ul style="list-style-type: none"> Identify areas of possible danger, show video or demonstrate air bag deployment. (Teacher will emphasize the importance of correctly identifying the yellow and orange circuits). 	SL11-12.2 R11-12.7 R11-12.6	CRP3 CRP5 CRP11
1.2.7 Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.).	<ul style="list-style-type: none"> Identify areas of possible danger. Have a live demonstration of a volunteer being tazed by security office so they will understand the shock hazard. 	SL11-121d	CRP1 CRP12
1.2.8 Locate and demonstrate knowledge of material safety data sheets (MSDS).	<ul style="list-style-type: none"> Location of MSDS included in safety test. Have students identify chemicals and pull up and print MSDS sheets on chemicals in the lab area. http://www.msds.com/ 	R11-12.3	CRP11 CRP7

Standard 2.0 Demonstrate proper usage of Tools and Equipment			
Performance Indicator 2.1 Student will demonstrate knowledge of shop tools and equipment.	Recommended Application/Activity	CCSS Standards	CCTC Standards
2.1.1 Identify tools and their usage in automotive applications.	<ul style="list-style-type: none"> Tool identification exercises, including hand outs and spot quizzes. 	R11-12.4	TD2
2.1.2 Identify standard and metric designation.	<ul style="list-style-type: none"> Review and identify common tool sizes utilizing textbook, handouts and enrichment exercises. http://www.cdtextbook.com/toolsEquip/hpt/common/title.html 	R11-12.4 L11-12.6	TD2
2.1.3 Demonstrate safe handling and use of appropriate tools.	<ul style="list-style-type: none"> Demonstrate proficiency. Have students identify the proper application of tools by setting up a scenario for students to describe which tool is used where. 	R11-12.4 L11-12.6	CRP1 CRP3
2.1.4 Demonstrate proper cleaning, storage, and maintenance of tools and equipment.	<ul style="list-style-type: none"> Demonstrate proficiency. (Teacher review policies regarding tool disbursement and storage). Have students clean and store tools according to school policy. 	R11-12.4 L11-12.6	CRP12
2.1.5 Demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper).	<ul style="list-style-type: none"> Demonstrate proficiency in measuring brake rotors, drums, thickness, parallelism, and run-out. Have students' measure items with different types of tools. 	R11-12.4 L11-12.6	CRP2 CRP4

Tools:

<http://www.onguardsafetytraining.com/samples/2Automotive%20Hand%20tools.pdf>

SAE/Metric:

<http://www.sosmath.com/tables/sae/sae.html>

http://www.hondachopper.com/garage/sae_to_metric/SAE-Metric_Conversion_Chart.pdf

http://www.engineeringtoolbox.com/wrenches-inches-metric-us-conversion-comparison-d_1607.html

Standard 3.0 Develop Employability/Leadership Skills			
Performance Indicator 3.1 Student will demonstrate employability skills.	Recommended Application/Activity	CCSS Standards	CCTC Standards
3.1.1 Demonstrate a good work ethic (i.e., relations with other, dependability, attitude, and personal hygiene).	<ul style="list-style-type: none"> Use guest speakers from industry. Utilize career coaches to model appropriate behavior and attitude. 	SL11-12.1	TD1 CRP1
3.1.2 Demonstrate teamwork.	<ul style="list-style-type: none"> Utilize team building activities. Assign paired work. Place students in work groups with rotating roles. 	SL11-12.1b	CRP1 CRP12
3.1.3 Demonstrate job-seeking techniques (i.e., write a resume, search for a job, arrange references, and apply interview techniques)	<ul style="list-style-type: none"> Prepare resume. Perform mock interview. Have career coach assist in resume building. Complete a job application. 	W11-12.5 W11-12.6	CRP10
3.1.4 Describe legal issues of sexual harassment in the workplace.	<ul style="list-style-type: none"> Sexual harassment seminar. Invite guest speakers. 	SL11-12.3	CRP5
3.1.5 Identify employment eligibility requirements (e.g. valid driver's license, background check etc.)	<ul style="list-style-type: none"> Guest speaker for job requirements. Review job opening requirements. 	SL11-12.3	TD5
Performance Indicator 3.2 Student will demonstrate leadership skills.	Recommended Application/Activity	CCSS Standards	CCTC Standards
3.2.1 Perform basic parliamentary procedures in a group meeting.	<ul style="list-style-type: none"> Have class meetings. Following Robert Rules of Order. 	SL11-12.1b	CRP9
3.2.2 Demonstrate an understanding of one's personal values, interpersonal skills, etiquette, effectiveness in oral and written communication and courtesy. Develop and maintain a code of professional ethics.	<ul style="list-style-type: none"> Perform self-evaluation. Use a professional development manual. Practice communication exercises. Practice writing examples, role-play conflict resolution scenarios. Utilize appropriate CTSO resources. 	SL11-12.1b	CRP4 CRP9
3.2.3 Maintain a good professional appearance.	<ul style="list-style-type: none"> Teacher will counsel students on importance of maintaining a positive image. Invite industry representatives to discuss standards. 	SL11-12.3	CRP3
3.2.4 Perform basic tasks related to securing and terminating employees.	<ul style="list-style-type: none"> Perform mock interviews. Evaluate employee performance and simulate terminations. 	SL11-12.3	CRP9 TD5

Standard 4.0 Diagnose and Repair Hydraulic Brake System			
Performance Indicator 4.1 Student will demonstrate initial diagnostic procedures.	Recommended Application/Activity	CCSS Standards	CCTC Standards
4.1.1 Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	<ul style="list-style-type: none"> • Use online service information to research vehicle information and technical service bulletins. • Use online or digital system for vehicle service history. • Use service manual to identify service precautions. □ 	<ul style="list-style-type: none"> • SL11-12.1a • SL11-12.5 	<ul style="list-style-type: none"> • CRP11 • TD-MTN1
4.1.2 Describe procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS).	<ul style="list-style-type: none"> • Use service manual to discuss proper operation. • (Teacher will discuss and teach OBDII drive cycle requirements.) 	<ul style="list-style-type: none"> • R11-12.4 	<ul style="list-style-type: none"> • TD-MTN1
Performance Indicator 4.2 Student will demonstrate ability to repair hydraulic brake system.	Recommended Application/Activity	CCSS Standards	CCTC Standards
4.2.1 Measure brake pedal height, travel, and free play (as applicable); determine necessary action.	<ul style="list-style-type: none"> • Use service information to review specifications, measure and adjust according to manufacturer procedures. • Replace components that are not within specifications. 	<ul style="list-style-type: none"> • SL11-12.5 	<ul style="list-style-type: none"> • TD-MTN2
4.2.2 Check master cylinder for internal and external leaks and proper operation.	<ul style="list-style-type: none"> • Perform visual inspection. • Check output pressure. • Apply brake pedal and inspect for proper application of service brakes. 	<ul style="list-style-type: none"> • R11-12.3 	<ul style="list-style-type: none"> • CRP8
4.2.3 Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging, wear, loose fittings and supports; determine necessary action.	<ul style="list-style-type: none"> • Perform visual inspection. • (Teacher will show examples of faulty components.) • Determine if repair or replacement is warranted. 	<ul style="list-style-type: none"> • R11-12.8 	<ul style="list-style-type: none"> • CRP8
4.2.4 Select, handle, store, and fill brake fluids to proper level.	<ul style="list-style-type: none"> • Refer to MSDS for proper handling and storage. • Refer to service information for proper procedure. • Fill or top off reservoir. 	<ul style="list-style-type: none"> • R11-12.1 	<ul style="list-style-type: none"> • CRP12 • CRP11
4.2.5 Identify components of brake warning light system.	<ul style="list-style-type: none"> • Use service information to identify components in individual system. • Identify brake components on vehicle. • Identify components on vehicle. 	<ul style="list-style-type: none"> • R11-12.1 	<ul style="list-style-type: none"> • CRP11
4.2.6 Bleed and/or flush brake system.	<ul style="list-style-type: none"> • Use pressure or gravity bleeder to bleed brakes. • Bleed brakes using the two person method. • Bleed brakes using gravity method. 	<ul style="list-style-type: none"> • L11-12.6 	<ul style="list-style-type: none"> • CRP2

4.2.7 Test brake fluid for contamination.	<ul style="list-style-type: none"> • Perform visual inspection. • Use disposable strips. 	R11-12.1	CRP5
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Standard 5.0 Diagnose and Repair Drum Brake System			
Performance Indicator 5.1 Student will demonstrate initial diagnostic procedures.	Recommended Application/Activity	CCSS Standards	CCTC Standards
5.1.1 Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	<ul style="list-style-type: none"> • Use online service information to research vehicle information and technical service bulletins. • Use hard or digital storage system for vehicle service history. • Use service manual to identify service precautions. 	SL11-12.1a SL11-12.5	CRP11 TD-MTN1
5.1.2 Describe procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS).	<ul style="list-style-type: none"> • Use service information to determine recommended process for specific vehicle. • Identify areas of concern that would be checked. • Identify safety concerns while performing test. 	R11-12.3	CRP11 TD-MTN1
Performance Indicator 5.2 Student will demonstrate applicable knowledge of drum brake system.	Recommended Application/Activity	CCSS Standards	CCTC Standards
5.2.1 Remove, clean, inspect, and measure brake drum diameter; determine necessary action.	<ul style="list-style-type: none"> • Use service information or stamped data to establish specification. • Measure diameter with brake drum caliper. • Determine if refining or replacement is needed 	R11-12.3	CRP11
5.2.2 Refinish brake drum and measure final drum diameter; compare with specifications.	<ul style="list-style-type: none"> • Use a bench brake lathe to refinish drum. • Measure with a brake drum caliper. • Evaluate if drum can be reinstalled or replaced. 	R11-12.8	TD-MTN2
5.2.3 Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.	<ul style="list-style-type: none"> • Identify proper component location before beginning this task. Clean parts with approved cleaner. • Use specified lubricate when reassembling. 	R11-12.3	CRP5
5.2.4 Inspect wheel cylinders for leaks and proper operation; remove and replace as	<ul style="list-style-type: none"> • Perform visual inspection. • Check for signs of fluid on front and rear of backing plate. 	R11-12.9	CRP2 CRP5

needed.			
5.2.5 Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; make final checks and adjustments.	<ul style="list-style-type: none"> Remove rubber plug from access hole on backing plate. Rotate adjuster to proper clearance 	R11-12.4	CRP2
5.2.6 Install wheel and torque lug nuts.	<ul style="list-style-type: none"> Align studs with wheel. Tighten nuts to recommended pattern. Use a torque wrench to tighten nuts. Only use an impact wrench with a torque stick. 	R11-12.4	CRP2

Standard 6.0 Diagnose and Repair Disc Brake System			
Performance Indicator 6.1 Student will demonstrate initial diagnostic procedures.	Recommended Application/Activity	CCSS Standards	CCTC Standards
6.1.1 Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	<ul style="list-style-type: none"> Use online service information to research vehicle information and technical service bulletins. Use hard or digital storage system for vehicle service history. Use service manual to identify service precautions. 	<ul style="list-style-type: none"> SL11-12.1a SL11-12.5 	<ul style="list-style-type: none"> CRP11 TD-MTN1
6.1.2 Describe procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS).	<ul style="list-style-type: none"> Use service manual to discuss proper operation. (Teacher discusses and teaches OBDII drive cycle requirements.) 	<ul style="list-style-type: none"> R11-12.1 R11-12.6 	<ul style="list-style-type: none"> CRP11 TD-MTN1
Performance Indicator 6.2 Student will demonstrate applicable knowledge of disc brake system.	Recommended Application/Activity	CCSS Standards	CCTC Standards
6.2.1 Remove and clean caliper assembly; inspect for leaks and damage/wear to caliper housing; determine necessary action.	<ul style="list-style-type: none"> Perform visual inspection. Use proper tools to remove caliper. Clean with approved cleaner. 	R11-12.9	CRP2
6.2.2 Clean and inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action.	<ul style="list-style-type: none"> Perform visual inspection. Show examples of serviceable and non-serviceable components. Use approved cleaner. 	R11-12.9	CRP2

6.2.3 Remove, inspect, and replace pads and retaining hardware; determine necessary action.	<ul style="list-style-type: none"> Review service information. Follow manufacture service procedures. Inspect pads for specifications, cracking, or glazing. 	R11-12.1 SL11-12.2	CRP11 CRP2
6.2.4 Lubricate and reinstall caliper, pads, and related hardware; seat pads and inspect for leaks.	<ul style="list-style-type: none"> Use recommended lubricant. Install components in proper order. Perform visual inspection. 	R11-12.3	CRP2
6.2.5 Clean and inspect rotor, measure rotor thickness, thickness variation, and lateral runout; determine necessary action.	<ul style="list-style-type: none"> Use recommended cleaner. Perform visual inspection. Inspect rotor for cracks or hot spots. Measure thickness with a micrometer or caliper. Measure at 4 points around rotor to determine thickness variation. Mount a dial indicator to measure lateral run out. Compare results to specifications. 	R11-12.3	CRP2
6.2.6 Remove and reinstall rotor.	<ul style="list-style-type: none"> Remove rotor from hub. Remove integrated hub and rotor assembly 	R11-12.3	CRP2
6.2.7 Refinish rotor on vehicle; measure final rotor thickness and compare with specifications.	<ul style="list-style-type: none"> Verify rotor is capable of being machined. Follow recommended procedures for lifting vehicle and specific instructions for on-car brake lathe. Use service information to determine specifications. 	R11-12.1 SL11-12.2	CRP2 CRP11
6.2.8 Refinish rotor off vehicle; measure final rotor thickness and compare with specifications.	<ul style="list-style-type: none"> Verify rotor is capable of being machined. Follow recommended procedures for lifting vehicle and specific instructions for bench brake lathe. Use service information to determine specifications. 	R11-12.1 SL11-12.2	CRP2 CRP11
6.2.9 Retract and re-adjust caliper piston on an integral parking brake system.	<ul style="list-style-type: none"> Follow service information instructions to retract caliper piston. Demonstrate lack of parking brake application. Extend caliper piston to the point of wheel lock-up. Discuss ramifications of inadequate clearance. Adjust to proper specification. Differentiate between service brake and parking adjustment. 	R11-12.3	CRP2 CRP11
6.2.10 Check brake pad wear indicator; determine necessary action.	<ul style="list-style-type: none"> Remove components necessary for inspection. Determine if indicator is contacting disc rotor. Replace if necessary. 	R11-12.3	CRP2
6.2.11 Describe importance of operating vehicle to burnish/break-in replacement	<ul style="list-style-type: none"> Show examples of properly seated brake pads. (Teacher discusses possible consequences of failing to 	R11-12.9 SL11-12.4	CRP2 CRP2

brake pads according to manufacturer's recommendations.	perform this step in a complete brake service.)		CRP4
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Standard 7.0 Diagnose and Repair Power Assist Units			
Performance Indicator 7.1 Student will demonstrate initial diagnostic procedures.	Recommended Application/Activity	CCSS Standards	CCTC Standards
7.1.1 Check brake pedal travel with, and without, engine running to verify proper power booster operation.	<ul style="list-style-type: none"> • Measure static brake pedal height with engine off. • Measure height of depressed pedal with engine off and again with engine running. • Calculate difference. 	R11-12.3	CRP2
7.1.2 Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster.	<ul style="list-style-type: none"> • Identify vacuum source. • Install vacuum gauge and observe reading. • Compare to specification. 	R11-12.3	CRP2 CRP11

Standard 8.0 Diagnose and Repair Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.)			
Performance Indicator 8.1 Student will demonstrate initial diagnostic and repair procedures.	Recommended Application/Activity	CCSS Standards	CCTC Standards
8.1.1 Remove, clean, inspect, repack, and install wheel bearings; replace seals; install hub and adjust bearings.	<ul style="list-style-type: none"> • Follow service information to remove components. • Use approved cleaners. • Use recommended grease. • Follow manufacture procedure to reinstall components and adjust to specifications. 	R11-12.1 SL11-12.2	CRP11 TD-MTN1
8.1.2 Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed.	<ul style="list-style-type: none"> • Perform visual inspection. • Verify proper operation. • Inspect individual components. • Use approved cleaners and lubricants. • Replace worn parts and adjust to manufacture specifications. 	R11-12.1 SL11-12.2	CRP2
8.1.3 Check parking brake operation and	<ul style="list-style-type: none"> • Apply parking brake and verify wheel lock. 	R11-12.3	CRP2

parking brake indicator light system operation; determine necessary action.	<ul style="list-style-type: none"> Verify indicator light operation. 		
8.1.4 Check operation of brake stop light system.	<ul style="list-style-type: none"> Depress brake pedal and inspect stop lamps. Use service information to verify proper operation. Students are to identify or illustrate a diagram of the electrical circuit. 	R11-12.3	CRP2 CRP4
8.1.5 Replace wheel bearing and race.	<ul style="list-style-type: none"> Remove and disassemble hub. Follow service procedure to remove race from hub. Install new race to specified position. 	R11-12.3	CRP11 TD-MTN1

Standard 9.0 Diagnose and Repair Electronic Brakes, and Traction and Stability Control Systems

Performance Indicator 9.1 Student will demonstrate initial diagnostic and repair procedures.	Recommended Application/Activity	CCSS Standards	CCTC Standards
9.1.1 Identify traction control/vehicle stability control system components.	<ul style="list-style-type: none"> Use service information and vehicle identification to determine installed systems. Identify individual components. 	R11-12.1	CRP11 TD-MTN1
9.1.2 Describe the operation of a regenerative braking system.	<ul style="list-style-type: none"> (Teacher to use animations to demonstrate operation of regenerative brake system.) Students describe the power flow in a vehicle with a regenerative system. 	SL11-12.5 R11-12.9	CRP4 CRP2

Standard 10.0 Diagnose and Repair Manual Drive Train and Axles

Performance Indicator 10.1 Student will demonstrate initial diagnostic procedures.	Recommended Application/Activity	CCSS Standards	CCTC Standards
10.1.1 Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	<ul style="list-style-type: none"> Use online service information to research vehicle information and technical service bulletins. Use hard or digital storage system for vehicle service history. Use service manual to identify service precautions 	SL11-12.1a SL11-12.5	CRP11 TD-MTN2
10.1.2 Drain and refill manual transmission/transaxle and final drive unit.	<ul style="list-style-type: none"> Use service information to identify recommended procedure. 	R11-12.1 SL11-12.2	CRP11 TD-MTN2

	Remove drain plug. <ul style="list-style-type: none"> Inspect condition of fluid and check for contamination. Replace drain pug. Fill to proper level with approved fluid. 		
10.1.3 Check fluid condition; check for leaks.	<ul style="list-style-type: none"> Inspect for abnormal color and/or smell. Perform visual inspection. 	R11-12.9	CRP2
Performance Indicator 10.2 Student will demonstrate applicable knowledge of clutch system.	Recommended Application/Activity	CCSS Standards	CCTC Standards
10.2.1 Check and adjust clutch master cylinder fluid level.	<ul style="list-style-type: none"> Use service information to determine fluid proper level. Add recommended fluid as needed. 	R11-12.1 SL11-12.2	CRP11 TD-MTN1
10.2.2 Check for system leaks.	<ul style="list-style-type: none"> Perform visual inspection. 	R11-12.9	CRP2
Performance Indicator 10.3 Student will demonstrate applicable knowledge of the transmission/transaxle system.	Recommended Application/Activity	CCSS Standards	CCTC Standards
10.3.1 Describe the operational characteristics of an electronically-controlled manual transmission/transaxle.	<ul style="list-style-type: none"> (Teacher to use media source to present animation of electronically controlled transmission.) Students identify or illustrate a diagram of the electronic circuit and the power flow. 	R11-12.1 W11-12.9	CRP11 TD-MTN1
Performance Indicator 10.4 Student will demonstrate applicable knowledge of Drive Shaft, Half Shafts, Universal and Constant-Velocity (CV) Joints.	Recommended Application/Activity	CCSS Standards	CCTC Standards
10.4.1 Inspect, remove, and replace front wheel drive (FWD) bearings, hubs, and seals.	<ul style="list-style-type: none"> Perform visual inspection. Check for signs of rust trails or seepage. Check for lateral movement, roughness when rotating, or excessive noise. Use service information and follow proper disassembly procedures. Reinstall per service information and tighten to proper specifications. 	R11-12.1 SL11-12.2	CRP11 TD-MTN1
10.4.2 Inspect, service, and replace shafts,	<ul style="list-style-type: none"> Perform visual inspection. 	R11-12.9	CRP2

yokes, boots, and universal/CV joints.	<ul style="list-style-type: none"> Look for signs of leakage or binding. 		
Performance Indicator 10.5 Student will demonstrate applicable knowledge of Differential Case Assembly.	Recommended Application/Activity	CCSS Standards	CCTC Standards
10.5.1 Clean and inspect differential housing; check for leaks; inspect housing vent.	<ul style="list-style-type: none"> Perform visual inspection. Ensure air flow is possible through vent tube. 	R11-12.9	CRP2
10.5.2 Check and adjust differential housing fluid level.	<ul style="list-style-type: none"> Follow manufacturer recommendation for proper fill level. Add recommended fluid to proper level. 	R11-12.1	CRP11 TD-MTN1
10.5.3 Drain and refill differential housing.	<ul style="list-style-type: none"> Clean housing. Remove drain plug. Replace drain plug. Fill to proper level with recommended fluid. 	R11-12.1	CRP2
Performance Indicator 10.6 Student will demonstrate applicable knowledge of Drive Axles.	Recommended Application/Activity	CCSS Standards	CCTC Standards
10.6.1 Inspect and replace drive axle wheel studs.	<ul style="list-style-type: none"> Remove components to access studs. Use proper tools to remove damaged studs. Install new studs using manufacturing recommendations. 	R11-12.1	CRP11 TD-MTN1
Performance Indicator 10.7 Student will demonstrate applicable knowledge of Four-wheel Drive/All-wheel Drive.	Recommended Application/Activity	CCSS Standards	CCTC Standards
10.7.1 Inspect front-wheel bearings and locking hubs.	<ul style="list-style-type: none"> With vehicle securely supported, check for lateral movement, roughness when rotating, or excessive noise. Ensure locking hub engages and releases freely. 	R11-12.9	CRP2
10.7.2 Check for leaks at drive assembly seals; check vents; check lube level.	<ul style="list-style-type: none"> Perform visual inspection. Check for signs of seepage. Apply a small amount of pressure and check for adequate venting. 	R11-12.9	CRP2

Standard 11.0 Preparing Vehicle			
Performance Indicator 11.1	Recommended Application/Activity	CCSS	CCTC

Student will be able to prepare vehicle for service.		Standards	Standards
11.1.1 Identify information needed and the service requested on a repair order.	<ul style="list-style-type: none"> Have students write and print repair orders. Have students explain information on repair orders. 	SL11-12.1a SL11-12.5 W11-12.8	CRP11
11.1.2 Identify purpose and demonstrate proper use of fender covers, mats.	<ul style="list-style-type: none"> Have established policy of using covers and mats. Have students rotate as service writer and have them install mats and covers. 	R11-12.2 W11-12.8	CRP2
11.1.3 Demonstrate use of the three C's (concern, cause, and correction).	<ul style="list-style-type: none"> Have students list 3 c's on every work order. 	SL11-12.1b W11-12.8	CRP2
11.1.4 Review vehicle service history.	<ul style="list-style-type: none"> Review available service records. (Teacher led discussion on previous repairs and effect on current problem.) 	SL11-12.5	CRP2
11.1.5 Complete work order to include customer information, vehicle identifying information, customer concerns, related service history, cause, and correction.	<ul style="list-style-type: none"> Have students fill out work order on every vehicle. Train student on writing and filling out repair orders. 	W11-12.2	CRP11 CRP4
Performance Indicator 11.2 Student will be able to prepare vehicle for customer.	Recommended Application/Activity	CCSS Standards	CCTC Standards
11.2.1 Ensure vehicle is prepared to return to customer per school or company policy (floor mats, steering wheel cover, etc.).	<ul style="list-style-type: none"> (Teacher to have established policy of what is done to a vehicle before it is returned to customer.) Clean of grease marks or stains etc. Car is fixed according to work order. 	R11-12.2 R11-12.9	CRP11 CRP2

ELA Speaking and Listening Standards Grades 9-10

1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively. **SL9-10.1**
 - a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. **SL9-10.1a**
 - b. Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed. **SL9-10.1b**
 - c. Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions. **SL9-10.1c**
 - d. Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented. **SL9-10.1d**
2. Integrate multiple sources of information presented in diverse media or format(e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source. **SL9-10.2**
3. Evaluate a speaker’s point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence. **SL9-10.3**
4. Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task. **SL9-10.4**
5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. **SL9-10.5**

ELA Speaking and Listening Standards Grades 11-12

1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11–12 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively. **SL11-12.1**
 - a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. **SL11-12.1a**
 - b. Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed. **SL11-12.1b**
 - c. Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives. **SL11-12.1c**

- d. Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task. **SL11-12.1d**
- 2. Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. **SL11-12.2**
- 3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used. **SL11-12.3**
- 4. 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 of formal and informal tasks. **SL11-12.4**
- 5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. **SL11-12.5**

ELA Language Grades 9-10

- 4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 9–10 reading and content, choosing flexibly from a range of strategies. **L9-10.4**
 - a. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase. **L9-10.4a**
 - b. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., analyze, analysis, analytical; advocate, advocacy). **L9-10.4b**
 - c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, or its etymology. **L9-10.4c**
 - d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary). **L9-10.4d**
- 6. Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression. **L9-10.6**

ELA Language Grades 11-12

- 4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11–12 reading and content, choosing flexibly from a range of strategies. **L11-12.4**
 - a. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase. **L11-12.4a**
 - b. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., conceive, conception, conceivable). **L11-12.4b**

- c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, its etymology, or its standard usage. **L11-12.4c**
 - d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary) **L11-12.4d**
6. Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression. **L11-12.6**

Reading Standards for Literacy in Science and Technical Subjects Grades 9-10

1. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. **R9-10.1**
2. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. **R9-10.2**
3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. **R9-10.3**
4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. **R9-10.4**
5. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). **R9-10.5**
6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. **R9-10.6**
7. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. **R9-10.7**
8. Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. **R9-10.8**
9. Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. **R9-10.9**
10. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently. **R9-10.10**

Reading Standards for Literacy in Science and Technical Subjects Grades 11-12

1. Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. **R11-12.1**
2. Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. **R11-12.2**
3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. **R11-12.3**
4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. **R11-12.4**
5. Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. **R11-12.5**
6. Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. **R11-12.6**
7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. **R11-12.7**
8. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. **R11-12.8**
9. Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **R11-12.9**
10. By the end of grade 12, read and comprehend science/technical texts in the grades 11–CCR text complexity band independently and proficiently. **R11-12.10**

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 9-10

1. Write arguments focused on discipline-specific content. **W9-10.1**
 - a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence. **W9-10.1a**
 - b. Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience’s knowledge level and concerns. **W9-10.1b**
 - c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. **W9-10.1c**
 - d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. **W9-10.1d**
 - e. Provide a concluding statement or section that follows from or supports the argument presented. **W9-10.1e**
2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. **W9-10.2**

- a. Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. **W9-10.2a**
 - b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. **W9-10.2b**
 - c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts. **W9-10.2c**
 - d. Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers. **W9-10.2d**
 - e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. **W9-10.2e**
 - f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic). **W9-10.2f**
3. Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. **W9-10.3**
 4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. **W9-10.4**
 5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. **W9-10.5**
 6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. **W9-10.6**
 7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. **W9-10.7**
 8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. **W9-10.8**
 9. Draw evidence from informational texts to support analysis, reflection, and research. **W9-10.9**
 10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. **W9-10.10**

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 11-12

1. Write arguments focused on discipline-specific content. **W11-12.1**
 - a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence. **W11-12.1a**

- b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases. **W11-12.1b**
 - c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. **W11-12.1c**
 - d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. **W11-12.1d**
 - e. Provide a concluding statement or section that follows from or supports the argument presented. **W11-12.1e**
2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. **W11-12.2**
- a. Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. **W11-12.2a**
 - b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. **W11-12.2b**
 - c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. **W11-12.2c**
 - d. Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers. **W11-12.2d**
 - e. Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic). **W11-12.2e**
3. Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. **W11-12.3**
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. **W11-12.4**
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. **W11-12.5**
6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. **W11-12.6**
7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. **W11-12.7**
8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the

text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. **W11-12.8**

9. Draw evidence from informational texts to support analysis, reflection, and research. **W11-12.9**
10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. **W11-12.10**

Common Career and Technical Core Standards

Transportation, Distribution, & Logistics Career Cluster

Transportation, Distribution, & Logistics Career Cluster Standards (TD)

1. Describe the nature and scope of the Transportation, Distribution, and Logistics Career Cluster and the role of transportation, distribution and logistics in society and the economy. **TD1**
2. Describe the application and use of new and emerging advanced techniques to provide solutions for transportation, distribution, and logistics problems. **TD2**
3. Describe key operational activities required of successful transportation, distribution, and logistics facilities. **TD3**
4. Identify governmental policies and procedures for transportation, distribution, and logistics facilities. **TD4**
5. Describe transportation, distribution, and logistics employee rights and responsibilities and employers' obligations concerning occupational safety and health. **TD5**
6. Describe career opportunities and means to achieve those opportunities in each of the Transportation, Distribution, and Logistics Career Pathways. **TD6**

Facility and Mobile Equipment Maintenance Career Pathway (TD-MTN)

1. Develop preventative maintenance plans and systems to keep facility and mobile equipment inventory in operation. **TD-MTN1**
2. Design ways to improve facility and equipment system performance. **TD-MTN2**

Common Career and Technical Core Career Ready Practices (CCTC CRP)

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|---|--|
| <ol style="list-style-type: none"> 1. Act as a responsible and contributing citizen and employee. CRP1 2. Apply appropriate academic and technical skills. CRP2 3. Attend to personal health and financial well-being. CRP3 4. Communicate clearly, effectively, and with reason. CRP4 5. Consider the environmental, social and economic impacts of decisions. CRP5 6. Demonstrate creativity and innovation. CRP6 | <ol style="list-style-type: none"> 7. Employ valid and reliable research strategies. CRP7 8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP8 9. Model integrity, ethical leadership, and effective management. CRP9 10. Plan education and career path aligned to personal goals. CRP10 11. Use technology to enhance productivity. CRP11 12. Work productively in teams while using cultural/global competence. CRP12 |
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