Diesel Mechanics. Ohio's Competency Analysis Profile.

Ohio State Univ., Columbus. Vocational Instructional Materials Lab.

Ohio State Dept. of Education, Columbus. Div. of Vocational and Career Education.

91

48p.; For related documents, see CE 059 517-542.

Vocational Instructional Materials Lab, Ohio State University, 1900 Kenny Road, Columbus, OH 43210-1090 ($1.50).

Guides - Classroom Use - Teaching Guides (For Teacher) (052)

MF01/PC02 Plus Postage.

Air Conditioning; *Auto Mechanics; Basic Skills; Competence; *Competency Based Education; *Diesel Engines; Electrical Systems; Electronic Control; Employment Potential; Equipment Maintenance; Heating; High Schools; Job Analysis; Job Skills; Maintenance; Mechanical Skills; Occupational Safety and Health; Recordkeeping; Task Analysis

Brakes (Automotive); DACUM Process; Drive Trains (Automotive); Ohio; Steering (Automotive); Trucks

This Ohio Competency Analysis Profile (OCAP), derived from a modified Developing a Curriculum (DACUM) process, is a current comprehensive and verified employer competency program list for diesel mechanics. Each unit (with or without subunits) contains competencies and competency builders that identify the occupational, academic, and employability skills needed to enter this occupational area within that outline are three levels of items: core, advancing, and futuring. Core items are essential to entry-level employment. Advancing items are needed to advance in a given occupation. Futuring items are needed to enter and remain in a given occupation 3 to 4 years from now. This profile contains 17 units: (1) general safety and shop practices; (2) basic mechanical skills; (3) planned maintenance; (4) internal combustion engine operation; (5) gasoline engines; (6) diesel engines; (7) drivetrain; (8) brake systems; (9) suspension and steering; (10) chassis; (11) electrical systems; (12) truck and trailer lighting systems; (13) electronically operated control systems; (14) heating and air conditioning systems; (15) cab and trailer maintenance and repair; (16) record keeping; and (17) employability skills. (NLA)

* Reproductions supplied by EDRS are the best that can be made from the original document.
OHIO'S COMPETENCY ANALYSIS PROFILE

DIESEL MECHANICS

Employer Verification Panel

John A. Barnowski, Sherwin Williams/CTS, Cleveland, Ohio
Dennis Campbell, Yellow Freight Systems, Columbus, Ohio
Michael Cochran, O. S. Hill and Co., Inc., East Liverpool, Ohio
Richard A. Cochran, Cummins Ohio Inc., Hilliard, Ohio
John R. Cowan, Sr., Graham Ford—Heavy Truck Services, Columbus, Ohio
Ronald C. Gulbransen, Cummins Ohio Inc., Cincinnati, Ohio
James R. Jones, Seaway Foodtown Inc., Maumee, Ohio
William A. Kolibaba, Williams Detroit Diesel—Allison, Brunswick, Ohio
George M. Miller, Fields Construction, Kitts Hill, Ohio
Daniel Renovetz, City of Cleveland, Cleveland, Ohio
James W. Roark, Akron Wheel and Frame Inc., Akron, Ohio
Michael C. Schiele, Portman Equipment Co., Cincinnati, Ohio
James P. Timmer, Timon's Certified Car and Truck Inc., Cincinnati, Ohio
What is OCAP?

"A comprehensive and verified employer competency list will be developed and kept current for each program." This is the second objective of Imperati e 3 of the Action Plan for Accelerating the Modernization of Vocational Education: Ohio's Future at Work. Ohio's Competency Analysis Profile (OCAP) lists are the Division of Vocational and Career Education's response to that objective. OCAP lists evolve from a modified DACUM process involving business, industry, labor, and community agency representatives from throughout Ohio. The OCAP process is directed by the Vocational Instructional Materials Laboratory at The Ohio State University's Center on Education and Training for Employment.

How is OCAP used?

Each OCAP contains units (with and without subunits), competencies, and competency builders that identify the occupational, academic, and employability skills needed to enter a given occupation or occupational area. Within that outline there are three levels of items: core, advancing, and futuring. Core items are essential to entry-level employment. These items are required to be taught and will be the basis for questions on the state vocational competency tests (scheduled to begin in FY93). Advancing items (marked with one asterisk) are needed to advance in a given occupation. Futuring items (marked with two asterisks) are needed to enter and remain in a given occupation three to four years from now.

Districts may add as many units, subunits, competencies, and competency builders as desired to reflect local employment needs, trends, and specialties. Local advisory committees should be actively involved in the identification and verification of additional items. Using OCAP lists, instructors will be able to formulate their courses of study and monitor competency gains via the new competency testing program.

The Employability Skills portion of this list was verified by the following employer panel:

Gary J. Corrigan, Dana Corporation, Ottawa Lake, Michigan
David Crooks, Bowling Green State University Union Food Service, Bowling Green, Ohio
Pat Doerman, Farrow's Harley-Davidson, Columbus, Ohio
William Gockenbach, Kaiser Aluminum, Heath, Ohio
Patsy Hathaway, CBS Personnel Services, Inc., Dayton, Ohio
Marlyn Harman, Marlyn Harman & Associates, Cleveland, Ohio
Thomas R. Hyldahl, Toledo Edison, Toledo, Ohio
Carol C. James, Ohio Contractors Association, Columbus, Ohio
James Mack, Chrysler Jeep Assembly, Toledo, Ohio
Rocky McCoy, Ironton-Lawrence Co. Community Action Organization, Ironton, Ohio
James Needs, Independent Crop Producer, Upper Sandusky, Ohio
Ronald Simmons, Former GM Executive, Warren Ohio
UNIT 1: Safety and Shop Practices

COMPETENCY 1.0.1: Use and care for personal safety equipment

COMPETENCY BUILDERS:

1.0.1.1 Use eye and ear protection according to Occupational Safety and Health Administration (OSHA) standards
1.0.1.2 Wear proper foot and hand protection
1.0.1.3 Wear clothing according to OSHA standards
1.0.1.4 Remove jewelry
1.0.1.5 Secure long hair
1.0.1.6 Demonstrate proper lifting techniques

COMPETENCY 1.0.2: React to emergency and injury situations

COMPETENCY BUILDERS:

1.0.2.1 Report injury to designated supervisor
1.0.2.2 Explain and interpret shop safety plan
1.0.2.3 Demonstrate all steps of shop safety plan
1.0.2.4 Identify nature of injury

COMPETENCY 1.0.3: React to fire

COMPETENCY BUILDERS:

1.0.3.1 Demonstrate proper reporting procedures
1.0.3.2 Identify types of fires
1.0.3.3 Locate fire exits and alarms
1.0.3.4 Locate fire blankets and first-aid kits
1.0.3.5 Locate and demonstrate use of fire extinguishers
1.0.3.6 Inspect and maintain fire extinguishers
1.0.3.7 Report and/or exchange used fire extinguishers

COMPETENCY 1.0.4: Demonstrate general safety practices

COMPETENCY BUILDERS:

1.0.4.1 Demonstrate proper techniques of jacking, lifting, and blocking vehicles
1.0.4.2 Demonstrate proper equipment-moving techniques
1.0.4.3 Check brakes before moving equipment

(continued)
(continued)

1.0.4.4 Identify dischargeable offences (e.g., horseplay, substance abuse, theft)
1.0.4.5 Demonstrate and explain proper use of chains and straps
1.0.4.6 Identify and use proper fasteners

COMPETENCY 1.0.5: Maintain tools and equipment

COMPETENCY BUILDERS:

1.0.5.1 Check grounding and wire condition of all electrical tools
1.0.5.2 Demonstrate proper care, use, and maintenance procedures for all tools and equipment
1.0.5.3 Check mounting shields according to OSHA standards
1.0.5.4 Initiate inspection by Ohio Department of Industrial Relations, Division of Safety and Hygiene
1.0.5.5 Demonstrate and explain safety-tag and lockout procedures for equipment

COMPETENCY 1.0.6: Avoid hazardous situations

COMPETENCY BUILDERS:

1.0.6.1 Maintain clean and safe work environment
1.0.6.2 Follow directions on hazardous materials tags or labels
1.0.6.3 Handle and dispose of hazardous materials
1.0.6.4 Interpret personal safety rights according to OSHA's Right to Know plan
1.0.6.5 Read and interpret material safety data sheet (MSDS)
1.0.6.6 Demonstrate proper action associated with hazardous chemical spill
1.0.6.7 Explain liability associated with hazardous material disposal

COMPETENCY 1.0.7: Use reference and training materials provided by manufacturers

COMPETENCY BUILDERS:

1.0.7.1 Identify and locate specific reference materials
1.0.7.2 Interpret reference materials
1.0.7.3 Attend inservice training
1.0.7.4 Read training materials
1.0.7.5 Identify resources (e.g., manufacturers' representatives)
1.0.7.6 Follow manufacturers' specifications
COMPETENCY 1.0.8: Use measuring tools

COMPETENCY BUILDERS:

1.0.8.1 Review basic math
1.0.8.2 Identify measuring tools and their uses
1.0.8.3 Measure with specific measuring tools

UNIT 2: Basic Mechanical Skills

COMPETENCY 2.0.1: Perform basic mechanical tasks

COMPETENCY BUILDERS:

2.0.1.1 Maintain hand tools
2.0.1.2 Demonstrate basic drilling and tapping techniques
2.0.1.3 Sharpen drill bits and chisels
2.0.1.4 Demonstrate correct procedure for screw extraction
2.0.1.5 Demonstrate correct procedure for thread repair
2.0.1.6 Demonstrate proper flaring techniques (single and double)
2.0.1.7 Demonstrate proper soldering techniques
2.0.1.8 Demonstrate proper wire connection techniques, including soldering and crimping

COMPETENCY 2.0.2: Perform basic welding and cutting

COMPETENCY BUILDERS:

2.0.2.1 Wear proper safety gloves, eye protection, and leathers
2.0.2.2 Demonstrate proper use of oxygen/acetylene torch in welding, brazing and cutting
2.0.2.3 Demonstrate proper techniques of electrical arc welding
2.0.2.4 Discuss new and emerging welding techniques (e.g., plasma cutting, mig & tig)

UNIT 3: Planned Maintenance

COMPETENCY 3.0.1: Inspect vehicle

COMPETENCY BUILDERS:

3.0.1.1 Inspect inside of cab
3.0.1.2 Raise cab or hood assembly and inspect
3.0.1.3 Inspect chassis
3.0.1.4 Complete inspection form

* Advancing
** Futuring
COMPETENCY 3.0.2: Maintain fluid and filters

COMPETENCY BUILDERS:

3.0.2.1 Refer to manufacturer's specifications
3.0.2.2 Identify fluid and lubricant characteristics
3.0.2.3 Change crankcase oil
3.0.2.4 Change oil filter
3.0.2.5 Replace other filters and fluids
3.0.2.6 Identify proper disposal procedures for fluids and solids

COMPETENCY 3.0.3: Lubricate vehicle components

COMPETENCY BUILDERS:

3.0.3.1 Refer to manufacturer's specifications
3.0.3.2 Check lubrication level for all gear boxes
3.0.3.3 Lubricate chassis (e.g., clutch, U-joint)
3.0.3.4 Lubricate hardware

COMPETENCY 3.0.4: Maintain wheels and tires

COMPETENCY BUILDERS:

3.0.4.1 Refer to manufacturer's specifications
3.0.4.2 Inspect wheels, tires, and mounting
3.0.4.3 Check air pressure
3.0.4.4 Inspect, repack, and adjust wheel bearings
3.0.4.5 Remove tire/wheel assembly
3.0.4.6 Inspect, remove, and replace wheel seals

UNIT 4: Internal Combustion Engine Operation

COMPETENCY 4.0.1: Examine two-cycle engine

COMPETENCY BUILDERS:

4.0.1.1 Explain operation of two-cycle engine
4.0.1.2 Identify components and their operations

COMPETENCY 4.0.2: Examine four-cycle engine

COMPETENCY BUILDERS:

4.0.2.1 Explain operation of four-cycle engine
4.0.2.2 Identify components and their operations

* Advancing
** Futuring

4
UNIT 5: Gasoline Engines

COMPETENCY 5.0.1: Troubleshoot and repair cylinder head and valve train

COMPETENCY BUILDERS:

5.0.1.1 Remove and clean cylinder heads
5.0.1.2 Inspect cylinder heads for cracks
5.0.1.3 Inspect gasket surface areas for warpage and leakage
5.0.1.4 Check fluid passage condition
5.0.1.5 Inspect threaded holes, stubs, and bolts
5.0.1.6 Install cylinder heads and gaskets
5.0.1.7 Inspect and test valve springs for squareness, pressure, and free height comparison*
5.0.1.8 Inspect valve spring retainers, locks, and valve-lock grooves*
5.0.1.9 Replace valve stem seals*
5.0.1.10 Inspect valve guides for wear*
5.0.1.11 Check valve guide height and stem-to-guide clearance*
5.0.1.12 Recondition or replace valve guides*
5.0.1.13 Inspect and resurface or replace valves*
5.0.1.14 Inspect and resurface or replace valve seats*
5.0.1.15 Check valve face-to-seat contact and valve seat concentricity (run-out)*
5.0.1.16 Service seats and valves*
5.0.1.17 Check valve spring assembled height and valve stem height*
5.0.1.18 Service valve and spring assemblies*
5.0.1.19 Inspect pushrods, rocker arms, rocker-arm pivots, and shafts
5.0.1.20 Inspect, test, and replace hydraulic or mechanical lifters
5.0.1.21 Adjust valves
5.0.1.22 Inspect and replace camshaft drives*
5.0.1.23 Inspect and measure camshaft journals and lobes*
5.0.1.24 Inspect and measure camshaft bearing surfaces*
5.0.1.25 Time camshaft

COMPETENCY 5.0.2: Troubleshoot and repair engine block

COMPETENCY BUILDERS:

5.0.2.1 Inspect and replace pans, covers, gaskets, and seals
5.0.2.2 Inspect engine block*
5.0.2.3 Clean and repair engine block*
5.0.2.4 Remove cylinder wall ridges
5.0.2.5 Inspect and measure cylinder walls for damage and wear
5.0.2.6 Hone and clean cylinder walls

(continued)

* Advancing
** Futuring
Diesel Mechanics--10/91

(continued)

5.0.2.7 Inspect and measure camshaft bearings and determine needed repairs*
5.0.2.8 Inspect crankshaft, check oil passage condition, and measure journal wear
5.0.2.9 Inspect and clean crankshaft and determine needed repairs*
5.0.2.10 Inspect and measure main and connecting rod bearings
5.0.2.11 Identify piston and bearing wear patterns that indicate problems in connecting-rod alignment and main bearing bore
5.0.2.12 Inspect rod alignment and bearing bore condition*
5.0.2.13 Install new piston pins and bushings
5.0.2.15 Inspect and repair or replace crankshaft vibration damper (harmonic balancer)
5.0.2.16 Visually inspect crankshaft flange and flywheel or flexplate
5.0.2.17 Inspect flywheel or flexplate, measure run-out, and determine needed repairs*
5.0.2.18 Reassemble engine parts using correct gaskets and sealants
5.0.2.19 Prime engine lubrication system

COMPETENCY 5.0.3: Troubleshoot and repair lubrication and cooling systems

COMPETENCY BUILDERS:

5.0.3.1 Perform oil-pressure tests
5.0.3.2 Inspect, measure, and repair or replace oil pumps, pressure-relief devices, and pump drives*
5.0.3.3 Perform cooling system tests
5.0.3.4 Inspect and replace and/or adjust drive belt and pulleys
5.0.3.5 Inspect and replace hoses of engine-cooling and heater systems
5.0.3.6 Inspect, test, and replace thermostat, bypass, and housing
5.0.3.7 Inspect coolant
5.0.3.8 Drain, flush, refill, and bleed cooling system
5.0.3.9 Inspect, test, and replace water pump
5.0.3.10 Inspect, test, and replace radiator, pressure cap, and coolant-recovery system
5.0.3.11 Clean, inspect, test, and replace fan(s), fan clutch, fan shroud, and cooling-system-related temperature sensors or switches
5.0.3.12 Inspect and test oil coolers and determine needed repairs

* Advancing
** Futuring
5.0.3.13 Inspect, test, and replace oil-temperature or oil-pressure switches and sensors
5.0.3.14 Perform oil change

COMPETENCY 5.0.4: Troubleshoot and repair ignition system

COMPETENCY BUILDERS:

5.0.4.1 Diagnose no-starting, hard starting, and engine misfiring
5.0.4.2 Inspect, test, and repair or replace primary circuit wiring and components of ignition system
5.0.4.3 Remove, inspect, test, repair, and reinstall distributor
5.0.4.4 Inspect, test, and repair or replace ignition system, secondary circuit wiring, and components
5.0.4.5 Inspect, test, and replace ignition coil
5.0.4.6 Check and adjust ignition system timing and verify timing advance
5.0.4.7 Inspect, test, and replace wiring harness and connectors of electronic ignition system
5.0.4.8 Inspect, test, and replace pickup sensor or trigger devices of electronic ignition system
5.0.4.9 Inspect, test, and replace control unit of electronic ignition system*
5.0.4.10 Test spark-control system and determine needed repairs*
5.0.4.11 Inspect, test, and repair or replace electrical or electronic components and circuits of spark-control system*

COMPETENCY 5.0.5: Troubleshoot and repair fuel and exhaust systems

COMPETENCY BUILDERS:

5.0.5.1 Diagnose no-starting, hard starting, poor idle, flooding, hesitation, surging, engine misfiring, power loss, poor mileage, and dieseling problems on vehicle with carburetor-type fuel system and determine needed repairs*
5.0.5.2 Diagnose no-starting, hard starting, poor idle, flooding, hesitation, surging, engine misfiring, power loss, poor mileage, and dieseling problems on vehicle with injection-type fuel system and determine needed repairs*
5.0.5.3 Inspect and replace fuel tank, fuel-gauge sending unit, fuel tank filter, fuel cap, fuel lines, and fuel hoses

* Advancing
** Futuring
Check fuel for contaminants
Inspect, test, and replace fuel pumps and pump controls
Inspect and repair or replace fuel filters
Inspect, clean, adjust, test, and repair or replace cold-enrichment systems
Remove and replace carburetor or fuel-injection throttle body and adjust related linkages
Rebuild carburetor*
Inspect, clean, and repair or replace carburetor mounting plates, fuel-injection air-induction system, intake manifold, and gaskets
Adjust carburetor idle speed and fuel mixture
Inspect, test, clean, and adjust or replace components of fuel-injection system*
Inspect, clean, and/or replace air cleaner and element
Perform fuel injector tests
Inspect, test, and replace or reinstall exhaust manifold, exhaust pipes, mufflers, resonators, tail pipes, catalytic converter, and heat shields

COMPETENCY 5.0.6: Troubleshoot and repair emission control systems

COMPETENCY BUILDERS:

Inspect and test positive crankcase ventilation (PCV) systems and determine needed repairs
Test exhaust gas recirculation (EGR) systems
Inspect and repair or replace EGR valves, valve manifolds, and exhaust passages of EGR systems*
Inspect and repair or replace controls and hoses of EGR systems*
Test air-injection emission systems*
Inspect and repair or replace pumps, pressure-relief valves, filters, pulleys, and belts of air-injection emission systems*
Inspect and replace bypass valves and vacuum hoses of air-injection emission systems*
Inspect and repair or replace hoses, check valves, air manifolds, and injectors of air-injection emission systems*
Test fuel/vapor control system and determine needed repairs*
Inspect and replace liquid/vapor separator, liquid check valve, lines, and hoses of fuel/vapor control system*

* Advancing
** Futuring
(continued)

5.0.6.11 Inspect and repair or replace canister, purge lines, and filter of fuel/vapor control system*
5.0.6.12 Test inlet air-temperature control system and determine needed repairs*
5.0.6.13 Inspect, test, and replace sensors, heat stove shroud, hot-air pipe, and damper of inlet air-temperature control system*

UNIT 6: Diesel Engines

COMPETENCY 6.0.1: Troubleshoot engine

COMPETENCY BUILDERS:

6.0.1.1 Refer to manufacturer's specifications
6.0.1.2 Listen to and verify operator's complaint
6.0.1.3 Review past maintenance documents
6.0.1.4 Inspect fuel, oil, and coolant levels
6.0.1.5 Inspect engine assembly and compartment for fuel, oil, coolant, air, and other leaks
6.0.1.6 Listen to engine noises
6.0.1.7 Check engine exhaust color and quantity
6.0.1.8 Check fuel system
6.0.1.9 Perform air-intake system restriction and/or pressure test
6.0.1.10 Perform manifold pressure test, air box pressure test, and/or compression test and determine needed repairs*
6.0.1.11 Perform exhaust back-pressure test and determine needed repairs*
6.0.1.12 Perform crankcase pressure test and determine needed repairs*
6.0.1.13 Diagnose no-cranking and determine needed repairs
6.0.1.14 Diagnose surging, rough operation, misfiring, low power, slow deceleration, slow acceleration, and shutdown and determine needed repairs*
6.0.1.15 Diagnose engine vibration and determine needed repairs*
6.0.1.16 Locate misfiring cylinder and determine needed repairs*
6.0.1.17 Test cooling system
6.0.1.18 Test lubrication system

* Advancing
** Futuring
Diesel Mechanics--10/91

COMPETENCY 6.0.2: Troubleshoot and repair cylinder head and valve train

COMPETENCY BUILDERS:

6.0.2.1 Remove, clean, inspect, and replace cylinder head assembly
6.0.2.2 Inspect threaded holes, studs, and bolts
6.0.2.3 Repair or replace threaded holes, studs, and bolts
6.0.2.4 Inspect cylinder head mating surface areas for warpage, visible cracks, or damage and determine needed repairs*
6.0.2.5 Check condition of cylinder head and block passages and determine needed repairs*
6.0.2.6 Inspect core, gallery, and plugs and determine needed repairs*
6.0.2.7 Pressure-test cylinder head for coolant leakage and determine needed repairs*
6.0.2.8 Inspect and test valve springs for squareness, pressure, and free height comparison and replace as needed*
6.0.2.9 Inspect and replace valve spring retainers and/or rotators and locks
6.0.2.10 Measure valve guides for wear, and repair or replace as needed*
6.0.2.11 Check valve guide-to-stem clearance and repair or replace as needed*
6.0.2.12 Measure valve guide height and repair or replace as needed*
6.0.2.13 Replace or recondition valve guides*
6.0.2.14 Inspect and recondition or replace valves*
6.0.2.15 Inspect and recondition or replace valve seats*
6.0.2.16 Measure valve head height relative to deck, valve face-to-seat contact, and valve seat concentricity*
6.0.2.17 Repair seats and valves*
6.0.2.18 Inspect and replace injector sleeves and seals*
6.0.2.19 Measure injector tip or nozzle protrusion according to manufacturer's specifications*
6.0.2.20 Inspect, clean, and replace precombustion chambers*
6.0.2.21 Inspect and replace valve bridges (crossheads) and guides
6.0.2.22 Adjust valve bridges
6.0.2.23 Reassemble cylinder head and vacuum-test valve sealing*
6.0.2.24 Inspect pushrods, rocker arms, rocker-arm shafts, and brackets
6.0.2.25 Inspect and adjust or replace cam followers*
6.0.2.26 Adjust valve clearance

* Advancing
** Futuring
COMPETENCY 6.0.3: Troubleshoot and repair engine block

COMPETENCY BUILDERS:

6.0.3.1 Inspect, repair, and install pans, covers, vents, gaskets, seals, and wear rings
6.0.3.2 Clean and inspect engine block for cracks and mating surface areas for warpage*
6.0.3.3 Check condition of passages, core, and gallery plugs*
6.0.3.4 Inspect threaded holes, studs, dowel pins, and bolts for serviceability*
6.0.3.5 Pressure-test engine block for leakage and determine needed repairs*
6.0.3.6 Inspect cylinder sleeve counterbore and lower bore, check bore distortion, and determine needed repairs*
6.0.3.7 Clean, inspect, and measure cylinder walls or liners and determine needed repairs*
6.0.3.8 Replace cylinder liners and seals*
6.0.3.9 Check and adjust liner height*
6.0.3.10 Inspect camshaft bearings and determine needed repairs*
6.0.3.11 Inspect, measure, and replace or reinstall camshaft*
6.0.3.12 Measure and/or adjust end-play of camshaft*
6.0.3.13 Clean and inspect crankshaft
6.0.3.14 Check condition of oil passage(s) in crankshaft
6.0.3.15 Check passage plugs in crankshaft
6.0.3.16 Measure journal diameter of crankshaft
6.0.3.17 Check main bearing bore cap fit and determine needed repairs*
6.0.3.18 Inspect and replace main bearings
6.0.3.19 Check bearing clearances
6.0.3.20 Check and adjust crankshaft end-play
6.0.3.21 Inspect, replace, and time drive gear train
6.0.3.22 Clean, inspect, measure, and replace pistons, pins, and retainers
6.0.3.23 Measure piston-to-cylinder wall clearance
6.0.3.24 Check ring-to-groove clearance and end gap and install rings on pistons
6.0.3.25 Identify piston and bearing wear patterns, check bearing bore and bushing condition, and determine needed repairs*
6.0.3.26 Assemble pistons and connecting rods and install in block
6.0.3.27 Replace rod bearings and check clearances
6.0.3.28 Check condition, position, and clearance of piston cooling jets (nozzles)
6.0.3.29 Inspect, measure, and repair or replace crankshaft vibration damper and flywheel
6.0.3.30 Inspect, install, and align flywheel housing*

* Advancing
** Futuring
Diesel Mechanics--10/91

COMPETENCY 6.0.4: Troubleshoot and repair lubrication systems

COMPETENCY BUILDERS:

6.0.4.1 Check engine oil, pressure, gauge, and sending unit
6.0.4.2 Check level, contamination, and consumption of engine oil and pull sample for oil analysis
6.0.4.3 Inspect, measure, and repair or replace oil pump, drives, inlet pipes, and screens
6.0.4.4 Inspect and repair or replace oil-pressure regulator valves, bypass, and pressure-relief proper valves and filters
6.0.4.5 Inspect, clean, test, reinstall or replace, and align oil cooler
6.0.4.6 Test and reinstall or replace differential valve and thermostat
6.0.4.7 Inspect and repair or replace lines and hoses
6.0.4.8 Inspect turbocharger lubrication system

COMPETENCY 6.0.5: Troubleshoot and repair cooling system

COMPETENCY BUILDERS:

6.0.5.1 Check engine coolant level, contamination, and consumption
6.0.5.2 Check coolant temperature, gauge, and sending unit
6.0.5.3 Inspect, reinstall or replace, and adjust drive belts
6.0.5.4 Inspect and replace thermostat, bypasses, housing(s), and seals
6.0.5.5 Identify coolant types and additives
6.0.5.6 Discuss use of refractometer
6.0.5.7 Check conditioner and coolant concentration levels
6.0.5.8 Flush and refill cooling system
6.0.5.9 Bleed air from cooling system
6.0.5.10 Inspect and repair or replace conditioner and/or filter, check valves, lines, and fittings
6.0.5.11 Inspect and repair or replace water pump, hoses, and idler pulley
6.0.5.12 Inspect, pressure-test, and clean radiator, pressure cap, and tanks
6.0.5.13 Inspect and repair or replace fan hub, fan, fan clutch, controls, thermostat, and fan shroud*
6.0.5.14 Inspect and repair or replace radiator shutter assembly and controls*

* Advancing
** Futuring
COMPETENCY 6.0.6: Troubleshoot and repair air-induction and exhaust systems

COMPETENCY BUILDERS:

6.0.6.1 Inspect and repair or replace air-induction piping, air cleaner, and element
6.0.6.2 Inspect turbocharger or engine-driven blowers and piping system
6.0.6.3 Remove and replace turbocharger
6.0.6.4 Remove and replace engine blower*
6.0.6.5 Inspect and repair or replace intake manifold, gaskets, and connections
6.0.6.6 Inspect, clean, test, and repair or replace aftercooler assembly*
6.0.6.7 Inspect and repair or replace exhaust manifold, piping, mufflers, and mounting hardware
6.0.6.8 Inspect and repair or replace preheater system and controls
6.0.6.9 Inspect and repair or replace ether or starting-fluid system and controls
6.0.6.10 Inspect and repair or replace emergency air-induction shutoff system

COMPETENCY 6.0.7: Troubleshoot and repair fuel system

COMPETENCY BUILDERS:

6.0.7.1 Explain and comply with emission control laws
6.0.7.2 Check level, contamination, and consumption of fuel
6.0.7.3 Inspect and repair or replace fuel tanks, vents, caps, mounts, screens, supply, crossover, and return lines and fittings
6.0.7.4 Inspect, clean, test, and repair or replace fuel transfer (lift) pump, pump drives, screens, separators, proper filters, heaters, and associated mounting hardware
6.0.7.5 Check fuel system for air
6.0.7.6 Prime and bleed fuel system
6.0.7.7 Repair or replace primer pump*
6.0.7.8 Inspect, adjust, and repair or replace throttle-control linkage and/or electronic controls
6.0.7.9 Inspect, adjust, and repair or replace electronic fuel controls*
6.0.7.10 Perform on-engine inspections, tests, and adjustments of distributor-type injection pump drives*
6.0.7.11 Replace and/or time distributor-type injection pump drives*

* Advancing
** Futuring
Perform on-engine inspections, tests, and adjustments of in-line-type injection pump drives and/or electronic controls*

Replace and/or time in-line-type injection pump drives and/or electronic controls*

Perform on-engine inspections and tests of PT-type injection pump, drives, injectors, and/or electronic controls*

Adjust and/or replace PT-type injection pump, drives, injectors, and/or electronic controls*

Perform on-engine inspections and tests of unit injectors and/or electronic controls*

Adjust and/or replace unit injectors and/or electronic controls*

Inspect, test, and adjust injection nozzles and determine needed repairs*

Inspect smoke limiters and determine needed repairs*

Inspect and reinstall or replace high-pressure injection lines, fittings, and seals

Inspect low-pressure fuel lines, fittings, and seals

Replace or repair and reinstall low-pressure fuel lines, fittings, and seals

Inspect, test, and adjust engine governors and/or electronic controls and determine needed repairs*

Inspect, test, and adjust engine fuel shutdown devices and controls

Inspect, test, and adjust safety shutdown devices, circuits, and sensors and determine needed repairs*

COMPETENCY 6.0.8: Troubleshoot and repair engine brake systems

COMPETENCY BUILDERS:

Refer to manufacturer's specifications

Inspect and adjust engine brakes

Inspect, test, adjust, and repair or replace engine brake control circuits, switches, and solenoids*

Inspect and repair or replace engine brake housing, valves, seals, screens, lines, and fittings*

* Advancing
** Futuring
UNIT 7: Drivetrain

COMPETENCY 7.0.1: Troubleshoot and repair clutch

COMPETENCY BUILDERS:

7.0.1.1 Diagnose clutch noise, binding, slippage, pulsation, grabbing, and chatter*
7.0.1.2 Diagnose clutch failure
7.0.1.3 Inspect, adjust, and repair or replace clutch linkage, cables, levers, brackets, bushings, pivots, and springs
7.0.1.4 Inspect and adjust or replace hydraulic clutch slave and master cylinders
7.0.1.5 Inspect brake lines and brake hoses
7.0.1.6 Bleed brake hydraulic system
7.0.1.7 Inspect and adjust or replace release (throwout) bearing
7.0.1.8 Inspect sleeve, bushing, springs, levers, shafts, and seals of clutch system
7.0.1.9 Inspect and replace single-disc clutch assembly
7.0.1.10 Inspect, adjust, measure, and align or replace double-disc clutch assembly
7.0.1.11 Inspect and adjust or replace clutch/brake assembly
7.0.1.12 Inspect input shaft splines
7.0.1.13 Inspect self-adjusting clutch mechanisms
7.0.1.14 Inspect and replace pilot bearing
7.0.1.15 Inspect flywheel mounting area on crankshaft
7.0.1.16 Check crankshaft end-play
7.0.1.17 Inspect and repair or replace flywheel and starter ring gear
7.0.1.18 Measure flywheel face run-out and pilot bore run-out and determine needed repairs*
7.0.1.19 Inspect engine block, flywheel housing, and transmission housing mating surfaces
7.0.1.20 Measure flywheel housing bore run-out and face run-out and determine needed repairs*

COMPETENCY 7.0.2: Troubleshoot and repair transmission

COMPETENCY BUILDERS:

7.0.2.1 Diagnose transmission noise, shifting, lockup, jumping out-of-gear, overheating, and vibration problems*
7.0.2.2 Diagnose transmission component failure before and during disassembly and determine needed repairs*
7.0.2.3 Inspect, adjust, and repair or replace transmission remote shift linkages, brackets, bushings, pivots, and levers

* Advancing
** Futuring
Diesel Mechanics--10/91

(continued)

7.0.2.4 Inspect, test, adjust, and repair or replace air shift controls, lines, hoses, valves, regulators, filters, and cylinder assemblies

7.0.2.5 Inspect and replace transmission mounts, insulators, and mounting bolts

7.0.2.6 Inspect transmission cover plates, gaskets, seals, and cap bolts for leakage and replace as needed

7.0.2.7 Inspect seal surfaces

7.0.2.8 Check transmission fluid for proper level, type, and condition according to manufacturer's specifications

7.0.2.9 Drain and refill transmission

7.0.2.10 Check magnetic plugs and vents

7.0.2.11 Inspect and adjust or replace transmission shift lever, cover, rails, forks, levers, bushings, sleeves, detents, interlocks, springs, and lock bolts

7.0.2.12 Remove and reinstall transmission and check crankshaft end-play

7.0.2.13 Inspect and replace input shaft, gear, spacers, bearings, retainers, and slingers

7.0.2.14 Inspect, adjust, and replace main shaft, gears, sliding clutches, washers, spacers, bushings, bearings, auxiliary drive assemblies, retainers, and keys

7.0.2.15 Inspect and replace countershafts, gears, bearings, retainers, and keys

7.0.2.16 Adjust bearing preload and time-multiple countershaft gears

7.0.2.17 Inspect and replace output shafts, gears, washers, spacers, bearings, retainers, and keys

7.0.2.18 Inspect and replace reverse idler shafts, gears, bushings, bearings, thrust washers, and retainers

7.0.2.19 Check reverse idler gear end-play

7.0.2.20 Inspect and replace synchronizer hub, sleeve, keys, springs, blocking rings, synchronizer plates, blocker pins, and sliding clutches

7.0.2.21 Inspect and repair or replace transmission cases

7.0.2.22 Inspect and repair or replace transmission lubrication system pumps, troughs, collectors, and slingers

7.0.2.23 Inspect and replace transmission oil filters and inspect coolers

7.0.2.24 Inspect mechanical speedometer components

7.0.2.25 Inspect electronic speedometer components

7.0.2.26 Inspect, adjust, and repair or replace power take-off (PTO) assemblies, controls, and shafts

7.0.2.27 Inspect and test backup light, neutral start, and warning device circuit switches

7.0.2.28 Inspect and test transmission temperature gauge circuit for accuracy

7.0.2.29 Inspect, adjust, remove, and replace transfer case assemblies

* Advancing
** Futuring 16
COMPETENCY 7.0.3: Troubleshoot and repair driveshaft and universal joint

COMPETENCY BUILDERS:

7.0.3.1 Diagnose noise and vibration problems in driveshaft and universal joint and determine needed repairs*
7.0.3.2 Inspect and repair or replace driveshaft, slip joints, yokes, drive flanges, and universal joints
7.0.3.3 Check phasing of all yokes
7.0.3.4 Inspect and repair or replace driveshaft center support bearings and mounts
7.0.3.5 Measure and adjust loaded and unloaded driveline angles*

COMPETENCY 7.0.4: Troubleshoot and repair drive axle

COMPETENCY BUILDERS:

7.0.4.1 Diagnose noise and overheating in rear-axle drive unit problems and determine needed repairs*
7.0.4.2 Check for and repair fluid leaks
7.0.4.3 Inspect and replace cover plates, gaskets, vents, magnetic plugs, and seals of rear-axle drive unit
7.0.4.4 Check fluid level and condition in rear-axle drive unit and determine needed repair
7.0.4.5 Add lubricant to rear-axle drive unit
7.0.4.6 Inspect and repair or replace differential carrier assembly
7.0.4.7 Inspect and repair or replace differential case assembly*
7.0.4.8 Inspect and replace components of traction-control differential case assembly*
7.0.4.9 Inspect differential carrier case and cap, side-bearing bores, and pilot-bearing bore and determine needed repairs*
7.0.4.10 Measure ring gear run-out and determine needed repairs*
7.0.4.11 Inspect and replace ring gears, drive-pinion gears, spacers, sleeves, bearing cage, and bearings*
7.0.4.12 Measure and adjust drive-pinion bearing preload*
7.0.4.13 Adjust drive-pinion depth*
7.0.4.14 Measure and adjust side-bearing preload and ring and pinion backlash*
7.0.4.15 Check and interpret ring and pinion tooth contact pattern and adjust according to manufacturers' specifications*
7.0.4.16 Inspect and adjust or repair ring-gear thrust block or screw*

* Advancing
** Futuring
Inspect, adjust, and repair or replace planetary-gear-type 2-speed axle assembly*
Inspect and repair or replace speedometer adapters, motors, axle-shift units, wires, air lines, and connectors of 2-speed axle-shift control systems*
Inspect and adjust power divider assembly*
Inspect, adjust, and repair or replace air-operated power divider lockout assembly*
Inspect and measure rear-axle housing mating surfaces and alignment and determine needed repairs*
Inspect and repair or replace rear-axle lubrication system pump troughs, collectors, slingers, tubes, and filters*
Inspect and replace rear-axle shafts
Remove and replace wheel assembly
Check rear-wheel seal and axle flange gasket
Diagnose noises and damage of rear-wheel bearing
Clean, inspect, lubricate, and replace wheel bearings
Replace seals and wear rings
Adjust rear-wheel bearings
Inspect and test rear-axle temperature gauge sensor for accuracy and determine needed repairs

UNIT 8: Brake Systems
SUBUNIT 8.1: Air Brakes

COMPETENCY 8.1.1: Troubleshoot and repair air supply and service systems

COMPETENCY BUILDERS:

8.1.1.1 Diagnose poor stopping, air leaks, pulling, grabbing, and dragging and determine needed repairs*
8.1.1.2 Check air-system buildup time
8.1.1.3 Drain air reservoir tanks and check for oil, water, and foreign material
8.1.1.4 Inspect, align, and adjust or replace compressor drive belts and pulleys
8.1.1.5 Inspect, repair or replace, and time compressor drive gear and coupling
8.1.1.6 Inspect and repair or replace air compressor, air cleaner, and oil and water lines and fittings
8.1.1.7 Inspect, test, adjust, and replace system-pressure controls, couplings, filters, lines, hoses, and fittings

* Advancing
** Futuring
Diesel Mechanics--10/91

(continued)

8.1.1.8 Inspect, test, adjust, and replace unloaded assembly
valves*
8.1.1.9 Inspect, test, clean, and replace air-tank relief
valves, one-way check valves, drain-cocks, spitter
valves, heaters, wiring, and connectors
8.1.1.10 Inspect, clean, and repair or replace air-drier
systems, filters, valves, heaters, wiring, and connectors
8.1.1.11 Inspect, test, adjust, and repair or replace brake
application valve, fittings, and mounts
8.1.1.12 Inspect, test, clean, and replace two-way check valves
8.1.1.13 Inspect, test, and repair or replace circuit switches,
wiring, and connectors of stoplight and parking brake
light
8.1.1.14 Inspect, test, and repair or replace hand brake
(trailer) control valve, lines, fittings, and mountings
8.1.1.15 Inspect, test, and repair or replace brake-relay valve
8.1.1.16 Inspect, test, and replace quick-release valves
8.1.1.17 Inspect, test, and replace limiting quick-release valve
8.1.1.18 Inspect, test, and replace tractor-protection valve
8.1.1.19 Inspect, test, and replace emergency brake-control
valve
8.1.1.20 Inspect, test, and replace inversion valve
8.1.1.21 Inspect, test, and repair or replace low-pressure
warning devices
8.1.1.22 Inspect, test, and replace air-pressure gauges, lines,
and fittings
8.1.1.23 Identify operation of automatic braking system (ABS)

COMPETENCY 8.1.2: Troubleshoot and repair mechanical/foundation
brake components

COMPETENCY BUILDERS:

8.1.2.1 Diagnose poor stopping, brake noise, pulling, grabbing,
and dragging and determine needed repairs*
8.1.2.2 Inspect, test, and adjust, repair or replace brake
chambers, diaphragm, clamp, spring, pushrod, clevis,
and mounting brackets
8.1.2.3 Inspect and adjust, repair, or replace manual and
automatic slack adjusters
8.1.2.4 Inspect and repair or replace cams, rollers, shafts,
bushings, seals, spacers, and retainers
8.1.2.5 Inspect and repair or replace brake spider, shields,
anchor pins, bushings, and springs
8.1.2.6 Inspect, repair or replace, and adjust wedge-type brake
housing, plungers, and wedge assembly

* Advancing
** Futuring

19
Diesel Mechanics--10/91

(continued)

8.1.2.7 Inspect and repair or replace wedge brake spider, manual adjuster plungers, and automatic adjuster plungers

8.1.2.8 Inspect, clean, and adjust air-disc brake caliper assemblies

8.1.2.9 Inspect and replace brake shoes or pads

8.1.2.10 Inspect brake drums or rotors and ensure parts meet Department of Transportation (DOT) specifications

COMPETENCY 8.1.3: Troubleshoot and repair parking brakes

COMPETENCY BUILDERS:

8.1.3.1 Inspect and adjust, repair, or replace drums, rotors, bands, shoes, mounting hardware, and adjusters of driveline parking brake

8.1.3.2 Inspect and adjust, repair, or replace application system pedal, cables, linkage, levers, pivots, and springs of driveline parking brake

8.1.3.3 Check operation of parking brake chamber (i.e., air brakes and spring brake)

8.1.3.4 Demonstrate proper changing of spring chamber during removal and replacement

8.1.3.5 Inspect, test, and replace check valves, lines, hoses, and fittings of parking brake

8.1.3.6 Inspect, test, and replace parking brake application and release valve

8.1.3.7 Release and reset parking brakes manually according to manufacturers' recommendations

SUBUNIT 8.2: Basic Hydraulics

COMPETENCY 8.2.1: Examine basic hydraulic theory

COMPETENCY BUILDERS:

8.2.1.1 Explain Pascal's Law

8.2.1.2 Explain hydraulic pressure (i.e., neutral, working, and relief)

8.2.1.3 Identify major causes of hydraulic failure (e.g., dirt, air, heat)
COMPETENCY 8.2.2: Examine hydraulic components and their relationships

COMPETENCY BUILDER:

8.2.2.1 Identify sump characteristics
8.2.2.2 Identify filtration characteristics
8.2.2.3 Identify fluid characteristics according to manufacturer's specifications
8.2.2.4 Identify characteristics of different pumps (e.g., vane, gear, piston)
8.2.2.5 Identify hydraulic motor characteristics
8.2.2.6 Identify control valve characteristics
8.2.2.7 Identify relief valve characteristics
8.2.2.8 Identify hydraulic symbols
8.2.2.9 Identify single and double action symbols

SUBUNIT 8.3: Hydraulic Brakes

COMPETENCY 8.3.1: Troubleshoot and repair hydraulic system

COMPETENCY BUILDERS:

8.3.1.1 Diagnose poor stopping, pulling, and dragging problems
8.3.1.2 Pressure-test hydraulic system and inspect for leaks
8.3.1.3 Check and adjust brake pedal pushrod length
8.3.1.4 Inspect and test master cylinder and determine needed repairs
8.3.1.5 Inspect, test, and replace brake lines, flexible hoses, and fittings
8.3.1.6 Inspect, test, and replace metering, proportioning, and combination valves*
8.3.1.7 Inspect, test, and repair or replace brake-pressure differential valve and warning light circuit-switch, bulbs, wiring, and connectors
8.3.1.8 Inspect and rebuild or replace wheel cylinders
8.3.1.9 Inspect disc-brake caliper assemblies
8.3.1.10 Bleed and/or flush hydraulic system
8.3.1.11 Inspect, test, and repair or replace hydraulic parking brake system
8.3.1.12 Explain operation of ABS
8.3.1.13 Explain safety in relation to extreme high pressure of brake fluid in ABS

* Advancing
** Futuring
COMPETENCY 8.3.2: Troubleshoot and repair power-assist units and related components

COMPETENCY BUILDERS:

8.3.2.1 Diagnose poor stopping caused by power-brake booster and determine needed repairs*
8.3.2.2 Inspect, test, and replace booster, hoses and control valves of power brake*
8.3.2.3 Test, adjust, and replace brake stoplight switch, bulbs, wiring, and connectors

UNIT 9: Suspension and Steering

COMPETENCY 9.0.1: Troubleshoot and repair steering column and manual steering gear

COMPETENCY BUILDERS:

9.0.1.1 Diagnose steering system problems, column and shaft noise, looseness, and binding problems
9.0.1.2 Inspect and replace steering shaft U-joint, slip joints, bearings, bushings, and seals
9.0.1.3 Phase steering shaft U-joints
9.0.1.4 Diagnose noise, binding, uneven turning effort, looseness, hard steering, and lubricant leakage in manual steering gear
9.0.1.5 Inspect lubricant for proper type, level, and condition
9.0.1.6 Inspect and repair or replace bushings, bearings, shafts, seals, gaskets, and mounting bolts of manual steering gear
9.0.1.7 Adjust worm-bearing preload of manual steering gear
9.0.1.8 Determine center position of pitman shaft
9.0.1.9 Adjust sector shaft lash

COMPETENCY 9.0.2: Troubleshoot and repair power steering units

COMPETENCY BUILDERS:

9.0.2.1 Refer to manufacturer's specifications
9.0.2.2 Diagnose problems in power steering system and determine needed repairs*
9.0.2.3 Inspect power steering fluid type, level, and condition
9.0.2.4 Purge power steering system
9.0.2.5 Perform power steering system pressure and flow tests and determine needed repairs*
9.0.2.6 Inspect and repair or replace power steering reservoir including filter, seals, and gaskets*

* Advancing
** Futuring
Inspect, replace, adjust, and align belts and pulleys of power steering pump*

Inspect and replace drive gear and coupling of power steering pump*

Inspect and repair or replace power steering pump, mountings, and brackets*

Inspect and replace pressure-regulator valves of power steering pump*

Inspect and replace cooler, lines, hoses, and fittings of power steering system

Inspect, repair or replace, and adjust linkage assist-type power steering control and remote relief valves (air and hydraulic)*

Inspect, replace, and adjust linkage assist-type power steering cylinder*

Inspect, replace, and adjust integral-type power steering gear*

Inspect, replace, and adjust dual power steering gear systems*

COMPETENCY 9.0.3: Troubleshoot and repair steering linkage

COMPETENCY BUILDERS:

Inspect and replace pitman arm
Inspect and adjust or replace drag link and tie rod
Inspect and adjust or replace drag-link and tie-rod ends
Inspect and replace idler arm, bearings, and bushings
Inspect and replace steering arm, levers, and linkage pivot joints
Inspect, replace, and position clamps and retainers
Check and adjust steering linkage or wheel stops

COMPETENCY 9.0.4: Troubleshoot, adjust, and repair wheel alignment

COMPETENCY BUILDERS:

Refer to manufacturer's specifications
Explain reasons for vehicle wandering, pulling, shimmy, and hard steering
Explain camber and king pin inclination
Explain caster in relation to chassis angle
Check and adjust toe
Check rear-axle alignment (e.g., thrustline, centerline) and tracking
Diagnose turning-angle problems (e.g., Ackerman-angle, toe-out-on-turns)

* Advancing
** Futuring
COMPETENCY 9.0.5: Troubleshoot and repair suspension systems

COMPETENCY BUILDERS:

9.0.5.1 Diagnose rough-ride problems*
9.0.5.2 Inspect front axles, U-bolts, and nuts and determine needed repairs
9.0.5.3 Inspect and repair king pin, steering knuckle bushings, locks, bearings, seals, and covers
9.0.5.4 Inspect and repair or replace shock absorbers, bushings, brackets, and mounts
9.0.5.5 Inspect and repair leaf springs, center bolts, clips, eye bolts and bushings, shackles, slippers, insulators, brackets, and mounts
9.0.5.6 Inspect and repair torsion bars, bell cranks, ratchets, bushings, bearings, and mounting brackets
9.0.5.7 Inspect torque arms, bushings, and mounts
9.0.5.8 Inspect axle-aligning devices (e.g., radius rods, track bars, stabilizer bars, bushings, mounts, shims, cams)
9.0.5.9 Inspect and repair or replace walking beams, center tubes, bushings, mounts, load pads, and caps*
9.0.5.10 Inspect, test, repair or replace, and adjust air-suspension pressure-regulator and height-control valves, lines, hoses, and fittings*
9.0.5.11 Inspect, test, and replace air bags, springs, mounting plates, suspension arms, and bushings*
9.0.5.12 Measure vehicle riding height and determine needed adjustments or repairs according to manufacturer's specifications*

COMPETENCY 9.0.6: Troubleshoot and repair wheels and tires

COMPETENCY BUILDERS:

9.0.6.1 Explain unusual tire wear patterns
9.0.6.2 Explain wheel/tire vibration, shimmy, pounding, and hop (tramp) problems
9.0.6.3 Inspect and replace wheels, rims, spacers, clamps, studs, and nuts
9.0.6.4 Inspect multipiece rim assembly according to manufacturer's specifications
9.0.6.5 Measure and explain wheel and tire radial and lateral run-out
9.0.6.6 Explain proper tire-to-wheel assembly procedure
9.0.6.7 Inspect tires and check air pressure
9.0.6.8 Perform static balance of wheel/tire assembly
9.0.6.9 Perform dynamic balance of wheel/tire assembly
9.0.6.10 Measure tire diameter and match tires on tandem axles
9.0.6.11 Inspect, repair or replace, and adjust front-wheel speedometer drive assembly

* Advancing
** Futuring
UNIT 10: Chassis

COMPETENCY 10.0.1: Inspect frame

COMPETENCY BUILDERS:

10.0.1.1 Inspect and explain repair of fifth-wheel assembly
10.0.1.2 Inspect frame and frame rails for cracks and loose fasteners
10.0.1.3 Inspect and/or install hangers, brackets, crossmembers, and gussets

COMPETENCY 10.0.2: Examine frame construction theory

COMPETENCY BUILDERS:

10.0.2.1 Explain effects of heat treating of frame rails (e.g., on tensile strength)
10.0.2.2 Demonstrate proper fastening of attachments
10.0.2.3 Demonstrate proper frame repair according to Truck Frame and Axle Repair Association (TARA)*

UNIT 11: Electrical Systems

COMPETENCY 11.0.1: Examine basic concepts of electricity

COMPETENCY BUILDERS:

11.0.1.1 Discuss evolution of electricity
11.0.1.2 Explain magnetism
11.0.1.3 Explain current flow
11.0.1.4 Explain voltage (e.g., electromotive force [EMF])
11.0.1.5 Explain resistance (e.g., watt flow)
11.0.1.6 Explain Ohm's Law
11.0.1.7 Explain wattage
11.0.1.8 Explain conventional and electron theories of electron flow
11.0.1.9 Identify basic electrical symbols

COMPETENCY 11.0.2: Examine basic terms and tools

COMPETENCY BUILDERS:

11.0.2.1 Explain schematics
11.0.2.2 Explain wiring diagrams
11.0.2.3 Read digital and analog meters accurately
11.0.2.4 Explain operations of sol and relays

* Advancing
** Futuring
COMPETENCY 11.0.3: Troubleshoot electrical/electronic systems

COMPETENCY BUILDERS:

11.0.3.1 Check continuity in electrical or electronic circuits
11.0.3.2 Check applied voltages, circuit voltages, and voltage drops in electrical or electronic circuits using a digital volt ohmmeter (DVOM), digital multimeter (DMM), and analog voltmeter
11.0.3.3 Check current flow in electrical or electronic circuits and components using an ammeter
11.0.3.4 Check resistance in electrical or electronic circuits and components using an ohmmeter
11.0.3.5 Find shorts and grounds in electrical or electronic circuits
11.0.3.6 Diagnose key-off battery drain
11.0.3.7 Inspect, test, and replace fusible links, circuit breakers, relays, solenoids, and fuses
11.0.3.8 Identify characteristics of spike suppression diodes or resistors

COMPETENCY 11.0.4: Troubleshoot and repair or replace batteries

COMPETENCY BUILDERS:

11.0.4.1 Perform battery hydrometer test and determine specific gravity of each cell
11.0.4.2 Perform battery capacity test and determine needed repairs
11.0.4.3 Determine battery state-of-charge by measuring terminal post voltage using a DVOM or DMM
11.0.4.4 Inspect, clean, and repair or replace battery
11.0.4.5 Inspect, clean, and repair or replace battery boxes, mounts, and hold-downs
11.0.4.6 Charge battery using slow-charge or fast-charge method
11.0.4.7 Inspect, clean, and repair or replace battery cables and connectors
11.0.4.8 Jump-start vehicle using jumper cables and booster battery or auxiliary power supply according to approved safety procedures and manufacturer's specifications
COMPETENCY 11.0.5: Troubleshoot and repair starting system

COMPETENCY BUILDERS:

11.0.5.1 Perform starter current draw test
11.0.5.2 Perform starter circuit voltage drop tests
11.0.5.3 Inspect, test, and replace components and wires in starter control circuit
11.0.5.4 Remove and replace starter
11.0.5.5 Inspect, test, and replace starter relays and solenoids or switches
11.0.5.6 Diagnose series/parallel (12/24 volt) problems in starting system and determine needed repairs*

COMPETENCY 11.0.6: Troubleshoot and repair charging system

COMPETENCY BUILDERS:

11.0.6.1 Diagnose no-charge, low-charge, or overcharge condition of dash-mounted charge meters and/or indicator lights and determine needed repairs
11.0.6.2 Diagnose no-charge, low-charge, or overcharge condition and determine needed repairs
11.0.6.3 Inspect, adjust, and replace drive belts, pulleys, fans, and mounting brackets of alternator
11.0.6.4 Inspect and replace drive gears and couplings of alternator
11.0.6.5 Perform charging system output test
11.0.6.6 Perform charging circuit voltage drop tests and determine needed repairs
11.0.6.7 Remove and replace alternator
11.0.6.8 Inspect and repair or replace connectors and wires in charging circuit
11.0.6.9 Diagnose 12/24 volt alternator problems in charging system

* Advancing
** Futuring
COMPETENCY 12.0.1: Troubleshoot and repair headlights, parking lights, clearance lights, taillights, cab lights, and dash lights

COMPETENCY BUILDERS:

12.0.1.1 Explain cause of brighter-than-normal, intermittent, dim, or inoperative headlights
12.0.1.2 Test, aim, and replace headlights
12.0.1.3 Test and repair or replace headlight and dimmer switches, wires, connectors, and sockets
12.0.1.4 Inspect, test, and repair or replace switches, bulbs, sockets, connectors, and wires of parking light, clearance light, and taillight circuits
12.0.1.5 Inspect, test, and repair or replace circuit switches, bulbs, sockets, connectors, wires, and printed circuits or control modules of dash lights
12.0.1.6 Inspect, test, and repair or replace circuit switches, bulbs, sockets, connectors, and wires of interior cab light

COMPETENCY 12.0.2: Troubleshoot and repair stoplights, turn signals, hazard lights, and backup lights

COMPETENCY BUILDERS:

12.0.2.1 Inspect, test, repair or replace, and adjust circuit switches, bulbs, sockets, connectors, and wires of stoplight
12.0.2.2 Diagnose failure of one or both turn signals or hazard lights
12.0.2.3 Inspect, test, and repair or replace turn signal and hazard circuit flasher, switches, bulbs, sockets, connectors, and wires
12.0.2.4 Inspect, test, and adjust, repair, or replace backup light and warning device circuit switches, bulbs, sockets, horns, buzzers, connectors, and wires
COMPETENCY 12.0.3: Troubleshoot and repair gauges and warning devices

COMPETENCY BUILDERS:

12.0.3.1 Diagnose gauge problems (i.e., intermittent, high, low, or no readings) and determine needed repairs
12.0.3.2 Test and replace voltage regulators of gauge circuit
12.0.3.3 Inspect, test, and adjust, repair, or replace gauge circuit sending units, gauges, connectors, and wires
12.0.3.4 Inspect, test, and repair or replace warning light circuit sending units, bulbs, sockets, connectors, wires, and printed circuits or control modules
12.0.3.5 Inspect, test, and repair or replace warning buzzer circuit sending units, buzzers, switches, relays, connectors, wires, and printed circuits or control modules
12.0.3.6 Inspect, test, replace, and calibrate electronic speedometer, odometer, and tachometer systems

COMPETENCY 12.0.4: Troubleshoot and repair related electrical components

COMPETENCY BUILDERS:

12.0.4.1 Diagnose horn problems (i.e., constant, intermittent, or no operation)
12.0.4.2 Inspect, test, and repair or replace horn circuit relays, horns, switches, connectors, and wires
12.0.4.3 Diagnose wiper speed control and/or park problems (i.e., constant, intermittent, or no operation)
12.0.4.4 Inspect, test, and repair or replace wiper motor, resistors, park switch, relays, switches, connectors, and wires
12.0.4.5 Inspect and replace wiper motor transmission linkage, arms, and blades
12.0.4.6 Inspect, test, and repair or replace windshield-washer motor or pump/relay assembly, switches, connectors, and wires
12.0.4.7 Inspect, test, and repair or replace mirror, heater circuit grids, motors, relays, switches, connectors, and wires
12.0.4.8 Inspect, test, and repair or replace electrical components of heater and air-conditioning (AC)
12.0.4.9 Inspect, test, and repair or replace cigarette lighter case, integral fuse, connectors, and wires
12.0.4.10 Diagnose side window problems (i.e., slow, intermittent, or no-power operation)

(continued)
Diesel Mechanics--10/91

(continued)

12.0.4.11 Inspect, test, and repair or replace motors, switches, relays, connectors, and wires of power side window circuits
12.0.4.12 Inspect preheaters

UNIT 13: Electronically Operated Control Systems*

COMPETENCY 13.0.1: Test system components*

COMPETENCY BUILDERS:

13.0.1.1 Test system-sensing unit*
13.0.1.2 Test system computer*
13.0.1.3 Test system activators*
13.0.1.4 Test all system connections and wiring*

COMPETENCY 13.0.2: Test electronic fuel system*

COMPETENCY BUILDERS:

13.0.2.1 Test system-sensing unit*
13.0.2.2 Test system activator*

COMPETENCY 13.0.3: Test electronic automatic transmission*

COMPETENCY BUILDERS:

13.0.3.1 Test system computer*
13.0.3.2 Test system-sensing unit*
13.0.3.3 Test system activator*

COMPETENCY 13.0.4: Test electronic emission system*

COMPETENCY BUILDERS:

13.0.4.1 Test system computer*
13.0.4.2 Test system-sensing unit*
13.0.4.3 Test system activator*

COMPETENCY 13.0.5: Test electronic braking system*

COMPETENCY BUILDERS:

13.0.5.1 Test system computer*
13.0.5.2 Test system-sensing unit*
13.0.5.3 Test system activator*

* Advancing
** Futuring
UNIT 14: Heating and Air-Conditioning (AC) Systems

COMPETENCY 14.0.1: Troubleshoot and repair AC system

COMPETENCY BUILDERS:

14.0.1.1 Diagnose unusual operating noises in AC system
14.0.1.2 Identify type of AC system and conduct performance test
14.0.1.3 Diagnose AC system problems indicated by pressure-gauge readings
14.0.1.4 Diagnose AC system problems indicated by visual and touch procedures
14.0.1.5 Leak-test AC system
14.0.1.6 Identify proper and safe procedures for recovering refrigerant from AC system
14.0.1.7 Evacuate AC system
14.0.1.8 Clean AC system components and hoses according to manufacturer's specifications
14.0.1.9 Charge AC system with refrigerant
14.0.1.10 Inspect and correct oil level in AC system

COMPETENCY 14.0.2: Troubleshoot and repair compressor and clutch of refrigeration system

COMPETENCY BUILDERS:

14.0.2.1 Explain AC system problems that cause pressure-protection devices to interrupt system operation
14.0.2.2 Inspect pressure-protection devices of AC system
14.0.2.3 Inspect and adjust drive belts and pulleys of AC compressor
14.0.2.4 Inspect, test, and repair or replace clutch components or assembly of AC compressor
14.0.2.5 Inspect and correct oil level in AC compressor
14.0.2.6 Inspect, test, and repair or replace AC compressor
14.0.2.7 Inspect and repair or replace AC compressor mountings

COMPETENCY 14.0.3: Troubleshoot and repair evaporator, condenser, and related components

COMPETENCY BUILDERS:

14.0.3.1 Inspect and repair or replace mufflers, hoses, lines, filters, fittings, and seals of AC system
14.0.3.2 Inspect AC condenser for airflow restrictions and clean and straighten fins
14.0.3.3 Inspect, test, and replace condenser and mountings of AC system

(continued)
Diesel Mechanics--10/91

(continued)

14.0.3.4 Inspect and replace receiver/drier
14.0.3.5 Inspect and replace accumulator or drier in orifice tube AC system
14.0.3.6 Inspect, test, and replace expansion valve
14.0.3.7 Inspect, test, and replace orifice tube
14.0.3.8 Inspect, test, clean, and replace evaporator
14.0.3.9 Inspect, clean, and repair evaporator housing and water drain
14.0.3.10 Identify, inspect, and replace AC system service valves
14.0.3.11 Inspect and replace high-pressure relief device of AC system

COMPETENCY 14.0.4: Troubleshoot and repair cab heating systems

COMPETENCY BUILDERS:

14.0.4.1 Explain cause of temperature-control problems in heating and ventilation systems
14.0.4.2 Diagnose window-fogging problems
14.0.4.3 Perform cooling system tests
14.0.4.4 Inspect and replace hoses and belts of heater system
14.0.4.5 Inspect, test, and replace radiator, pressure cap, coolant-recovery system, and water pump
14.0.4.6 Inspect, test, and replace thermostat, bypass, and housing
14.0.4.7 Inspect coolant
14.0.4.8 Remove, flush, and refill system with proper coolant
14.0.4.9 Inspect, test, and replace fan, fan clutch, and fan shroud
14.0.4.10 Inspect, test, and replace heater/coolant control valve
14.0.4.11 Inspect, flush, and replace heater core

COMPETENCY 14.0.5: Troubleshoot and repair electrical heating and AC operating systems*

COMPETENCY BUILDERS:

14.0.5.1 Diagnose failures in electrical/electronic control systems of heating, ventilating, and AC systems and determine needed repairs*
14.0.5.2 Inspect, test, and repair or replace AC/heater blower motors, resistors, switches, relay or modules, wiring, and protection devices*
14.0.5.3 Inspect, test, and repair or replace AC compressor clutch, relay or modules, wiring, sensors, switches, diodes, and protection devices*

* Advancing
** Futuring
COMPETENCY 14.0.6: Troubleshoot and repair vacuum/mechanical heating and AC operating systems*

COMPETENCY BUILDERS:

14.0.6.1 Diagnose failures in controls of heating, ventilating, and AC systems*
14.0.6.2 Inspect, test, and repair or replace control panel assemblies of heating, ventilating, and AC systems*
14.0.6.3 Inspect, test, and adjust or replace cables and linkages of heating, ventilating, and AC control systems*
14.0.6.4 Inspect, test, and adjust or replace ducts, doors, hoses, and outlets of heating, ventilating, and AC systems*
14.0.6.5 Diagnose problems in temperature-control system*
14.0.6.6 Diagnose problems in blower system and determine needed repairs*
14.0.6.7 Diagnose problems in air-distribution system and determine needed repairs*
14.0.6.8 Diagnose problems in compressor-clutch control system and determine needed repairs*
14.0.6.9 Inspect, test, and adjust or replace climate-control temperature sensor systems*
14.0.6.10 Inspect, test, and adjust or replace blend-door or power-servo system*
14.0.6.11 Inspect, test, and replace low-coolant temperature-blower control system*
14.0.6.12 Inspect, test, and replace heater valve and controls*
14.0.6.13 Inspect, test, and replace electric and vacuum motors, solenoids, and switches*

UNIT 15: Cab and Trailer Maintenance and Repair

COMPETENCY 15.0.1: Maintain cab

COMPETENCY BUILDERS:

15.0.1.1 Repair doors, hinges, and latches
15.0.1.2 Inspect and repair mirrors
15.0.1.3 Install windshield, back glass, and side glass
15.0.1.4 Repair ventilation system
15.0.1.5 Repair seats and seat belts
15.0.1.6 Test and replace gauges
15.0.1.7 Install safety equipment

* Advancing
** Futuring
COMPETENCY 15.0.2: Maintain trailer

COMPETENCY BUILDERS:

15.0.2.1 Test and repair lights
15.0.2.2 Test and repair trailer brake system
15.0.2.3 Inspect and lube landing gear
15.0.2.4 Identify and inspect coupling devices (e.g., kingpins, pintle hook)
15.0.2.5 Explain Department of Transportation (DOT) trip inspection

UNIT 16: Record Keeping

COMPETENCY 16.0.1: Use computer

COMPETENCY BUILDERS:

16.0.1.1 Demonstrate keyboarding skills
16.0.1.2 Use database
16.0.1.3 Schedule maintenance

COMPETENCY 16.0.2: Maintain records

COMPETENCY BUILDERS:

16.0.2.1 Explain shop documentation
16.0.2.2 Complete warranty contracts
16.0.2.3 File warranty contracts
16.0.2.4 Record maintenance activities

COMPETENCY 16.0.3: Maintain inventory

COMPETENCY BUILDERS:

16.0.3.1 Order supplies
16.0.3.2 Receive and store supplies

* Advancing
** Futuring

34
UNIT 17: Employability Skills

SUBUNIT 17.1: Career Development

COMPETENCY 17.1.1: Investigate career options

COMPETENCY BUILDERS:

17.1.1.1 Determine interests and aptitudes
17.1.1.2 Identify career options
17.1.1.3 Research occupations matching interests and aptitudes
17.1.1.4 Select career(s) that best match(es) interests and aptitudes
17.1.1.5 Identify advantages and disadvantages of career options, including nontraditional careers
17.1.1.6 Assess differences in wages, annual incomes, and job opportunities based on geographic location
17.1.1.7 Develop a career plan

COMPETENCY 17.1.2: Analyze potential barriers to employment

COMPETENCY BUILDERS:

17.1.2.1 Identify common barriers to employment
17.1.2.2 Develop strategies to overcome employment barriers

SUBUNIT 17.2: Decision Making and Problem Solving

COMPETENCY 17.2.1: Apply decision-making techniques in the workplace

COMPETENCY BUILDERS:

17.2.1.1 Identify the decision to be made
17.2.1.2 Compare alternatives
17.2.1.3 Determine consequences of each alternative
17.2.1.4 Make decisions based on values and goals
17.2.1.5 Evaluate the decision made

* Advancing
** Futuring
COMPETENCY 17.2.2: Apply problem-solving techniques in the workplace

COMPETENCY BUILDERS:

17.2.2.1 Diagnose the problem and its causes
17.2.2.2 Identify alternatives and their consequences in relation to the problem
17.2.2.3 Examine multicultural and nonsexist dimensions of problem solving
17.2.2.4 Utilize resources to explore possible solutions to the problem
17.2.2.5 Compare and contrast the advantages and disadvantages of each solution
17.2.2.6 Determine appropriate action
17.2.2.7 Evaluate results

UNIT 17: Employability Skills

SUBUNIT 17.3: Work Ethic

COMPETENCY 17.3.1: Evaluate the relationship of self-esteem to work ethic

COMPETENCY BUILDERS:

17.3.1.1 Identify special characteristics and abilities in self and others
17.3.1.2 Identify internal and external factors that affect self-esteem

COMPETENCY 17.3.2: Analyze the relationship of personal values and goals to work ethic both in and out of the workplace

COMPETENCY BUILDERS:

17.3.2.1 Distinguish between values and goals
17.3.2.2 Determine the importance of values and goals
17.3.2.3 Evaluate how values affect goals
17.3.2.4 Identify short-term and long-term goals
17.3.2.5 Prioritize personal goals
17.3.2.6 Describe how personal values are reflected in work ethic
17.3.2.7 Describe how interactions in the workplace affect personal work ethic
17.3.2.8 Examine how life changes affect personal work ethic

* Advancing
** Futuring
COMPETENCY 17.3.3: Demonstrate work ethic

COMPETENCY BUILDERS:

17.3.3.1 Examine factors that influence work ethic
17.3.3.2 Exhibit characteristics that reflect an appropriate work ethic

UNIT 17: Employability Skills

SUBUNIT 17.4: Job-Seeking Skills

COMPETENCY 17.4.1: Prepare for employment

COMPETENCY BUILDERS:

17.4.1.1 Identify traditional and nontraditional employment sources
17.4.1.2 Utilize employment sources
17.4.1.3 Research job opportunities, including nontraditional careers
17.4.1.4 Interpret equal employment opportunity laws
17.4.1.5 Explain the critical importance of personal appearance, hygiene, and demeanor throughout the employment process
17.4.1.6 Prepare for generic employment tests and those specific to an occupation/organization

COMPETENCY 17.4.2: Design a résumé

COMPETENCY BUILDERS:

17.4.2.1 Identify personal strengths and weaknesses
17.4.2.2 List skills and/or abilities, career objective(s), accomplishments/achievements, educational background, and work experience
17.4.2.3 Demonstrate legible written communication skills using correct grammar, spelling, and concise wording
17.4.2.4 Complete résumé using various formats
17.4.2.5 Secure references
COMPETENCY 17.4.3: Complete and process job application forms

COMPETENCY BUILDERS:

17.4.3.1 Explain the importance of an application form
17.4.3.2 Identify ways to obtain job application forms
17.4.3.3 Describe methods for handling illegal questions on job application forms
17.4.3.4 Demonstrate legible written communications skills using correct grammar, spelling, and concise wording
17.4.3.5 Return application to proper person, request interview, and follow up

COMPETENCY 17.4.4: Demonstrate interviewing skills

COMPETENCY BUILDERS

17.4.4.1 Investigate interview environment and procedures
17.4.4.2 Explain the critical importance of personal appearance, hygiene, and demeanor
17.4.4.3 Demonstrate question and answer techniques
17.4.4.4 Demonstrate methods for handling difficult and/or illegal interview questions

COMPETENCY 17.4.5: Secure employment

COMPETENCY BUILDERS:

17.4.5.1 Identify present and future employment opportunities within an occupation/organization
17.4.5.2 Research the organization/company
17.4.5.3 Use follow-up techniques to enhance employment potential
17.4.5.4 Compare and evaluate job offers
UNIT 17: Employability Skills

SUBUNIT 17.5: Job Retention Skills

COMPETENCY 17.5.1: Analyze the organizational structure of the workplace

COMPETENCY BUILDERS:

17.5.1.1 Identify and evaluate employer expectations regarding job performance, work habits, attitudes, personal appearance, and hygiene
17.5.1.2 Be aware of and obey all company policies and procedures
17.5.1.3 Examine the role/relationship between employee and employer
17.5.1.4 Recognize opportunities for advancement and reasons for termination

COMPETENCY 17.5.2: Maintain positive relations with others

COMPETENCY BUILDERS:

17.5.2.1 Exhibit appropriate work habits and attitude
17.5.2.2 Identify behaviors to establish successful working relationships
17.5.2.3 Cooperate and compromise through teamwork and group participation
17.5.2.4 Identify alternatives for dealing with harassment, bias, and discrimination based on race, color, national origin, sex, religion, handicap, or age

UNIT 17: Employability Skills

SUBUNIT 17.6: Job Advancement

COMPETENCY 17.6.1: Analyze opportunities for personal and career growth

COMPETENCY BUILDERS:

17.6.1.1 Determine opportunities within an occupation/organization
17.6.1.2 Compare and contrast other opportunities
17.6.1.3 List benefits of job advancement
17.6.1.4 Evaluate factors involved when assuming a new position within or outside an occupation/organization

* Advancing
** Futuring
COMPETENCY 17.6.2: Exhibit characteristics needed for advancement

COMPETENCY BUILDERS:

17.6.2.1 Display a positive attitude
17.6.2.2 Demonstrate knowledge of a position
17.6.2.3 Perform quality work
17.6.2.4 Adapt to changing situations and technology
17.6.2.5 Demonstrate capability for different positions
17.6.2.6 Participate in continuing education/training programs
17.6.2.7 Respect, accept, and work with ALL individuals in the workplace

UNIT 17: Employability Skills

SUBUNIT 17.7: Technology in the Workplace

COMPETENCY 17.7.1: Assess the impact of technology in the workplace

COMPETENCY BUILDERS:

17.7.1.1 Cite how past business/industry practices have influenced present business/industry processes
17.7.1.2 Investigate the use of technology in the workplace
17.7.1.3 Analyze how present skills can be applied to learning new technologies

COMPETENCY 17.7.2: Use a variety of technological applications

COMPETENCY BUILDERS:

17.7.2.1 Explore basic mathematical, scientific, computer, and technological principles
17.7.2.2 Use technology to accomplish assigned tasks
17.7.2.3 Create solutions to problems using technical means

* Advancing
** Futuring
UNIT 17: Employability Skills

SUBUNIT 17.8: Lifelong Learning

COMPETENCY 17.8.1: Apply lifelong learning to individual situations

COMPETENCY BUILDERS:

17.8.1.1 Define lifelong learning
17.8.1.2 Identify factors that cause the need for lifelong learning

COMPETENCY 17.8.2: Adapt to change

COMPETENCY BUILDERS:

17.8.2.1 Analyze the effects of change
17.8.2.2 Identify reasons why goals change
17.8.2.3 Describe the importance of flexibility when reevaluating goals
17.8.2.4 Evaluate the need for continuing education/training

UNIT 17: Employability Skills

SUBUNIT 17.9: Economic Education

COMPETENCY 17.9.1: Analyze global enterprise systems

COMPETENCY BUILDERS:

17.9.1.1 Identify characteristics of various enterprise systems
17.9.1.2 Examine the relationship between competition, risk, and profit
17.9.1.3 Illustrate how supply and demand influence price

COMPETENCY 17.9.2: Evaluate personal money management

COMPETENCY BUILDERS:

17.9.2.1 Describe the need for personal management records
17.9.2.2 Identify methods of taxation
17.9.2.3 Analyze how credit affects financial security
17.9.2.4 Compare types and methods of investments
17.9.2.5 Prepare a personal budget
17.9.2.6 Be an informed and responsible consumer
17.9.2.7 Analyze the effects of advertising on the consumer

* Advancing
** Futuring
Diesel Mechanics--10/91

UNIT 17: Employability Skills

SUBUNIT 17.10: Balancing Work and Family

COMPETENCY 17.10.1: Analyze the effects of family on work

COMPETENCY BUILDERS:

17.10.1.1 Recognize how family values, goals, and priorities are reflected in the workplace
17.10.1.2 Identify present and future family structures and responsibilities
17.10.1.3 Describe personal and family roles
17.10.1.4 Analyze concerns of working parent(s)
17.10.1.5 Examine how family responsibilities can conflict with work
17.10.1.6 Resolve family-related conflicts
17.10.1.7 Explain how to use support systems/community resources to help resolve family-related conflicts

COMPETENCY 17.10.2: Analyze the effects of work on family

COMPETENCY BUILDERS:

17.10.2.1 Identify responsibilities associated with paid and nonpaid work
17.10.2.2 Compare the advantages and disadvantages of multiple incomes
17.10.2.3 Examine how work can conflict with family responsibilities
17.10.2.4 Describe how work-related stress can affect families
17.10.2.5 Identify family support systems and resources

UNIT 17: Employability Skills

SUBUNIT 17.11: Citizenship in the Workplace

COMPETENCY 17.11.1: Exercise the rights and responsibilities of citizenship in the workplace

COMPETENCY BUILDERS:

17.11.1.1 Identify the basic rights and responsibilities of citizenship
17.11.1.2 Examine the history and contributions of all racial, ethnic, and cultural groups

* Advancing
** Futuring
COMPETENCY 17.11.2: Cooperate with others in the workplace

COMPETENCY BUILDERS:

17.11.2.1 Identify situations in which compromise is necessary
17.11.2.2 Examine how individuals from various backgrounds contribute to work-related situations
17.11.2.3 Demonstrate initiative to facilitate cooperation
17.11.2.4 Give and receive constructive criticism to enhance cooperation

UNIT 17: Employability Skills

SUBUNIT 17.12: Leadership

COMPETENCY 17.12.1: Evaluate leadership styles appropriate for the workplace

COMPETENCY BUILDERS:

17.12.1.1 Identify characteristics of effective leaders
17.12.1.2 Compare leadership styles
17.12.1.3 Demonstrate effective delegation skills
17.12.1.4 Identify opportunities to lead in the workplace

COMPETENCY 17.12.2: Demonstrate effective teamwork skills

COMPETENCY BUILDERS:

17.12.2.1 Identify the responsibilities of a valuable group member
17.12.2.2 Exhibit open-mindedness
17.12.2.3 Identify methods of involving each member of a team
17.12.2.4 Contribute to the efficiency and success of a group
17.12.2.5 Determine ways to motivate others

COMPETENCY 17.12.3: Utilize effective communication skills

COMPETENCY BUILDERS:

17.12.3.1 Demonstrate the importance of listening
17.12.3.2 Demonstrate assertive communication
17.12.3.3 Recognize the importance of verbal and nonverbal cues and messages
17.12.3.4 Analyze written material
17.12.3.5 Prepare written material
17.12.3.6 Give and receive feedback
17.12.3.7 Articulate thoughts
17.12.3.8 Use appropriate language

* Advancing
** Futuring

43
UNIT 17: Employability Skills

SUBUNIT 17.13: Entrepreneurship

COMPETENCY 17.13.1: Evaluate the role of small business in the economy

COMPETENCY BUILDERS:

17.13.1.1 Identify the benefits of small business to a community
17.13.1.2 Analyze opportunities for small business in a community

COMPETENCY 17.13.2: Examine considerations of starting a business

COMPETENCY BUILDERS:

17.13.2.1 Research a business idea
17.13.2.2 Compare various ways to become a small business owner
17.13.2.3 Investigate factors to consider in financing a new business
17.13.2.4 Evaluate entrepreneurship as a career option

* Advancing
** Futuring