

Automotive Basics

At-A-Glance - Lamar CISD

Professional Standards/Employability Skills/Technical Skills			
Ongoing Skills Imbedded All Year	NATEF Shop and Personal Safety 1. The student will identify general shop safety rules and procedures. 2. The student will utilize safe procedures for handling of tools and equipment. 5. The student will utilize proper ventilation procedures for working within the lab/shop area. 6. The student will identify marked safety areas. 7. The student will 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. 9. The student will identify the location of the posted evacuation routes. 10. The student will comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities. 11. The student will identify and wear appropriate clothing for lab/shop activities. 12. The student will secure hair and jewelry for lab/shop activities. 13. The student will demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits. 14. The student will demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.).		
	Grading Period	Unit Name	Estimated Time Frame
Grading Period 1 28 Days	Career Exploration and Entrepreneurship	8 Days	1.B, 1.D, 1.E, 1.H, 2.B, NATEF
	AB 1(B) The student will identify career and employment opportunities, including entrepreneurship opportunities internships, and industry-recognized certification requirements for the field of automotive technology. AB 1(D) The student will apply competencies related to resources, information, interpersonal skills, problem solving, critical thinking, and systems of operation in the automotive technology industry. AB 1(E) The student will discuss certification opportunities. AB 1(H) The student will develop personal goals, objectives, and strategies as part of a plan for future career and educational opportunities. AB 2(B) The student will demonstrate proper etiquette and behavior. NATEF Workplace Employability Skills Personal Standards 1. The student will report to work daily on time; able to take directions and motivated to accomplish the task at hand. 2. The student will dress appropriately and uses language and manners suitable for the workplace. 3. The student will maintain appropriate personal hygiene. 4. The student will meet and maintain employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc. 5. The student will demonstrate honesty, integrity and reliability.		
	Health and Safety	15 Days	1.A, 1.C, 1.F, 1.G, 2.D, 2.F, 3.A, NATEF
AB 1(A) The student will demonstrate knowledge of the technical knowledge and skills related to health and safety in the workplace such as safety glasses, other personal protective equipment (PPE), and safety data sheets (SDS). AB 1(C) The student will demonstrate the principles of group participation, team concept, and leadership related to citizenship and career preparation. AB 1(F) The student will discuss response plans to emergency situations. AB 1(G) The student will identify employers' expectations and appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills. AB 2(D) The student will demonstrate effective written and oral communication skills and employ effective listening skills. AB 2(F) The student will demonstrate effective demonstrate effective speaking skills through prepared and extemporaneous oral presentations. AB 3(A) The student will demonstrate effective oral communication skills with individuals from various cultures such as fellow students, coworkers, and customers. NATEF Shop and Personal Safety 1. The student will identify general shop safety rules and procedures. 2. The student will utilize safe procedures for handling of tools and equipment. 3. The student will identify and use proper placement of floor jacks and jack stands. 4. The student will identify and use proper procedures for safe lift operation. 5. The student will utilize proper ventilation procedures for working within the lab/shop area. 6. The student will identify marked safety areas. 7. The student will 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. 8. The student will identify the location and use of eye wash stations. 9. The student will identify the location of the posted evacuation routes. 10. The student will comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities. 11. The student will identify and wear appropriate clothing for lab/shop activities. 12. The student will secure hair and jewelry for lab/shop activities. 13. The student will demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits. 14. The student will demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.). 15. The student will locate and demonstrate knowledge of material safety data sheets (MSDS).			

	Mathematics in Automotive Technology – Vehicle Maintenance & Service Areas and Tire Sidewall Data	5 Days	3.A, 3.C, 4.A, 4.B, 4.C, NATEF
Grading Period 2 25 Days	<p>AB 3(A) The student will demonstrate effective oral communication skills with individuals from various cultures such as fellow students, coworkers, and customers.</p> <p>AB 3(C) The student will demonstrate mathematical skills in performing addition, subtraction, multiplication, division, and measurements using decimals and fractions in the metric and U.S. standard systems as appropriate.</p> <p>AB 4(A) The student will describe the eight major vehicle systems.</p> <p>AB 4(B) The student will locate, read, and interpret vehicle maintenance and service information.</p> <p>AB 4(C) The student will describe the basic and emerging vehicle power systems.</p> <p>NATEF Work Habits and Work Ethics</p> <ol style="list-style-type: none"> 1. The student will comply with workplace policies/laws. 2. The student will contribute to the success of the team, assists others and requests help when needed. 3. The student will work well with all customers and coworkers. 4. The student will negotiate solutions to interpersonal and workplace conflicts. 5. The student will contribute ideas and initiative. 6. The student will follow directions. 7. The student will communicate (written and verbal) effectively with customers and coworkers. 8. The student will read and interpret workplace documents; writes clearly and concisely. 9. The student will analyze and resolve problems that arise in completing assigned tasks. 10. The student will organize and implement a productive plan of work. 11. The student will use scientific, technical, engineering and mathematics principles and reasoning to accomplish assigned tasks. 12. The student will identify and address the needs of all customers, providing helpful, courteous and knowledgeable service and advice as needed. 		
	Mathematics in Automotive Technology – Continue	15 Days	3.A, 3.C, 4.A, 4.B, 4.C, NATEF
	<p>AB 3(A) The student will demonstrate effective oral communication skills with individuals from various cultures such as fellow students, coworkers, and customers.</p> <p>AB 3(C) The student will demonstrate mathematical skills in performing addition, subtraction, multiplication, division, and measurements using decimals and fractions in the metric and U.S. standard systems as appropriate.</p> <p>AB 4(A) The student will describe the eight major vehicle systems.</p> <p>AB 4(B) The student will locate, read, and interpret vehicle maintenance and service information.</p> <p>AB 4(C) The student will describe the basic and emerging vehicle power systems.</p> <p>NATEF Work Habits and Work Ethics</p> <ol style="list-style-type: none"> 1. The student will comply with workplace policies/laws. 2. The student will contribute to the success of the team, assists others and requests help when needed. 3. The student will work well with all customers and coworkers. 4. The student will negotiate solutions to interpersonal and workplace conflicts. 5. The student will contribute ideas and initiative. 6. The student will follow directions. 7. The student will communicate (written and verbal) effectively with customers and coworkers. 8. The student will read and interpret workplace documents; writes clearly and concisely. 9. The student will analyze and resolve problems that arise in completing assigned tasks. 10. The student will organize and implement a productive plan of work. 11. The student will use scientific, technical, engineering and mathematics principles and reasoning to accomplish assigned tasks. 12. The student will identify and address the needs of all customers, providing helpful, courteous and knowledgeable service and advice as needed. 		
Tools, Equipment and Materials	10 Days	5.A, 5.B, 5.C, 5.D, NATEF	
<p>AB 5(A) The student will demonstrate the proper way to safely use hand and power tools and equipment commonly employed in the maintenance and repair of vehicles.</p> <p>AB 5(B) The student will discuss the proper handling and disposal of environmentally hazardous materials used in servicing vehicles.</p> <p>AB 5(C) The student will identify diagnostic tools and equipment.</p> <p>AB 5(D) The student will identify hand and shop tools and describe their proper usage.</p> <p>NATEF Tools and Equipment</p> <ol style="list-style-type: none"> 1. The student will identify tools and their usage in automotive applications. 2. The student will identify standard and metric designation. 3. The student will demonstrate safe handling and use of appropriate tools. 4. The student will demonstrate proper cleaning, storage, and maintenance of tools and equipment. 5. The student will demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper). 			

Grading Period 3 25 Days	Tools, Equipment and Materials continue	10 Days	5.A, 5.B, 5.C, 5.D, NATEF
	<p>AB 5(A) The student will demonstrate the proper way to safely use hand and power tools and equipment commonly employed in the maintenance and repair of vehicles.</p> <p>AB 5(B) The student will discuss the proper handling and disposal of environmentally hazardous materials used in servicing vehicles.</p> <p>AB 5(C) The student will identify diagnostic tools and equipment.</p> <p>AB 5(D) The student will identify hand and shop tools and describe their proper usage.</p> <p>NATEF Tools and Equipment</p> <ol style="list-style-type: none"> The student will identify tools and their usage in automotive applications. The student will identify standard and metric designation. The student will demonstrate safe handling and use of appropriate tools. The student will demonstrate proper cleaning, storage, and maintenance of tools and equipment. The student will demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper). 		
	Engine, Heating and Cooling - Internal Combustion Engines, Chassis & Power Train NATEF I. Engine Repair A. General	11 Days	6.B, 6.F, 6.G, NATEF I.A
	<p>AB 6(B) The student will demonstrate an understanding of the operation theory of internal combustion engines.</p> <p>AB 6(F) The student will identify air-conditioning, heating, and accessory system components.</p> <p>AB 6(G) The student will inspect and identify chassis and power train components and systems.</p> <p>NATEF I. Engine Repair A. General</p> <p>NATEF I. Engine Repair A. General 1. The student will research vehicle service information, including fluid type, vehicle service history, service precautions, and technical service bulletins.</p> <p>NATEF I. Engine Repair A. General 2. The student will verify operation of the instrument panel engine warning indicators.</p> <p>NATEF I. Engine Repair A. General 3. The student will inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.</p> <p>NATEF I. Engine Repair A. General 4. The student will install engine covers using gaskets, seals, and sealers as required.</p> <p>NATEF I. Engine Repair A. General 5. The student will verify engine mechanical timing.</p> <p>NATEF I. Engine Repair A. General 6. The student will perform common fastener and thread repair, to include: remove broken bolt restore internal and external threads, and repair internal threads with thread insert.</p> <p>NATEF I. Engine Repair A. General 7. The student will identify service precautions related to service of the internal combustion engine of a hybrid vehicle.</p>		
	Semester Review and Exam	4 Days	
Grading Period 4 33 Days	Engine, Heating and Cooling continue	9 Days	6.B, 6.F, 6.G, NATEF I.A
	<p>AB 6(B) The student will demonstrate an understanding of the operation theory of internal combustion engines.</p> <p>AB 6(F) The student will identify air-conditioning, heating, and accessory system components.</p> <p>AB 6(G) The student will inspect and identify chassis and power train components and systems.</p> <p>NATEF I. Engine Repair A. General</p> <p>NATEF I. Engine Repair A. General 1. The student will research vehicle service information, including fluid type, vehicle service history, service precautions, and technical service bulletins.</p> <p>NATEF I. Engine Repair A. General 2. The student will verify operation of the instrument panel engine warning indicators.</p> <p>NATEF I. Engine Repair A. General 3. The student will inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.</p> <p>NATEF I. Engine Repair A. General 4. The student will install engine covers using gaskets, seals, and sealers as required.</p> <p>NATEF I. Engine Repair A. General 5. The student will verify engine mechanical timing.</p> <p>NATEF I. Engine Repair A. General 6. The student will perform common fastener and thread repair, to include: remove broken bolt restore internal and external threads, and repair internal threads with thread insert.</p> <p>NATEF I. Engine Repair A. General 7. The student will identify service precautions related to service of the internal combustion engine of a hybrid vehicle.</p>		
	Brake System – ABS & Hydraulic	15 Days	6.C, 6.D, NATEF V.A, V.B
	<p>AB 6(C) The student will identify brake system components, including drum, disc, power assist, and anti-lock braking system (ABS).</p> <p>AB 6(D) The student will demonstrate an understanding of basic concepts related to hydraulic brakes systems, including Pascal's Theory of Hydraulics.</p>		

	<p>NATEF V. Brakes A. General NATEF V. Brakes A. General 1. The student will research vehicle service information including fluid type, vehicle service history, service precautions, and technical service bulletins. NATEF V. Brakes A. General 2. The student will describe procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS). NATEF V. Brakes A. General 3. The student will install wheel and torque lug nuts. NATEF V. Brakes A. General 4. The student will identify brake system components and configuration.</p> <p>NATEF V. Brakes B. Hydraulic System NATEF V. Brakes B. Hydraulic System 1. The student will describe proper brake pedal height, travel, and feel. NATEF V. Brakes B. Hydraulic System 2. The student will check master cylinder for external leaks and proper operation. NATEF V. Brakes B. Hydraulic System 3. The student will inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging, wear, and loose fittings/supports. NATEF V. Brakes B. Hydraulic System 4. The student will select, handle, store, and fill brake fluids to proper level; use proper fluid type per manufacturer specification. NATEF V. Brakes B. Hydraulic System 5. The student will identify components of hydraulic brake warning light system. NATEF V. Brakes B. Hydraulic System 6. The student will bleed and/or flush brake system. NATEF V. Brakes B. Hydraulic System 7. The student will test brake fluid for contamination.</p>		
	<p>Preventative Maintenance – Cooling & Lubrication, Steering & Suspension</p>	<p>9 Days</p>	<p>3.C, 6.H, 6.I, 6.J, 6.K, 6.L, 6.N, NATEF I.B</p>
	<p>AB 3(C) The student will demonstrate mathematical skills in performing addition, subtraction, multiplication, division, and measurements using decimals and fractions in the metric and U.S. standard systems as appropriate. AB 6(H) The student will identify cooling and lubrication system components. AB 6(I) The student will identify steering and suspension components, including power steering. AB 6(J) The student will identify and interpret tire sidewall data information such as Department of Transportation (DOT) production date information, tire load capacity, inflation pressures, sizing description, and speed rating. AB 6(K) The student will compare the preventative maintenance schedules for a variety of vehicles based on their use. AB 6(L) The student will perform a preventative maintenance inspection. AB 6(N) The student will perform regular audits and inspections to maintain compliance with safety, health, and environmental regulations.</p> <p>NATEF I. Engine Repair B. Cylinder Head and Valve Train NATEF I. Engine Repair B. Cylinder Head and Valve Train 1. The student will adjust valves (mechanical or hydraulic lifters). NATEF I. Engine Repair B. Cylinder Head and Valve Train 2. The student will identify components of the cylinder head and valve train.</p>		
<p>Grading Period 5 34 Days</p>	<p>Preventative Maintenance continue</p>	<p>12 Days</p>	<p>3.C, 6.H, 6.I, 6.J, 6.K, 6.L, 6.N, NATEF I.B</p>
	<p>AB 3(C) The student will demonstrate mathematical skills in performing addition, subtraction, multiplication, division, and measurements using decimals and fractions in the metric and U.S. standard systems as appropriate. AB 6(H) The student will identify cooling and lubrication system components. AB 6(I) The student will identify steering and suspension components, including power steering. AB 6(J) The student will identify and interpret tire sidewall data information such as Department of Transportation (DOT) production date information, tire load capacity, inflation pressures, sizing description, and speed rating. AB 6(K) The student will compare the preventative maintenance schedules for a variety of vehicles based on their use. AB 6(L) The student will perform a preventative maintenance inspection. AB 6(N) The student will perform regular audits and inspections to maintain compliance with safety, health, and environmental regulations.</p> <p>NATEF I. Engine Repair B. Cylinder Head and Valve Train NATEF I. Engine Repair B. Cylinder Head and Valve Train 1. The student will adjust valves (mechanical or hydraulic lifters). NATEF I. Engine Repair B. Cylinder Head and Valve Train 2. The student will identify components of the cylinder head and valve train.</p>		
	<p>Electronics and Electrical Systems</p>	<p>20 Days</p>	<p>3.C, 6.E, 6.M, NATEF VI.A</p>
	<p>AB 3(C) The student will demonstrate mathematical skills in performing addition, subtraction, multiplication, division, and measurements using decimals and fractions in the metric and U.S. standard systems as appropriate. AB 6(E) The student will demonstrate an understanding of basic concepts related to electrical and electronic systems such as Ohm's law, voltage drop, resistance, amperage, voltage, and wiring diagram symbols. AB 6(M) The student will explain and perform a "jump-start" of a vehicle using jumper cables and a booster battery or an auxiliary power supply according to manufacturer recommended procedures</p>		

	<p>NATEF VI. Electrical/Electronic A. General NATEF VI. Electrical/Electronic A. General 1. The student will research vehicle service information including vehicle service history, service precautions, and technical service bulletins. NATEF VI. Electrical/Electronic A. General 2. The student will demonstrate knowledge of electrical/electronic series, parallel, and series parallel circuits using principles of electricity (Ohm's Law). NATEF VI. Electrical/Electronic A. General 3. The student will use wiring diagrams to trace electrical/electronic circuits. NATEF VI. Electrical/Electronic A. General 4. The student will demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow, and resistance. NATEF VI. Electrical/Electronic A. General 5. The student will demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits. NATEF VI. Electrical/Electronic A. General 6. The student will use a test light to check operation of electrical circuits. NATEF VI. Electrical/Electronic A. General 7. The student will use fused jumper wires to check operation of electrical circuits. NATEF VI. Electrical/Electronic A. General 8. The student will measure key-off battery drain (parasitic draw). NATEF VI. Electrical/Electronic A. General 9. The student will inspect and test fusible links, circuit breakers, and fuses; determine necessary action. NATEF VI. Electrical/Electronic A. General 10. The student will repair and/or replace connectors, terminal ends, and wiring of electrical/electronic systems (including solder repair). NATEF VI. Electrical/Electronic A. General 11. The student will identify electrical/electronic system components and configuration.</p>		
	<p>Parts and Paperwork – Ordering & Locating Parts, Technical Writing</p>	<p>2 Days</p>	<p>2.E, 3.A, 3.B, 3.C, 6.A, NATEF</p>
	<p>AB 2(E) The student will demonstrate advanced technical writing and preparation skills. AB 3(A) The student will demonstrate effective oral communication skills with individuals from various cultures such as fellow students, coworkers, and customers. AB 3(B) The student will demonstrate effective written communication skills, including documenting on a repair order the customer concern/complaint, root cause of the failure, and corrective action to complete the repair. AB 3(C) The student will demonstrate mathematical skills in performing addition, subtraction, multiplication, division, and measurements using decimals and fractions in the metric and U.S. standard systems as appropriate. AB 6(A) The student will demonstrate the procedures for ordering and locating parts. NATEF Preparing Vehicle for Service 1. The student will identify information needed and the service requested on a repair order. 2. The student will identify purpose and demonstrate proper use of fender covers, mats. 3. The student will demonstrate use of the three C's (concern, cause, and correction). 4. The student will review vehicle service history. 5. The student will complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. NATEF Preparing Vehicle for Customer 1. The student will ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).</p>		
<p>Grading Period 6 28 Days</p>	<p>Parts and Paperwork – Ordering & Locating Parts, Technical Writing</p>	<p>14 Days</p>	<p>2.E, 3.A, 3.B, 3.C, 6.A, NATEF</p>
	<p>AB 2(E) The student will demonstrate advanced technical writing and preparation skills. AB 3(A) The student will demonstrate effective oral communication skills with individuals from various cultures such as fellow students, coworkers, and customers. AB 3(B) The student will demonstrate effective written communication skills, including documenting on a repair order the customer concern/complaint, root cause of the failure, and corrective action to complete the repair. AB 3(C) The student will demonstrate mathematical skills in performing addition, subtraction, multiplication, division, and measurements using decimals and fractions in the metric and U.S. standard systems as appropriate. AB 6(A) The student will demonstrate the procedures for ordering and locating parts. NATEF Preparing Vehicle for Service 1. The student will identify information needed and the service requested on a repair order. 2. The student will identify purpose and demonstrate proper use of fender covers, mats. 3. The student will demonstrate use of the three C's (concern, cause, and correction). 4. The student will review vehicle service history. 5. The student will complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. NATEF Preparing Vehicle for Customer 1. The student will ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).</p>		
	<p>Automotive Career Activities – Certification Testing and/or Career Project</p>	<p>12 Days</p>	<p>1.C, 1.G, 2.A, 2.B, 2.C, 2.D, 2.F, 3.A, NATEF</p>
	<p>AB 1(C) The student will demonstrate the principles of group participation, team concept, and leadership related to citizenship and career preparation. AB 1(G) The student will identify employers' expectations and appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills. AB 2(A) The student will describe, demonstrate, and apply ethical and legal responsibilities for appropriate workplace conduct. AB 2(B) The student will demonstrate proper etiquette and behavior.</p>		

	<p>AB 2(D) The student will demonstrate effective written and oral communication skills and employ effective listening skills. AB 2(F) The student will demonstrate effective speaking skills through prepared and extemporaneous oral presentations. AB 3(A) The student will demonstrate effective oral communication skills with individuals from various cultures such as fellow students, coworkers, and customers.</p> <p>NATEF Workplace Employability Skills Personal Standards</p> <ol style="list-style-type: none"> 1. The student will report to work daily on time; able to take directions and motivated to accomplish the task at hand. 2. The student will dress appropriately and uses language and manners suitable for the workplace. 3. The student will maintain appropriate personal hygiene. 4. The student will meet and maintain employment eligibility criteria, such as drug/alcohol-free status, clean driving record, etc. 5. The student will demonstrate honesty, integrity and reliability. 		
	<p>Exam Review and Test</p>	<p>2 Days</p>	