







Multiple Category Scope and Sequence: Scope and Sequence Report For Course Standards and Objectives, Content, Skills, Vocabulary

Wednesday, August 20, 2014, 2:01PM



District	Unit	Course Standards and Objectives	Content	Skills	Vocabulary
Basic <u>Introduction to Automotive - Sem (47.0604)* (District)</u> 2014-2015 <u>Nielsen, Chris</u>	<u>Safety</u>  (Week 1, 3 Weeks) 	UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Introduction to Automotive STANDARD 47060401 Students will be able to understand general shop safety. <ul style="list-style-type: none"> ▪ 470604-0101 Learn safe working habits and procedures. Pass a safety test with 100 percent. ▪ 470604-0102 Comply with safety rules for working with automotive chemicals. ▪ 470604-0103 Identify the gasses encountered in the automotive field and the hazards they present. ▪ 470604-0104 Identify the hazards and control of asbestos dust. STANDARD 47060402 Students will be able to understand basic hand tools, fasteners, and shop equipment.	<u>General Safety</u> <ul style="list-style-type: none"> ▪ Personal Protective Equipment (PPE) ▪ Ventilation/hazardous materials ▪ Workplace safety/shop procedures <u>Tools Usage and Safety</u> <ul style="list-style-type: none"> ▪ Lifting and jacking ▪ Hand tools ▪ Power tools ▪ Machine operation 	<u>General Safety</u> <ul style="list-style-type: none"> ▪ Demonstrate consistent use of personal protective equipment ▪ Locate Safety Data Sheets (SDS) for specific chemicals ▪ Assess and appropriately respond to automobile dangers <u>Tools Usage and Safety</u> <ul style="list-style-type: none"> ▪ Lift a vehicle safely using a floor jack and a hoist ▪ Demonstrate the proper use of tools 	<ul style="list-style-type: none"> ▪ Amperage ▪ Bench Grinder ▪ Carbon Monoxide ▪ Carburetor ▪ Chocks ▪ Clockwise ▪ Combustible ▪ Counter clockwise ▪ Creeper ▪ Floor Jack ▪ Freon ▪ Hydraulic ▪ Jack stand/safety stand ▪ Lathe ▪ Ohms ▪ Radiator ▪ Solvent ▪ Spark plug wire ▪ Spontaneous combustion ▪ Stabilize ▪ Twin post lift ▪ Voltage

- 470604-0205 Properly raise and support vehicles. using jack stands and a frame contact hoist.

Tools/Measuring 
(Week 4, 2 Weeks) 

UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Introduction to Automotive
STANDARD 47060402 Students will be able to understand basic hand tools, fasteners, and shop equipment.

- 470604-0201 Identify and measure metric and standard fasteners.
- 470604-0202 Correctly identify and use basic hand tools.
- 470604-0203 Identify and demonstrate use of basic measuring tools (accurate to 1/32 or 1mm).
- 470604-0204 Use reference manuals or information systems to find service procedures and specifications.
- 470604-0205 Properly raise and support vehicles. using jack stands and a frame contact

Hand Tools

- Fastening tools (i.e. wrenches, sockets, screw driver, etc.)
- Cutting tools (i.e. saws, grinders, files, tin snips, etc.)
- Measuring tools (i.e. tape measure, micrometer, rulers, etc.)
- Testing tools (i.e. test light, multi meter, scan tool, etc.)

Fastener

- Bolts
- Nuts
- Screws
- Other

Power Tools

- Air tools
- Electric tools (i.e.

Shop Equipment

- Floor jacks
- Battery chargers

Electronic Data Retrieval Systems (EDRS)

Alldata

- Identifix
- Youtube
- Pioneer Library

Hand Tools

- Identify and use basic hand tools correctly
- Identify and demonstrate the use of basic measuring tools (accurate to 1/32 or 1 mm)

Fastener

- Measure and specify appropriate replacements for bolts, nuts and screws

Power Tools

- Understand when power tools are appropriate
- Identify and use power tools correctly

Shop Equipment

- Raise and support vehicles using jack stands and a frame contact hoist properly

Electronic Data Retrieval Systems (EDRS)

- Use reference manuals or information systems to find procedures and specifications

- pitch
- metric
- standard (SAE)
- minor diameter
- major diameter
- ratchet
- speed wrench
- socket
- impact
- torque wrench
- extensions
- channel locks
- vice grips
- micrometer

hoist.

Maintenance  (Week 6, 2 Weeks) 

UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Introduction to Automotive
STANDARD 47060403
Students will be able to understand proper techniques in removal and installation of tires and wheels.

- 470604-0303
Properly rotate tires and reinstall using proper torque procedures.

STANDARD 47060404
Students will be able to identify and perform basic services on a vehicle.

- 470604-0402
Based on the manufacture's specifications, check and adjust all vehicle fluid levels.
- 470604-0403
Change engine oil and filter on a vehicle. Use proper disposal methods for waste oil.
- 470604-0407
Check brakes.
- 470604-0408
Check lights.

- Understand importance of maintaining a car
- Savings in doing own maintenance

- Perform a complete oil, filter and lubrication check
- Check and adjust all serviceable fluids
- Perform a tire rotation, visually inspect brakes, reinstall and torque wheels

- Multi-viscosity
- Modified X
- Additive
- Dip sticks
- Drain plus
- Grease zerk
- DOT (Department of Transportation) 3, 4, 5

Tires  (Week 8, 2 Weeks) 

UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Introduction to

Sidewall Identification

- Tire identification/markings

Sidewall Identification

- Identify traction, temperature

- Aspect ratio
- Diameter
- Static and dynamic

Automotive
STANDARD 47060403
Students will be able to understand proper techniques in removal and installation of tires and wheels.

- 470604-0301
Inspect tires for abnormal wear.
- 470604-0302
Remove a tire from a wheel.
- 470604-0304
Use a tire balancer to balance tires of a vehicle using proper procedures.
- 470604-0305
Locate a leak. Identify proper repair procedure.
- 470604-0306
Interpret tire sidewall markings: size, inflation, and load.

- Aspect ratio
- Traction/tread wear/temperature
- Tire construction

Tire Wear

- Effects of inflation
- Alignment
- Mechanical
- Balance

Tire Repair

- Mount and dismount
- Patching and plugging

Tire Maintenance

- Rotation
- Balance

- and tread wear
- Differentiate sizing and loading information

Tire Wear

- Identify the effects of tire inflation, wheel alignment, and tire balance

Tire Repair

- Mount and dismount a tire from a wheel
- Locate a leak and identify proper repair procedures

Tire Maintenance

- Rotate and balance tires per Rubber Manufacturers Association (RMA)
- Use proper torque procedures

- balance
- RMA
- Torque
- Wheel/rim
- Rim offset
- Bead
- Sidewall
- Tread section
- Radial/Bias
- Tire
- Steel Belted
- Lug Nuts
- Lug centric
- Hub centric
- DOT date code

Brakes  (Week 10, 2 Weeks) 

UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Introduction to Automotive
STANDARD 47060404
Students will be able to identify and perform basic services on a vehicle.

- 470604-0401
Locate and identify basic automotive parts.
- 470604-0407

Brake Replacement Sequence – What Students Need To Know

Diagnose - pedal feel, noises

- Smooth, quiet, good solid pressure

Test parking brake operation

- What parking brake does
- How to operate

Types of brake fluid

- Where to find the type of brake fluid for the car (owner's manual)

- Read a dial indicator and a micrometer
- Measure and evaluate brake linings
- Identify the brake components
- Flush and refill brake fluid system
- Bleed a system
- Machine rotors and drums on a lathe
- Service brake systems properly

- Master cylinder
- Brake booster
- Park brake
- Caliper
- Equalizer
- Duo-servo
- Rotor
- Drum
- Wheel cylinder
- Brake pad
- Brake shoe (primary and secondary)
- Leading/trailing
- Anti-lock brake systems (ABS)

Check brakes.
UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, ASE Brakes
V. BRAKES
B. Hydraulic System Diagnosis and Repair

- 1. Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law). P-1
- 9. Select, handle, store, and fill brake fluids to proper level. P-1
- 12. Bleed and/or flush brake system. P-1

- Location of master cylinder
- Removal of cap
- How to read (minimum/maximum)
- Brief reference to safety
- Park brake off
- How to remove (hit in correct place)
- Dust
- How to back off drum brakes
- Hoses
- How to identify visual cracks
- How to visually inspect pads
- How to identify minimum/maximum measurements
- How to read data
- How to determine if new brakes are needed
- Check fluid level in master cylinder
- Remove all wheels
- Remove brake drums

Visually inspect - damage, leaks, wear

- Hoses
- How to identify visual cracks
- How to visually inspect pads

Check measurements - drums, rotors, linings

- How to identify minimum/maximum measurements

Analyze data

- How to read data
- How to determine if new brakes are needed

Front brake inspection and repair

- How to properly remove brake caliper
- How to properly measure brake pads with a depth gauge
- How to properly measure a rotor using a micrometer
- How to determine if rotor is warped and beyond minimum thickness

- Traction control

Engines

Weeks) >

(Week 12, 2

UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Introduction to Automotive
STANDARD 47060404
Students will be able to identify and perform basic services on a vehicle.

- 470604-0401 Locate and identify basic automotive parts.
- 470604-0406 Understand the four stroke cycle.

- How to look up specs using all data

Otto Four-Stroke Cycle

- Difference between cycles and strokes
- Internal versus external combustion
- Intake compression power exhaust
- Valve positions

Factors that Impact Compression

- Heat
- Camshafts
- Speed
- Throttle
- Engine wear
- Lubrication

Basic Engine Parts

- Describe the four-stroke cycle
- Label the engine parts

- Piston
- Camshaft
- Crankshaft
- Connecting rod
- Journals
- Bearings
- Valve
- Valve springs
- Lobes
- Reciprocating
- Cylinder
- Cylinder head
- Engine block
- Bore
- Stroke
- Throw
- Lifters
- Push rods
- Piston rings (compression and oil)
- Wrist pin
- Oil pump
- Timing chain
- Cam gear
- Crank gear

Steering/Suspension

(Week 14, 2 Weeks) >

UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Introduction to Automotive
STANDARD 47060404
Students will be able to identify and perform basic services on a vehicle.

- 470604-0401 Locate and identify basic automotive parts.
- 470604-0405 Check shocks or struts.

- Difference between a steering part and a suspension part
- Difference between springs
- Why a car has springs
- Function of a strut
- Function of a shock
- Basics of alignment angles (caster, camber, toe)
- Rack and pinion versus steering boxes (gear, recirculating ball)

- Check shocks and struts for leaking and operation
- Identify and label suspension and steering parts

- Torsion spring (bar)
- Spring oscillation
- Strut
- Dampening
- Tie rod ends
- Ball joints
- Control arms
- Idler arm
- Pitman arm
- Rack and pinion
- Coil springs
- Leaf springs
- Air springs
- Shackle
- Sway bar
- Sway bar link
- Camber
- Caster

Power Train

16, 2 Weeks)



UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Introduction to Automotive STANDARD 47060404 Students will be able to identify and perform basic services on a vehicle.

- 470604-0401 Locate and identify basic automotive parts.

- Safety - Proper use of shop lifts and jack stands
- Why a car has a transmission
- Why the engine needs to be uncoupled at stops
- Why a car needs different gear ratios and what determines the ratio
- How the power is sent to the tires

- Identify if a vehicle is front wheel drive, rear wheel drive, four wheel drive or all wheel drive
- Identify drive train parts (manual transmission, automatic transmission, drivelines, drive axles)
- Inspect power train parts for damage or wear

- Toe
- Transmission
- Transaxle
- Manual
- Automatic
- Torque converter
- Universal joint
- Constant velocity joint (CV)
- Clutch (pressure plate, disc, throwout bearing, pilot bearing)
- Clutch fork
- Fly wheel
- Flex plate
- Clutch linkage (Slave cylinder, cables, bell crank)

Electrical

3 Weeks)



UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Introduction to Automotive STANDARD 47060402 Students will be able to understand basic hand tools, fasteners, and shop equipment.

- 470604-0203 Identify and demonstrate use of basic measuring tools (accurate to 1/32 or 1mm).

STANDARD 47060404 Students will be able to identify and perform basic services on a vehicle.

- 470604-0401 Locate and

- Ohms law
- Where electrical power comes from on a car
- Basic circuits
- AC versus DC voltage
- Proportional voltage drops

- Identify and test the battery
- Use basic functions on a multi-meter
- Identify and test an alternator
- Identify and test a starter motor

- Volt
- Amperage (Amp)
- Ohm
- Multi-meter
- Alternator
- Resistance
- Starter motor
- AC
- DC
- Battery
- Conductor
- Ignition system
- Spark plug/spark plug wire

identify basic
automotive
parts.

- 470604-0404
With a
voltmeter,
check battery
voltage with the
engine running
and with the
engine off.

