

# AUTO IA & IB

***Curriculum Standard One:* The student will understand the health hazards of toxic chemicals, safety practices, and environmental hazards related to his/her work in the shop. The student will operate and use equipment in the shop safely and efficiently.**

<b>Performance Objective</b>	<b>Critical Attributes</b>	<b>Benchmarks/Assessment</b>
<p>1. The student will demonstrate proper general automotive shop safety while practicing proper handling of toxic chemicals.</p>	<p>A. Can the student identify which chemicals are hazardous and the risks of each?</p> <p>B. Can the student use the correct tools for each job and handle the tools correctly?</p> <p>C. Can the student identify situations that require using protective gear (e.g., eye protection, face shields)?</p>	<ul style="list-style-type: none"> <li>• When handling toxic chemicals, the student will follow the recommended methods of handling and disposal.</li>   <li>• The student will demonstrate safe techniques while working with tools.</li>   <li>• The student will wear the appropriate protective equipment.</li> <li>• The student will pass the safety test with a grade of 100%.</li> </ul>

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**Curriculum Standard Two:** The student will understand how specific tools are used to perform maintenance and repair operations. The student will select and use the correct tools and pieces of equipment for diagnostic and repair procedures in the shop.

Performance Objective	Critical Attributes	Benchmarks/Assessment
1. The student will select and use the proper power tools and equipment for specific jobs.	A. Does the student know how to select or find out which is the proper power tool or equipment?	<ul style="list-style-type: none"><li>• Through written tests and practicums, the student will be assessed for proper usage of power tools and equipment while working on a car.</li><li>• The student will pass all equipment tests with an 85% or higher grade.</li></ul>

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<p><b>Curriculum Standard Three:</b> The student will understand the measurement scales and systems used in transportation and energy operations. The student will follow industry-approved standards when using the measuring tools and measurement systems required in diagnostic and adjustment procedures.</p>		
Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will demonstrate the proper use of various measurement tools.</p>	<p>A. Can the student identify the following measurement tools?</p> <ul style="list-style-type: none"> <li>➤ Steel, conventional, metric, and pocket rules</li> <li>➤ Tape measure</li> <li>➤ Calipers and dividers</li> <li>➤ Micrometers</li> <li>➤ Feeler gauges</li> <li>➤ Torque wrenches</li> <li>➤ Pressure gauge</li> <li>➤ Vacuum gauge</li> <li>➤ Temperature gauge</li> </ul>	<ul style="list-style-type: none"> <li>• The student will use the appropriate measurement tools while working in the auto shop.</li> <li>• The student will demonstrate how to read appropriate measurement tools.</li> <li>• The student will complete a measurement tools identification test with 80% or higher accuracy.</li> </ul>

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**Curriculum Standard Four:** The student will understand the functions of the basic components of carburetors and injection-type fuel systems.

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will be able to describe and identify the basic parts of a carburetor.</p> <p>2. The student will compare design differences and explain the fundamental carburetor systems.</p>	<p>A. Can the student identify and describe the function of the following parts?</p> <ul style="list-style-type: none"> <li>➤ Carburetor Body</li> <li>➤ Air Horns</li> <li>➤ Throttle Valve</li> <li>➤ Venturi</li> <li>➤ Main Discharge Tube</li> <li>➤ Fuel Bowl</li> </ul> <p>A. Can the student explain how each of the following systems operates?</p> <ul style="list-style-type: none"> <li>➤ Float System</li> <li>➤ Idle System</li> <li>➤ Off-Idle System</li> <li>➤ Acceleration System</li> <li>➤ High Speed System</li> <li>➤ Full Power System</li> <li>➤ Choke System</li> </ul>	<ul style="list-style-type: none"> <li>• The student will accurately draw and label a simple carburetor cutaway and show how fuel and air mix.</li> <li>• The student will demonstrate proper carburetor rebuilding techniques.</li> <li>• The student will pass a test with an 80% or higher grade.</li> <li>• The student will describe and demonstrate dual injection theory.</li> <li>• The student will demonstrate fuel pressure and volume testing.</li> </ul>

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Carburetor and Injection-Type Fuel Systems

9-12

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>3. The student will explain special carburetor devices.</p>	<p>A. Can the student explain the functions of the following parts?</p> <ul style="list-style-type: none"> <li>➤ Fast Idle Cam</li> <li>➤ Fast Idle Solenoid</li> <li>➤ Throttle Return</li> <li>➤ Dashpot</li> <li>➤ Hot Idle compensator</li> <li>➤ Altitude Compensator</li> <li>➤ Carburetor vacuum Connections</li> </ul>	<ul style="list-style-type: none"> <li>• The student will pass a written test and oral explanation with a grade of at least 80%.</li> <li>• The student will demonstrate how the sensors work in conjunction with the ECU computer.</li> <li>• The student will be able to pull codes and identify the problem circuit.</li> </ul>
<p>4. The student will describe the operation of computer-controlled carburetors.</p>	<p>A. Can the student explain the differences between a computer-controlled and non computer-controlled carburetor?</p>	

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**Industrial Technology**

**Automotive Tune-Up**

**9-12**

***Curriculum Standard Five: The student will understand the need for automotive engine tune-up. The student will diagnose malfunctions, replace and adjust components, and service systems related to basic vehicle tune-up.***

<b>Performance Objective</b>	<b>Critical Attributes</b>	<b>Benchmarks/Assessment</b>
<p>1. The student will be able to describe and identify different ignition systems and basic electricity.</p>	<p>A. Can the student articulate the purpose and function of the primary and secondary circuits of the ignition circuits of the ignition systems?</p> <p>B. Can the student articulate basic electricity and circuits?</p>	<ul style="list-style-type: none"> <li>• The student will be able to identify the two different ignition circuits within the ignition systems through written tests with 90% accuracy.</li> <li>• The student will perform minor repairs with 80% accuracy</li> <li>• The student will demonstrate, through usage, how to read voltmeters.</li>   <li>• The student will demonstrate a working knowledge of basic wiring schematic with testing equipment and written tests.</li> <li>• The student will articulate and demonstrate ignition firing through lab work.</li> <li>• The student will demonstrate proper engine timing procedures.</li> </ul>

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***Curriculum Standard Six:* The student will understand the design purposes and functions of automotive electrical and ignition systems and explain their interrelated operations. The student will demonstrate and explain the basic industry-required service procedures for each automotive electrical system.**

<b>Performance Objective</b>	<b>Critical Attributes</b>	<b>Benchmarks/Assessment</b>
<p>1. The student will demonstrate knowledge and understanding of the automotive electrical systems.</p>	<p>A. Can the student identify the different components in the starting, charging, and ignition systems?</p> <p>B. Can the student use the proper tools for basic diagnosis and repair?</p> <p>C. Can the student understand voltage and amperage applications?</p> <p>D. Can the student use a continuity tester?</p> <p>E. Can the student perform a voltage drop test?</p> <p>F. Can the student check power and ground circuits?</p>	<ul style="list-style-type: none"> <li>• The student will correctly identify the different components in the electrical system.</li> <li>• The student will demonstrate proper tool use in a diagnostics and repair.</li> <li>• The student will be tested on basic electron theory and ohms law.</li> <li>• The student will demonstrate industry accepted test procedures.</li> </ul>

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<b>Curriculum Standard Seven: The student will understand the functions and inter-relationships of gasoline engine parts and components.</b>		
<b>Performance Objective</b>	<b>Critical Attributes</b>	<b>Benchmarks/Assessment</b>
<p>1. The student will learn the four- and two-stroke engine theory and application.</p>	<p>A. Can the student identify engine parts and their functions?</p> <p>B. Can the student describe engine function?</p> <p>C. Can the student identify basic engine problems?</p>	<ul style="list-style-type: none"> <li>• The student will be tested on identification of engine parts and their function through written tests and will give an oral presentation on the four-stroke theory.</li> <li>• The student will identify basic engine problems through written tests and use of testing equipment, through application.</li> </ul>



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<b>Curriculum Standard Eight: The student will understand the operation of point-ignition systems and solid-state ignition systems.</b>		
<b>Performance Objective</b>	<b>Critical Attributes</b>	<b>Benchmarks/Assessment</b>
<p>1. The student will be able to describe and identify different ignition systems and basic electricity.</p>	<p>A. Can the student articulate the purpose and function of the primary and secondary circuits of the ignition circuits?</p> <p>B. Can the student articulate basic electricity and circuits?</p>	<ul style="list-style-type: none"> <li>• The student will identify the two different ignition circuits.</li> <li>• The student will perform basic diagnoses and perform minor repairs.</li>   <li>• The student will read volt meters accurately.</li> <li>• The student will explain a basic wire schematic.</li> </ul>

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**Curriculum Standard Nine:** The student will understand the construction and classification of tires and wheels and the physical forces that affect their functions. The student will identify wear and failure characteristics on tires and describe industry-recommended service and repair procedures.

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will develop a working knowledge of tires and wheels.</p>	<p>A. Can the student identify tire structure, size, and type?</p> <p>B. Can the student identify proper inflation of tires?</p> <p>C. Can the student remove, replace, balance, and rotate tires?</p> <p>D. Can the student identify straightness offset and serviceability of wheels?</p> <p>E. Can the student identify a misaligned car?</p>	<ul style="list-style-type: none"> <li>• The student will demonstrate understanding of tire specifications through written tests and oral presentations.</li> <li>• The student will identify properly inflated tires with 80% accuracy through written and practical testing.</li> <li>• The student will remove, replace, balance, and rotate tires using proper equipment with 90% accuracy.</li> <li>• Using actual wheels, the student will demonstrate knowledge of offset, run out and serviceability of wheels.</li> <li>• The student will align a car based on tire wear.</li> </ul>

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**Curriculum Standard Ten:** The student will know the basic parts of the drivetrain and understand their functions. The student will identify and describe the failures and malfunctions that can occur in the drivetrain system.

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will be able to identify basic drivetrains and their function.</p>	<p>A. Can the student identify different problems arising from the drivetrain?</p> <p>B. Can the student describe the differences between front and rear wheel drive vehicles?</p> <p>C. Can the student describe final drive function?</p> <p>D. Does the student understand driveshaft construction and application?</p> <p>E. Does the student understand proper drivetrain lubrication?</p>	<ul style="list-style-type: none"> <li>• The student will identify driveline components.</li> <li>• The student will be tested on driveline problems and repair procedures.</li> <li>• The student will articulate differences between front and rear wheel drive automobiles.</li> <li>• The student will describe final drive function and inspection techniques.</li> <li>• The student will be tested on proper drivetrain lubrication with an 80% or higher grade.</li> <li>• The student will demonstrate "U" and "CV" function and repair.</li> </ul>

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**Curriculum Standard Eleven:** The student will understand the basic and antilock braking-system components, parts, and functions. The student will understand the physical principles used in the operation of mechanical and hydraulic brakes. The student will explain brake-system deterioration, wear, and failure and the service procedures required by those conditions.

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will have a working knowledge of the modern automotive brake system.</p>	<p>A. Can the student identify brake hydraulic circuits?</p> <p>B. Can the student identify brake friction devices?</p> <p>C. Can the student diagnose brake problems and articulate correct repair procedures?</p> <p>D. Can the student replace brake parts?</p> <p>E. Can the student read rotor and drum micrometers?</p>	<ul style="list-style-type: none"> <li>• The student will identify and describe the function of the entire brake system.</li>   <li>• The student will be tested on brake problems and will have to articulate and demonstrate correct diagnosis and repair procedures.</li>   <li>• The student will demonstrate brake (R &amp; R) removal and replacement of brake system.</li>   <li>• The student will demonstrate correct use of and reading rotor and drum micrometers.</li> </ul>

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**Industrial Technology**

**Brakes**

**9-12**

<b>Performance Objective</b>	<b>Critical Attributes</b>	<b>Benchmarks/Assessment</b>
	<p>F. Can the student use the rotor and drum lathe correctly?</p> <p>G. Can the student bleed the brake hydraulic system using the manufacturer's procedures?</p>	<ul style="list-style-type: none"><li>• The student will demonstrate correct and safe use of the brake lathe.</li><li>• The student will demonstrate correct brake hydraulic system bleeding procedures.</li></ul>

# AUTO IA & IB

**Curriculum Standard Twelve:** The student will understand the operations of steering and suspension systems. The student will understand the geometrical principles applied to steering and suspension systems. The student will identify the basic parts of the steering and suspension system and explain their operation.

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will demonstrate his/her knowledge of steering and suspension systems.</p>	<p>A. Can the student identify steering and suspension components?</p> <p>B. Can the student explain the operation of components in the steering and suspension system?</p> <p>C. Can the student articulate and demonstrate the geometrical principles of the steering and suspension system?</p> <p>D. Can the student demonstrate correct diagnoses of tire wear?</p> <p>E. Can the student diagnose and correct a vehicle that pulls to one side?</p>	<ul style="list-style-type: none"> <li>• The student will identify all components of the steering and suspension system.</li> <li>• The student will articulate the operation of components in the steering and suspension systems both front and rear.</li> <li>• The student will demonstrate his/her knowledge of the geometrical principles through written and demonstration exams, with a passing score of 80% or higher.</li> <li>• The student will articulate and pass written exams on tire wear problems.</li> <li>• The student will diagnose and correct a vehicle that pulls to one side.</li> </ul>

# **AUTO IA & IB**

**Industrial Technology**

**Steering and Suspension**

**9-12**

<b>Performance Objective</b>	<b>Critical Attributes</b>	<b>Benchmarks/Assessment</b>
	F. Can the student diagnose loose suspension and steering parts?	<ul style="list-style-type: none"><li>• The student will identify loose, worn-out steering and suspension parts and replace per manufacturer's procedures.</li><li>• The student will accurately read a ball joint micrometer.</li></ul>

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**Curriculum Standard Thirteen:** The student will know the basic principles of the air conditioning refrigeration cycle and the basic components of the system. The student will demonstrate and explain basic air conditioning service procedures, including the recycling of CFC's.

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will demonstrate basic knowledge of the refrigerating system on modern automotive applications.</p>	<p>A. Can the student identify the A/C components?</p> <p>B. Can the student articulate the functions on the refrigerant in the A/C system?</p> <p>C. Can the student properly and safely hook up a gauge set?</p> <p>D. Can the student read the gauge set and diagnose problems in either the high or low side of the A/C system?</p> <p>E. Can the student operate an A/C recycler?</p> <p>F. Does the student understand the difference between R-12 and 134A refrigerants?</p>	<ul style="list-style-type: none"> <li>• The student will identify the components in the A/C system.</li> <li>• The student will pass the test about the function of the refrigeration system and how the refrigerant changes states (i.e., liquid to vapor).</li> <li>• The student will safely hook up gauge sets and test the A/C system.</li> <li>• The student will pass the test explaining why CFC's or R-12 is hazardous to our environment.</li> <li>• The student will diagnose A/C systems using gauge set readings and repair as required.</li> <li>• The student will be tested on the differences between R-12 and 134A refrigerants.</li> </ul>



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# **AUTO IA & IB**

**Industrial Technology**

**Automotive Air Conditioning**

**9-12**

<b>Performance Objective</b>	<b>Critical Attributes</b>	<b>Benchmarks/Assessment</b>
	<p>G. Can the student articulate the purpose of blend doors under the dash and the operation of the heater core?</p>	<ul style="list-style-type: none"><li>• The student will describe the function of blend doors and their relationship to heater operation.</li></ul>

# AUTO IA & IB

**Curriculum Standard Fourteen:** The student will understand the environmental impact of the automobile and on-board vehicle systems designed to deal each area of concern. The student will use HC/CO/CO<sup>2</sup> diagnostic equipment to explain and test the functions of vehicle emission-control systems.

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will demonstrate knowledge of emission controls on automobiles and their impact on the environment and engine performance.</p>	<p>A. Can the student identify the major components of emission control systems?</p> <p>B. Can the student articulate the reasons for a particular emission control system?</p> <p>C. Can the student describe the function of the combustion chamber and the tail pipe?</p> <p>D. Can the student identify problems and the effect of a non-functioning emission control system?</p> <p>E. Can the student use a 5-gas analyzer to diagnose basic tail pipe emissions?</p>	<ul style="list-style-type: none"> <li>• The student will identify the major emission components.</li> <li>• The student will describe the function of major automotive emission components.</li> <li>• The student will articulate what happens in the combustion chamber and the results at the tail pipe.</li> <li>• The student will demonstrate knowledge of a 5-gas analyzer and industry diagnostic procedures.</li> </ul>

# **AUTO IA & IB**

**Industrial Technology**

**Emission Controls**

**9-12**

<b>Performance Objective</b>	<b>Critical Attributes</b>	<b>Benchmarks/Assessment</b>
	F. Can the student retrieve codes and identify any problem circuit?	<ul style="list-style-type: none"><li>• The student will demonstrate code knowledge retrieval and diagnostic worksheet, problem solving.</li><li>• The student will pass written and demonstration test with 80% or higher grades.</li></ul>