Automotive Technology 3

AUTOMOTIVE 3

SAYREVILLE WAR MEMORIAL

5 CREDITS
FULL YEAR

TABLE OF CONTENTS:

STATEMENT OF PURPOSE:

Automotive Technology 3 is designed to develop students as independent, critical thinkers. Students will develop skills, including safe laboratory practice, measurement, math, and practical application of knowledge about self-propelled vehicles and machines. Students will apply their understanding of automobile parts, tools, and systems to model real world situations. Students will engage in hands on experimentation and identify and research areas of technological and environmental concern. Students will learn how to apply appropriate critical thinking skills to identify proper techniques and principles in making responsible decisions. The coursework is designed for the development of student-centered and inquiry-based lessons. Students in automobile technology 3 gain hands-on experience with working on various part and systems of an automobile. In general, they learn how to install, maintain, repair and replace automotive parts.

SUMMARY OF THE COURSE:

Automotive Technology 3 encompasses the quantitative and qualitative study of automobile ,their parts, systems, and computations. Students will connect these topics and recognize that everything we do has an impact on the performance of the automobile. The course provides the skills, concepts, and knowledge necessary to answer extended thinking questions. Multiple strategies, technologies, and resources are utilized to transmit and transform information. Various methods are utilized to assess student knowledge and understanding of the material. Students will develop critical thinking skills through a combination of authentic laboratory experiences, problem solving, data collection, and strategic thinking. Students will learn how to utilize technology to analyze and present data. The course is aligned to the New Jersey Core Curriculum Content Standards. All learning styles are addressed through instructional methods and assessments.

In order to demonstrate a cohesive and complete implementation plan the following general suggestions are provided:

- The use of various formative assessments are encouraged in order to provide an ongoing method of determining the current level of understanding the students have of the material presented.
- Homework, when assigned should be relevant and reflective of the current teaching taking place in the classroom.
- Organizational strategies should be in place that allow the students the ability to take the information gained in the classroom and put in in terms that are relevant to them.
- Instruction should be differentiated to allow students the best opportunity to learn.
- Assessments should be varied and assess topics of instruction delivered in class.
- Modifications to the curriculum should be included that address students with Individualized Educational Plans (IEP), English Language Learners (ELL), and those requiring other modifications (504 plans)

Unit 10- Automotive Safety

Content Area: **Science**
Course(s): **Auto Tech. 3**
Time Period: **1st Marking Period**
Length: **4 weeks**
Status: **Not Published**

Summary of the Unit

●Students will receive an overview of Safety related to the Automotive shop and Lab operations.

●They will learn the importance of Safety and how to use best practices when performing automotive operations.

Enduring Understandings

● Practicing good Safety habits is imperative to a successful Automotive Career

● Safety in the workplace is an essential life skill

Essential Questions

● Why is Safety important when working in the shop/lab?

● How have Safety practices in the shop changed to better protect workers

● How have Government agencies such as OSHA made shop environments safer?

● What PPE is essential in auto shop?

Summative Assessment and/or Summative Criteria

● Class participation

● Homework, reading assignments and preliminary exercises

● Written tests and quizzes

● Performance tests

● Instructor assigned and student initiated projects

● Cooperative activities

● Skills application

Resources

- Alliance of Automobile Manufacturers. www.autoalliance.org.
- "Aqueous Parts Cleaning." Best Environmental Practices for Auto Repair, November 1999.Environmental Protection Agency.
- Automotive Lift Institute. www.autolift.org
- Automotive Encyclopedia, 2006 Edition.
- "Battery Safety." National Ag Safety Database (NASD). www.cdc.gov/nasd.

- Chrysler. www.chrysler.com.
- Dodge. www.dodge.com.
- Duffy, James E. Modern Automotive Technology. Tinley Park, IL: The Goodheart-Willcox Company, Inc., 2000.
- "Floor Cleanup." Best Environmental Practices for Auto Repair, November 1999. Environmental Protection Agency.
- Ford Motor Company. www.ford.com.
- General Motors. www.gm.com.
- National Automotive Technicians Education Foundation (NATEF). www.natef.org.
- National Institute for Automotive Service Excellence (ASE). www.asecert.org.
- Occupational Outlook Handbook, 2006–07 Edition. United States Department of Labor. Bureau of Labor Statistics. www.bls.gov/oco.
- Screw Drive Systems. Sizes.com. www.sizes.com.
- Sunkin, Ed. "Trends and Traits of Today's Technicians: The 2001 Professional Automotive Technicians Survey." Underhood Service, March 2001.
- Tobolt, William K, Larry Johnson, and W. Scott Gauthier. Automotive Encyclopedia. Tinley Park, IL: The Goodheart-Willcox Company, Inc., 2000.
- United States Department of Labor, Occupational Safety and Health Administration. www.osha.gov.
- United States Environmental Protection Agency. www.epa.gov.

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments	Standards
Shop chemical safety 5-7 Days	● Students will be able to use shop chemicals safely	● Demonstrate proper use of chemicals in the shop. ● Dispense chemicals and store them properly. ● Discuss and/or demonstrate the importance of safety in all workplaces	● Class participation ● Homework, reading assignments and preliminary exercises ● Written tests and quizzes ● Performance tests ● Instructor assigned and student initiated projects ● Cooperative activities ● Skills application	8.2.12.B.CS4 8.2.12 8.2.12.A 8.2.12.B 8.2.12.A.CS1 8.2.12.B.3 8.2.12.B.CS2 8.2.12.B.1 8.2.12.C.CS2 8.2.12.B.CS1 8.2.12.A.CS2 8.1.12.A.1
Proper use of safety equipment 5-7 Days	● Students will apply proper usage of all shop safety equipment	● Demonstrate proper use of safety equipment in the shop. ● Discuss and/or demonstrate the importance of safety in all workplaces	● Class participation ● Homework, reading assignments and preliminary exercises ● Written tests and quizzes ● Performance tests ● Instructor assigned and student initiated projects ● Cooperative activities ● Skills application	8.2.12.B.CS4 8.2.12 8.2.12.A 8.2.12.B 8.2.12.A.CS1 8.2.12.B.3 8.2.12.B.CS2 8.2.12.B.1 8.2.12.C.CS2 8.2.12.B.CS1 8.2.12.A.CS2 8.1.12.A.1

Auto shop safety 5-7 Days	● Develop a working knowledge of auto shop safety.	● Discuss and/or demonstrate the importance of safety in all workplaces Have students prepare posters and/ or bulletin boards that reflect safety. ● Relate safe workplace practices to productivity and income. ● Recognize personal qualities that are needed to obtain and retain a job related to safe working practices	● Class participation ● Homework, reading assignments and preliminary exercises ● Written tests and quizzes ● Performance tests ● Instructor assigned and student initiated projects ● Cooperative activities ● Skills application	8.2.12.B.CS4 8.2.12 8.2.12.A 8.2.12.B 8.2.12.A.CS1 8.2.12.B.3 8.2.12.B.CS2 8.2.12.B.1 8.2.12.C.CS2 8.2.12.B.CS1 8.2.12.A.CS2 8.1.12.A.1

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.2	Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.
TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
TECH.8.1.12.A.5	Create a report from a relational database consisting of at least two tables and describe the process, and explain the report results.
TECH.8.1.12.B	Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
TECH.8.1.12.E.1	Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.
TECH.8.1.12.E.2	Research and evaluate the impact on society of the unethical use of digital tools and present your research to peers.
TECH.8.1.12.F	Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
TECH.8.1.12.F.1	Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.
TECH.8.1.12.F.CS2	Plan and manage activities to develop a solution or complete a project.

TECH.8.1.12.F.CS3	Collect and analyze data to identify solutions and/or make informed decisions.
TECH.8.1.12.F.CS4	Use multiple processes and diverse perspectives to explore alternative solutions.

Suggested Modifications for Special Education, ELL and Gifted Students

Students with individual learning styles can be assisted through:

Adjustments in assessments standards

One-to-one teacher support

Additional project time

Use of visual and auditory teaching methods

A wide variety of assessments and strategies complement the individual learning expereince.

Suggested Technological Innovations/Use

TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
TECH.8.1.12.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.12.D.1	Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.
TECH.8.1.12.D.3	Compare and contrast policies on filtering and censorship both locally and globally.
TECH.8.1.12.D.5	Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address personal, social, lifelong learning, and career needs.
TECH.8.1.12.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.12.D.CS2	Demonstrate personal responsibility for lifelong learning.
TECH.8.1.12.D.CS3	Exhibit leadership for digital citizenship.
TECH.8.1.12.E.CS1	Plan strategies to guide inquiry.
TECH.8.1.12.E.CS2	Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.

Cross Curricular/21st Century Connections

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP1.1	Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP3.1	Career-ready individuals understand the relationship between personal health, workplace performance and personal well-being; they act on that understanding to regularly practice healthy diet, exercise and mental health activities. Career-ready individuals also take regular action to contribute to their personal financial well-being, understanding that personal financial security provides the peace of mind required to contribute more fully to their own career success.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP10.1	Career-ready individuals take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.

Unit 20 Manual Transmission

Content Area: **Science**
Course(s): **Auto Tech. 3**
Time Period: **1st Marking Period**
Length: **7 weeks**
Status: **Not Published**

Summary of the Unit

● Students will be to explain the function of a transmission in an automotive vehicle.

● Students will be able to use basic terms related to manual transmission fundamentals

● Students will be able to trace the power flow through each "gear" of three-speed and four-speed manual transmissions

● Students will be able to explain how the three basic elements of planetary gearset work together to provide gear reduction or direct gear.

Enduring Understandings

● Students will know the purpose and functions of a transmission in automotive vehicle

● Students will be able to identify and use the proper terms related to manual transmission fundamentals

● Students will be able to identify components of manual transmissions in automotive vehicles.

Essential Questions

● What are the three major units in a planetary gearset?

● When a manual transmission is shifted into reverse, what extra gear is interposed to reverse the direction of the output shaft?

● What is the function of a blocker ring synchronizer?

Summative Assessment and/or Summative Criteria

● Class participation

● Homework, reading assignments and preliminary exercises

● Written tests and quizzes

● Performance tests

● Instructor assigned and student initiated projects

● Cooperative activities

● Skills application

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments	Standards
Basic Manual Transmission Terminology 5 Days	Students will be able to use correctly proper terminology to identify manual transmission components	Students will review terms used in manual transmissions	• Class participation • Homework, reading assignments and preliminary exercises • Written tests and quizzes • Performance tests • Instructor assigned and student initiated projects • Cooperative activities • Skills application	8.2.12.B.CS4 8.2.12 8.2.12.A 8.2.12.B 8.2.12.A.CS1 8.2.12.B.3 8.2.12.B.CS2 8.2.12.B.1 8.2.12.C.CS2 8.2.12.B.CS1 8.2.12.A.CS2 8.1.12.A.1
Basic Transmission Parts 8 Days	Students will be able to identify and apply the purpose of all basic transmission parts	Identification of the internal manual transmission of an automotive vehicle.	• Class participation • Homework, reading assignments and preliminary exercises • Written tests and quizzes • Performance tests • Instructor assigned and student initiated projects • Cooperative activities • Skills application	8.2.12.B.CS4 8.2.12 8.2.12.A 8.2.12.B 8.2.12.A.CS1 8.2.12.B.3 8.2.12.B.CS2 8.2.12.B.1 8.2.12.C.CS2 8.2.12.B.CS1 8.2.12.A.CS2 8.1.12.A.1
Function of Manual Transmission 7 Days	Students will be able to indicate the function of the manual transmission	Students will review the different function of the manual transmission	• Class participation • Homework, reading assignments and preliminary exercises • Written tests and	8.2.12.B.CS4 8.2.12 8.2.12.A 8.2.12.B 8.2.12.A.CS1 8.2.12.B.3 8.2.12.B.CS2 8.2.12.B.1 8.2.12.C.CS2 8.2.12.B.CS1

			quizzes • Performance tests • Instructor assigned and student initiated projects • Cooperative activities • Skills application	8.2.12.A.CS2 8.1.12.A.1

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
TECH.8.1.12.A.5	Create a report from a relational database consisting of at least two tables and describe the process, and explain the report results.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.B	Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
TECH.8.1.12.C.1	Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
TECH.8.1.12.C.CS1	Interact, collaborate, and publish with peers, experts, or others by employing a variety of digital environments and media.
TECH.8.1.12.C.CS2	Communicate information and ideas to multiple audiences using a variety of media and formats.
TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.
TECH.8.1.12.D	Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.

Resources

- Alliance of Automobile Manufacturers. www.autoalliance.org.
- "Aqueous Parts Cleaning." Best Environmental Practices for Auto Repair, November 1999.Environmental Protection Agency.
- Automotive Lift Institute. www.autolift.org

- Automotive Encyclopedia, 2006 Edition.
- "Battery Safety." National Ag Safety Database (NASD). www.cdc.gov/nasd.
- Chrysler. www.chrysler.com.
- Dodge. www.dodge.com.
- Duffy, James E. Modern Automotive Technology. Tinley Park, IL: The Goodheart-Willcox Company, Inc., 2000.
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- National Institute for Automotive Service Excellence (ASE). www.asecert.org.
- Occupational Outlook Handbook, 2006–07 Edition. United States Department of Labor. Bureau of Labor Statistics. www.bls.gov/oco.
- Screw Drive Systems. Sizes.com. www.sizes.com.
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- Tobolt, William K, Larry Johnson, and W. Scott Gauthier. Automotive Encyclopedia. Tinley Park, IL: The Goodheart-Willcox Company, Inc., 2000.
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Suggested Modifications for Special Education, ELL and Gifted Students

Students with individual learning styles can be assisted through:

Adjustments in assessments standards

One-to-one teacher support

Additional project time

Use of visual and auditory teaching methods

A wide variety of assessments and strategies complement the individual learning experience.

Suggested Technological Innovations/Use

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.

TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
TECH.8.1.12.A.5	Create a report from a relational database consisting of at least two tables and describe the process, and explain the report results.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.12.C.1	Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
TECH.8.1.12.C.CS1	Interact, collaborate, and publish with peers, experts, or others by employing a variety of digital environments and media.
TECH.8.1.12.C.CS2	Communicate information and ideas to multiple audiences using a variety of media and formats.
TECH.8.1.12.C.CS3	Develop cultural understanding and global awareness by engaging with learners of other cultures.
TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.

Cross Curricular/21st Century Connections

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP1.1	Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP3.1	Career-ready individuals understand the relationship between personal health, workplace performance and personal well-being; they act on that understanding to regularly practice healthy diet, exercise and mental health activities. Career-ready individuals also take regular action to contribute to their personal financial well-being, understanding that personal financial security provides the peace of mind required to contribute more fully to their own career success.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and

	others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP9.1	Career-ready individuals consistently act in ways that align personal and community-held ideals and principles while employing strategies to positively influence others in the workplace. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the directions and actions of a team or organization, and they apply insights into human behavior to change others' action, attitudes and/or beliefs. They recognize the near-term and long-term effects that management's actions and attitudes can have on productivity, morals and organizational culture.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP10.1	Career-ready individuals take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.

Unit 30 Rear Differential

Content Area: **Science**
Course(s): **Auto Tech. 3**
Time Period: **2nd Marking Period**
Length: **4 weeks**
Status: **Not Published**

Summary of the Unit

- Students will review, and be able to state the principles of operation of the differential
- Students will review and be able to explain the types and functions of various constant velocity joints
- Students will be able to review and discuss the the need for universal joints in a driveline
- Students will be able to trace the transfer of power in the drive train of a rear-wheel drive vehicle

Enduring Understandings

- Students will know the purpose of the operation of the differential
- Students will be able to identify components of various velocity joints
- Students will understand how all components of a vehicle interact

Essential Questions

- What is the main purpose of the driving axles on front-wheel drive cars?
- How do you trace the transfer of power in the drive train of a rear-wheel drive vehicle?
- What are the types and functions of various constant velocity joints?
- What purpose do the components of the differentials serve?

Summative Assessment and/or Summative Criteria

- Class participation
- Homework, reading assignments and preliminary exercises
- Written tests and quizzes
- Performance tests
- Instructor assigned and student initiated projects
- Cooperative activities
- Skills application

Resources

- Alliance of Automobile Manufacturers. www.autoalliance.org.
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- United States Department of Labor, Occupational Safety and Health Administration. www.osha.gov.
- United States Environmental Protection Agency. www.epa.gov.

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments	Standards
Purpose of engine parts 25 Days	● Students will be able to indicate the purpose of all basic engine parts	● Students will review the different types of engine parts and how it relates to vehicle efficiency ● Students will review engine emissions,(harmful and non harmful) and how they are produced Students will review vehicle devices that control emissions	● Class participation ● Homework, reading assignments and preliminary exercises ● Written tests and quizzes ● Performance tests ● Instructor assigned and student initiated projects ● Cooperative activities ● Skills application	8.2.12.B.CS4 8.2.12 8.2.12.A 8.2.12.B 8.2.12.A.CS1 8.2.12.B.3 8.2.12.B.CS2 8.2.12.B.1 8.2.12.C.CS2 8.2.12.B.CS1 8.2.12.A.CS2 8.1.12.A.1
Interaction vehicle Components	● Students will be able to apply	● Students will investigate the different vehicle	● Class participation ● Homework, reading assignments and	8.2.12.B.CS4 8.2.12 8.2.12.A

25 Days	how all components of a vehicle interact	components and how each interacts with the vehicle. ● differentiate engine types and how it relates to vehicle efficiency Students will review engine emissions,(harmful and non harmful) and how they are produced Students will review vehicle devices that control emissions	preliminary exercises ● Written tests and quizzes ● Performance tests ● Instructor assigned and student initiated projects ● Cooperative activities ● Skills application	8.2.12.B 8.2.12.A.CS1 8.2.12.B.3 8.2.12.B.CS2 8.2.12.B.1 8.2.12.C.CS2 8.2.12.B.CS1 8.2.12.A.CS2 8.1.12.A.1
Vehicle components terminology 10 Days	● Students will indicate proper terminology to identify vehicle components	●Students will review terms used in engine performance	● Class participation ● Homework, reading assignments and preliminary exercises ● Written tests and quizzes ● Performance tests ● Instructor assigned and student initiated projects ● Cooperative activities ● Skills application	8.2.12.B.CS4 8.2.12 8.2.12.A 8.2.12.B 8.2.12.A.CS1 8.2.12.B.3 8.2.12.B.CS2 8.2.12.B.1 8.2.12.C.CS2 8.2.12.B.CS1 8.2.12.A.CS2 8.1.12.A.1

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.B	Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
TECH.8.1.12.D.1	Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.
TECH.8.1.12.D.2	Evaluate consequences of unauthorized electronic access (e.g., hacking) and disclosure, and on dissemination of personal information.
TECH.8.1.12.D.4	Research and understand the positive and negative impact of one's digital footprint.
TECH.8.1.12.D.5	Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address personal, social, lifelong learning,

	and career needs.
TECH.8.1.12.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.12.D.CS3	Exhibit leadership for digital citizenship.
TECH.8.1.12.E.CS1	Plan strategies to guide inquiry.
TECH.8.1.12.E.CS2	Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.

Suggested Modifications for Special Education, ELL and Gifted Students

Students with individual learning styles can be assisted through:

Adjustments in assessments standards

One-to-one teacher support

Additional project time

Use of visual and auditory teaching methods

A wide variety of assessments and strategies complement the individual learning experience.

Suggested Technological Innovations/Use

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.2	Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.
TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
TECH.8.1.12.A.5	Create a report from a relational database consisting of at least two tables and describe the process, and explain the report results.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.B	Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
TECH.8.1.12.D.1	Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.
TECH.8.1.12.D.3	Compare and contrast policies on filtering and censorship both locally and globally.

TECH.8.1.12.D.5	Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address personal, social, lifelong learning, and career needs.
TECH.8.1.12.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.12.D.CS2	Demonstrate personal responsibility for lifelong learning.
TECH.8.1.12.D.CS3	Exhibit leadership for digital citizenship.

Cross Curricular/21st Century Connections

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP1.1	Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP3.1	Career-ready individuals understand the relationship between personal health, workplace performance and personal well-being; they act on that understanding to regularly practice healthy diet, exercise and mental health activities. Career-ready individuals also take regular action to contribute to their personal financial well-being, understanding that personal financial security provides the peace of mind required to contribute more fully to their own career success.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP9.1	Career-ready individuals consistently act in ways that align personal and community-held ideals and principles while employing strategies to positively influence others in the workplace. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to

	positively impact the directions and actions of a team or organization, and they apply insights into human behavior to change others' action, attitudes and/or beliefs. They recognize the near-term and long-term effects that management's actions and attitudes can have on productivity, morals and organizational culture.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP10.1	Career-ready individuals take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.

Unit 40 Advanced Electrical

Content Area: **Science**
Course(s): **Auto Tech. 3**
Time Period: **January**
Length: **4 weeks**
Status: **Not Published**

Summary of the Unit

- Students will be able to identify parts of a vehicle electrical system
- Students will be able to explain how electrical systems work, and why they are needed
- Students will be able to identify different electrical system components and explain their usage
- Students will be able to demonstrate how to test electrical components
- Students will be able to demonstrate how to diagnose and repair electrical systems

Enduring Understandings

- Students will know the purpose of automotive electrical systems
- Students will be able to identify components of electrical systems, and explain their use
- Students will understand how all components of a vehicle interact

Essential Questions

- What is the basic function of an automotive electrical system?
- How do different electrical system components work?
- What purpose do the components of the electrical system serve ?
- How do electrical system components get tested ?

Summative Assessment and/or Summative Criteria

- Class participation
- Homework, reading assignments and preliminary exercises
- Written tests and quizzes
- Performance tests
- Instructor assigned and student initiated projects
- Cooperative activities
- Skills application

Resources

- Alliance of Automobile Manufacturers. www.autoalliance.org.
- "Aqueous Parts Cleaning." Best Environmental Practices for Auto Repair, November 1999.Environmental Protection Agency.
- Automotive Lift Institute. www.autolift.org
- Automotive Encyclopedia, 2006 Edition.
- "Battery Safety." National Ag Safety Database (NASD). www.cdc.gov/nasd.
- Chrysler. www.chrysler.com.
- Dodge. www.dodge.com.
- Duffy, James E. Modern Automotive Technology. Tinley Park, IL: The Goodheart-Willcox Company, Inc., 2000.
- "Floor Cleanup." Best Environmental Practices for Auto Repair, November 1999. Environmental Protection Agency.
- Ford Motor Company. www.ford.com.
- General Motors. www.gm.com.
- National Automotive Technicians Education Foundation (NATEF). www.natef.org.
- National Institute for Automotive Service Excellence (ASE). www.asecert.org.
- Occupational Outlook Handbook, 2006–07 Edition. United States Department of Labor. Bureau of Labor Statistics. www.bls.gov/oco.
- Screw Drive Systems. Sizes.com. www.sizes.com.
- Sunkin, Ed. "Trends and Traits of Today's Technicians: The 2001 Professional Automotive Technicians Survey." Underhood Service, March 2001.
- Tobolt, William K, Larry Johnson, and W. Scott Gauthier. Automotive Encyclopedia. Tinley Park, IL: The Goodheart-Willcox Company, Inc., 2000.
- United States Department of Labor, Occupational Safety and Health Administration. www.osha.gov.
- United States Environmental Protection Agency. www.epa.gov.

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments	Standards
Identifying parts of the electrical systems 5-7 Days	● Students will learn, and be able to identify parts of a vehicle electrical system	Discuss and/or demonstrate the components of a vehicle electrical system Students will be introduced to OHMS law and its applications Students will learn basic electrical circuits, and their useage Using on line text and shop vehicles, students will identify basic vehicle electrical components	● Class participation ● Homework, reading assignments and preliminary exercises ● Written tests and quizzes ● Performance tests ● Instructor assigned and student initiated projects ● Cooperative activities ● Skills application	8.1.12 8.1.12.A 8.1.12.A.1 8.1.12.A.3 8.1.12.A.4 8.1.12.CS1 8.1.12.CS2 8.1.12.B 8.1.12.B.CS1 8.1.12.D.1 8.1.12.D.2 8.1.12.D.3 8.1.12.D.4 8.1.12.D.5 8.1.12.D.CS2 8.1.12D.CS3

Testing electrical components 5-7 Days	● Students will be able to learn how to test electrical components	Discuss and/or demonstrate the components of a vehicle electrical system Students will be introduced to OHMS law and its applications Students will learn basic electrical circuits, and their useage Using on line text and shop vehicles, students will identify basic vehicle electrical components	● Class participation ● Homework, reading assignments and preliminary exercises ● Written tests and quizzes ● Performance tests ● Instructor assigned and student initiated projects ● Cooperative activities ● Skills application	8.1.12 8.1.12.A 8.1.12.A.1 8.1.12.A.3 8.1.12.A.4 8.1.12.CS1 8.1.12.CS2 8.1.12.B 8.1.12.B.CS1 8.1.12.D.1 8.1.12.D.2 8.1.12.D.3 8.1.12.D.4 8.1.12.D.5 8.1.12.D.CS2 8.1.12D.CS3
Diagnosing/ repairing electrical systems 5-7 Days	● Students will be able to learn how to diagnose and repair electrical systems	Discuss and/or demonstrate the components of a vehicle electrical system Students will be introduced to OHMS law and its applications Students will learn basic electrical circuits, and their useage Using on line text and shop vehicles, students will identify basic vehicle electrical components	● Class participation ● Homework, reading assignments and preliminary exercises ● Written tests and quizzes ● Performance tests ● Instructor assigned and student initiated projects ● Cooperative activities ● Skills application	8.1.12 8.1.12.A 8.1.12.A.1 8.1.12.A.3 8.1.12.A.4 8.1.12.CS1 8.1.12.CS2 8.1.12.B 8.1.12.B.CS1 8.1.12.D.1 8.1.12.D.2 8.1.12.D.3 8.1.12.D.4 8.1.12.D.5 8.1.12.D.CS2 8.1.12D.CS3

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to

	reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.B	Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
TECH.8.1.12.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.12.D.1	Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.
TECH.8.1.12.D.2	Evaluate consequences of unauthorized electronic access (e.g., hacking) and disclosure, and on dissemination of personal information.
TECH.8.1.12.D.3	Compare and contrast policies on filtering and censorship both locally and globally.
TECH.8.1.12.D.4	Research and understand the positive and negative impact of one's digital footprint.
TECH.8.1.12.D.5	Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address personal, social, lifelong learning, and career needs.
TECH.8.1.12.D.CS2	Demonstrate personal responsibility for lifelong learning.
TECH.8.1.12.D.CS3	Exhibit leadership for digital citizenship.

Suggested Modifications for Special Education, ELL and Gifted Students

Students with individual learning styles can be assisted through:

Adjustments in assessments standards

One-to-one teacher support

Additional project time

Use of visual and auditory teaching methods

A wide variety of assessments and strategies complement the individual learning experience.

Suggested Technological Innovations/Use

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.

TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
TECH.8.1.12.A.5	Create a report from a relational database consisting of at least two tables and describe the process, and explain the report results.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.12.D.1	Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.
TECH.8.1.12.D.3	Compare and contrast policies on filtering and censorship both locally and globally.
TECH.8.1.12.D.4	Research and understand the positive and negative impact of one's digital footprint.
TECH.8.1.12.D.5	Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address personal, social, lifelong learning, and career needs.
TECH.8.1.12.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.12.D.CS2	Demonstrate personal responsibility for lifelong learning.

Cross Curricular/21st Century Connections

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP1.1	Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP3.1	Career-ready individuals understand the relationship between personal health, workplace performance and personal well-being; they act on that understanding to regularly practice healthy diet, exercise and mental health activities. Career-ready individuals also take regular action to contribute to their personal financial well-being, understanding that personal financial security provides the peace of mind required to contribute more fully to their own career success.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.

CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP10.1	Career-ready individuals take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.

Unit 50 Fuel System/ Fuel Injection

Content Area: **Science**
Course(s): **Auto Tech. 3**
Time Period: **February**
Length: **8 weeks**
Status: **Not Published**

Summary of the Unit

- Students will be able to identify parts of a vehicle fuel system
- Students will be able to explain how fuel systems work, and why they are needed
- Students will be able to identify different types of fuels, and explain their usage

Enduring Understandings

- Students will know the purpose of automotive fuel systems
- Students will be able to identify components of fuel systems, and explain their use
- Students will understand how all components of a vehicle interact

Essential Questions

- What is the basic function of an automotive fuel system?
- How do different types fuels work?
- What applications suit different types of fuels?
- What purpose do the components of the fuel system serve ?

Summative Assessment and/or Summative Criteria

- Class participation
- Homework, reading assignments and preliminary exercises
- Written tests and quizzes
- Performance tests
- Instructor assigned and student initiated projects
- Cooperative activities
- Skills application

Resources

- Alliance of Automobile Manufacturers. www.autoalliance.org.
- "Aqueous Parts Cleaning." Best Environmental Practices for Auto Repair, November 1999.Environmental Protection Agency.
- Automotive Lift Institute. www.autolift.org
- Automotive Encyclopedia, 2006 Edition.
- "Battery Safety." National Ag Safety Database (NASD). www.cdc.gov/nasd.
- Chrysler. www.chrysler.com.
- Dodge. www.dodge.com.
- Duffy, James E. Modern Automotive Technology. Tinley Park, IL: The Goodheart-Willcox Company, Inc., 2000.
- "Floor Cleanup." Best Environmental Practices for Auto Repair, November 1999. Environmental Protection Agency.
- Ford Motor Company. www.ford.com.
- General Motors. www.gm.com.
- National Automotive Technicians Education Foundation (NATEF). www.natef.org.
- National Institute for Automotive Service Excellence (ASE). www.asecert.org.
- Occupational Outlook Handbook, 2006–07 Edition. United States Department of Labor. Bureau of Labor Statistics. www.bls.gov/oco.
- Screw Drive Systems. Sizes.com. www.sizes.com.
- Sunkin, Ed. "Trends and Traits of Today's Technicians: The 2001 Professional Automotive Technicians Survey." Underhood Service, March 2001.
- Tobolt, William K, Larry Johnson, and W. Scott Gauthier. Automotive Encyclopedia. Tinley Park, IL: The Goodheart-Willcox Company, Inc., 2000.
- United States Department of Labor, Occupational Safety and Health Administration. www.osha.gov.
- United States Environmental Protection Agency. www.epa.gov.

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments	Standards
Purpose of fuel systems 5-8 Days	● Students will be able to know the purpose of automotive fuel systems	Discuss and/or demonstrate the components of a vehicle fuel system Students will learn the different types of vehicle fuels, (gasoline,diesel, etc) Using on line text and shop vehicles, students will identify fuel system components and explain their use	● Class participation ● Homework, reading assignments and preliminary exercises ● Written tests and quizzes ● Performance tests ● Instructor assigned and student initiated projects ● Cooperative activities ● Skills application	8.1.12 8.1.12.A 8.1.12.A.1 8.1.12.A.3 8.1.12.A.4 8.1.12.A.5 8.1.12.A.CS2 8.1.12.B 8.1.12.E.2 8.1.12.E.CS2 8.1.12.E.CS3 8.1.12.F.1 8.1.12.F.CS1 8.1.12.F.CS3
Understand the meaning of specific key terms and symbols	● Determine the meaning of symbols, key terms,	Discuss and/or demonstrate the components of a vehicle fuel	● Class participation	8.1.12 8.1.12.A 8.1.12.A.1 8.1.12.A.3

5-8 Days	and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.	system Students will learn the different types of vehicle fuels, (gasoline,diesel, etc) Using on line text and shop vehicles, students will identify fuel system components and explain their use	● Homework, reading assignments and preliminary exercises ● Written tests and quizzes ● Performance tests ● Instructor assigned and student initiated projects ● Cooperative activities ● Skills application	8.1.12.A.4 8.1.12.A.5 8.1.12.A.CS2 8.1.12.B 8.1.12.E.2 8.1.12.E.CS2 8.1.12.E.CS3 8.1.12.F.1 8.1.12.F.CS1 8.1.12.F.CS3
Testing, Diagnosing, and Repairing Fuel Systems/Injectors 15-25 Days	● Use technology, including the Internet, to research industry standards, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically	Discuss and/or demonstrate the components of a vehicle fuel system Students will learn the different types of vehicle fuels, (gasoline,diesel, etc) Using on line text and shop vehicles, students will identify fuel system components and explain their use	● Class participation ● Homework, reading assignments and preliminary exercises ● Written tests and quizzes ● Performance tests ● Instructor assigned and student initiated projects ● Cooperative activities ● Skills application	8.1.12 8.1.12.A 8.1.12.A.1 8.1.12.A.3 8.1.12.A.4 8.1.12.A.5 8.1.12.A.CS2 8.1.12.B 8.1.12.E.2 8.1.12.E.CS2 8.1.12.E.CS3 8.1.12.F.1 8.1.12.F.CS1 8.1.12.F.CS3

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
TECH.8.1.12.A.5	Create a report from a relational database consisting of at least two tables and

	describe the process, and explain the report results.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.B	Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
TECH.8.1.12.E.2	Research and evaluate the impact on society of the unethical use of digital tools and present your research to peers.
TECH.8.1.12.E.CS2	Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
TECH.8.1.12.E.CS3	Evaluate and select information sources and digital tools based on the appropriateness for specific tasks.
TECH.8.1.12.F.1	Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.
TECH.8.1.12.F.CS1	Identify and define authentic problems and significant questions for investigation.
TECH.8.1.12.F.CS3	Collect and analyze data to identify solutions and/or make informed decisions.

Suggested Modifications for Special Education, ELL and Gifted Students

Students with individual learning styles can be assisted through:

Adjustments in assessments standards

One-to-one teacher support

Additional project time

Use of visual and auditory teaching methods

A wide variety of assessments and strategies complement the individual learning experience.

Suggested Technological Innovations/Use

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.2	Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.
TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.

TECH.8.1.12.A.5	Create a report from a relational database consisting of at least two tables and describe the process, and explain the report results.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.12.D.1	Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.
TECH.8.1.12.D.2	Evaluate consequences of unauthorized electronic access (e.g., hacking) and disclosure, and on dissemination of personal information.
TECH.8.1.12.D.5	Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address personal, social, lifelong learning, and career needs.
TECH.8.1.12.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.12.D.CS3	Exhibit leadership for digital citizenship.

Cross Curricular/21st Century Connections

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP1.1	Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP3.1	Career-ready individuals understand the relationship between personal health, workplace performance and personal well-being; they act on that understanding to regularly practice healthy diet, exercise and mental health activities. Career-ready individuals also take regular action to contribute to their personal financial well-being, understanding that personal financial security provides the peace of mind required to contribute more fully to their own career success.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for

	their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP7.1	Career-ready individuals are discerning in accepting and using new information to make decisions, change practices or inform strategies. They use reliable research process to search for new information. They evaluate the validity of sources when considering the use and adoption of external information or practices in their workplace situation.

Unit 60 Basic Bodywork/ Welding Basics

Content Area: **Science**
Course(s): **Auto Tech. 3**
Time Period: **3rd Marking Period**
Length: **4 weeks**
Status: **Not Published**

Summary of the Unit

- Students will be able to identify how to use most common spray gun types used for auto body work.
- Students will be able to explain why it is important to properly prepare a surface before painting.
- Students will be able to demonstrate the procedure for straightening a damaged panel.
- Students will be able to describe the welding and cutting procedures used on late-model vehicles
- Students will be able to diagnose trouble codes stored in airbag restraint self diagnostic system.

Enduring Understandings

- Students will know the purpose of using various automotive body tools
- Students will be able to identify components of a vehicle's basic body structure
- Students will understand how to correctly assess a panel and choose the proper welding procedure

Essential Questions

- Before applying any paint, what should be done to the surface of the panel?
- Describe the procedure for replacing a portion of a body panel.
- Why is mig welding equipment used when repairing late model vehicles?
- What materials should be used when repairing the surface body painted with acrylic lacquer?

Summative Assessment and/or Summative Criteria

- Class participation
- Homework, reading assignments and preliminary exercises
- Written tests and quizzes
- Performance tests
- Instructor assigned and student initiated projects
- Cooperative activities
- Skills application

Resources

- Alliance of Automobile Manufacturers. www.autoalliance.org.
- "Aqueous Parts Cleaning." Best Environmental Practices for Auto Repair, November 1999.Environmental Protection Agency.
- Automotive Lift Institute. www.autolift.org
- Automotive Encyclopedia, 2006 Edition.
- "Battery Safety." National Ag Safety Database (NASD). www.cdc.gov/nasd.
- Chrysler. www.chrysler.com.
- Dodge. www.dodge.com.
- Duffy, James E. Modern Automotive Technology. Tinley Park, IL: The Goodheart-Willcox Company, Inc., 2000.
- "Floor Cleanup." Best Environmental Practices for Auto Repair, November 1999. Environmental Protection Agency.
- Ford Motor Company. www.ford.com.
- General Motors. www.gm.com.
- National Automotive Technicians Education Foundation (NATEF). www.natef.org.
- National Institute for Automotive Service Excellence (ASE). www.asecert.org.
- Occupational Outlook Handbook, 2006–07 Edition. United States Department of Labor. Bureau of Labor Statistics. www.bls.gov/oco.
- Screw Drive Systems. Sizes.com. www.sizes.com.
- Sunkin, Ed. "Trends and Traits of Today's Technicians: The 2001 Professional Automotive Technicians Survey." Underhood Service, March 2001.
- Tobolt, William K, Larry Johnson, and W. Scott Gauthier. Automotive Encyclopedia. Tinley Park, IL: The Goodheart-Willcox Company, Inc., 2000.
- United States Department of Labor, Occupational Safety and Health Administration. www.osha.gov.
- United States Environmental Protection Agency. www.epa.gov.

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments	Standards
Spray Guns 5-7 Days	● Identify the different types of spray guns and how each is needed. ● Students will review how to properly chose the correct spray gun ● Students will recognize how to properly disassemble, adjust, clean and reconstruct a	● Discuss and demonstrate the components of various spray guns ● Using on line texts, and shop vehicles, students will be able to show how Steering and Suspension system components work, and relate to each other	• Class participation • Homework, reading assignments and preliminary exercises • Written tests and quizzes • Performance tests • Instructor assigned and student initiated projects • Cooperative activities • Skills application	8.2.12.B.CS4 8.2.12 8.2.12.A 8.2.12.B 8.2.12.A.CS1 8.2.12.B.3 8.2.12.B.CS2 8.2.12.B.1 8.2.12.C.CS2 8.2.12.B.CS1 8.2.12.A.CS2 8.1.12.A.1

	spray gun			
Welding 10 Days	● Students will be able to learn how to describe the welding and cutting procedures used on late-model vehicles ● Students will be able to properly choose the correct welding equipment and procedure.	● Demonstrate the proper welding and cutting procedures ● Demonstrate the proper use of the welding tools and equipment, including safety	• Class participation • Homework, reading assignments and preliminary exercises • Written tests and quizzes • Performance tests • Instructor assigned and student initiated projects • Cooperative activities • Skills application	8.2.12.B.CS4 8.2.12 8.2.12.A 8.2.12.B 8.2.12.A.CS1 8.2.12.B.3 8.2.12.B.CS2 8.2.12.B.1 8.2.12.C.CS2 8.2.12.B.CS1 8.2.12.A.CS2 8.1.12.A.1
Airbag restraint self diagnostic system 5 Days	● Students will be able to learn how to diagnose trouble codes stored in airbag restraint self diagnostic system. ● Students will be able to properly access the vehicles airbag module.	● Demonstrate the proper procedures for diagnosing trouble codes stored in airbag restraint self diagnostic ● Demonstrate the proper use of a scan tool to properly access a vehicles airbag module.	• Class participation • Homework, reading assignments and preliminary exercises • Written tests and quizzes • Performance tests • Instructor assigned and student initiated projects • Cooperative activities • Skills application	8.2.12.B.CS4 8.2.12 8.2.12.A 8.2.12.B 8.2.12.A.CS1 8.2.12.B.3 8.2.12.B.CS2 8.2.12.B.1 8.2.12.C.CS2 8.2.12.B.CS1 8.2.12.A.CS2 8.1.12.A.1

TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.2	Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.
TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
TECH.8.1.12.A.CS1	Understand and use technology systems.

TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.B	Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
TECH.8.1.12.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.12.D.1	Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.
TECH.8.1.12.D.2	Evaluate consequences of unauthorized electronic access (e.g., hacking) and disclosure, and on dissemination of personal information.
TECH.8.1.12.D.3	Compare and contrast policies on filtering and censorship both locally and globally.
TECH.8.1.12.D.5	Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address personal, social, lifelong learning, and career needs.
TECH.8.1.12.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.12.D.CS2	Demonstrate personal responsibility for lifelong learning.

Suggested Modifications for Special Education, ELL and Gifted Students

Students with individual learning styles can be assisted through:

Adjustments in assessments standards

One-to-one teacher support

Additional project time

Use of visual and auditory teaching methods

A wide variety of assessments and strategies complement the individual learning experience.

Suggested Technological Innovations/Use

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
TECH.8.1.12.A.5	Create a report from a relational database consisting of at least two tables and describe the process, and explain the report results.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.12.C	Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support

	individual learning and contribute to the learning of others.
TECH.8.1.12.C.1	Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
TECH.8.1.12.C.CS1	Interact, collaborate, and publish with peers, experts, or others by employing a variety of digital environments and media.
TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.
TECH.8.1.12.D	Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
TECH.8.1.12.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.

Cross Curricular/21st Century Connections

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP1.1	Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP3.1	Career-ready individuals understand the relationship between personal health, workplace performance and personal well-being; they act on that understanding to regularly practice healthy diet, exercise and mental health activities. Career-ready individuals also take regular action to contribute to their personal financial well-being, understanding that personal financial security provides the peace of mind required to contribute more fully to their own career success.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.

CRP.K-12.CRP9.1	Career-ready individuals consistently act in ways that align personal and community-held ideals and principles while employing strategies to positively influence others in the workplace. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the directions and actions of a team or organization, and they apply insights into human behavior to change others' action, attitudes and/or beliefs. They recognize the near-term and long-term effects that management's actions and attitudes can have on productivity, morals and organizational culture.
CRP.K-12.CRP10.1	Career-ready individuals take personal ownership of their own education and career goals, and they regularly act on a plan to attain these goals. They understand their own career interests, preferences, goals, and requirements. They have perspective regarding the pathways available to them and the time, effort, experience and other requirements to pursue each, including a path of entrepreneurship. They recognize the value of each step in the education and experiential process, and they recognize that nearly all career paths require ongoing education and experience. They seek counselors, mentors, and other experts to assist in the planning and execution of career and personal goals.

Unit 70 Heating & Air Conditioning

Content Area: **Science**
Course(s): **Auto Tech. 3**
Time Period: **4th Marking Period**
Length: **4 weeks**
Status: **Not Published**

Summary of the Unit

- Students will be able to describe the fundamentals of an air conditioning
- Students will be able to explain how the heating system works
- Students will be able to demonstrate how to service an air conditioning system
- Students will be able to demonstrate how to troubleshoot an air conditioning system
- Students will be able to list the major parts of an air conditioning system and the purpose of each

Enduring Understandings

- The roles air conditioner systems play in automotive operation
- Parts of the air conditioning and heating system and how they operate
- How to diagnose and repair air conditioning and heating system failures

Essential Questions

- What is the purpose of the air conditioning and heating systems?
- How is heat provided by the car heating system?
- How are the air conditioning and heating systems related?

Summative Assessment and/or Summative Criteria

- Class participation
- Homework, reading assignments and preliminary exercises
- Written tests and quizzes
- Performance tests
- Instructor assigned and student initiated projects
- Cooperative activities
- Skills application

Resources

- Alliance of Automobile Manufacturers. www.autoalliance.org.
- "Aqueous Parts Cleaning." Best Environmental Practices for Auto Repair, November 1999.Environmental Protection Agency.
- Automotive Lift Institute. www.autolift.org
- Automotive Encyclopedia, 2006 Edition.
- "Battery Safety." National Ag Safety Database (NASD). www.cdc.gov/nasd.
- Chrysler. www.chrysler.com.
- Dodge. www.dodge.com.
- Duffy, James E. Modern Automotive Technology. Tinley Park, IL: The Goodheart-Willcox Company, Inc., 2000.
- "Floor Cleanup." Best Environmental Practices for Auto Repair, November 1999. Environmental Protection Agency.
- Ford Motor Company. www.ford.com.
- General Motors. www.gm.com.
- National Automotive Technicians Education Foundation (NATEF). www.natef.org.
- National Institute for Automotive Service Excellence (ASE). www.asecert.org.
- Occupational Outlook Handbook, 2006–07 Edition. United States Department of Labor. Bureau of Labor Statistics. www.bls.gov/oco.
- Screw Drive Systems. Sizes.com. www.sizes.com.
- Sunkin, Ed. "Trends and Traits of Today's Technicians: The 2001 Professional Automotive Technicians Survey." Underhood Service, March 2001.
- Tobolt, William K, Larry Johnson, and W. Scott Gauthier. Automotive Encyclopedia. Tinley Park, IL: The Goodheart-Willcox Company, Inc., 2000.
- United States Department of Labor, Occupational Safety and Health Administration. www.osha.gov.
- United States Environmental Protection Agency. www.epa.gov.

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments	Standards
Air Conditioning System 5 Days	● Students will identify the importance of the air conditioning system	● Discuss the purpose of and show major components of the air conditioning system ● Students will be able to locate and identify the air conditioning system in a automobile	● Class participation ● Homework, reading assignments and preliminary exercises ● Written tests and quizzes ● Performance tests ● Instructor assigned and student initiated projects ● Cooperative activities ● Skills application	8.2.12.B.CS4 8.2.12 8.2.12.A 8.2.12.B 8.2.12.A.CS1 8.2.12.B.3 8.2.12.B.CS2 8.2.12.B.1 8.2.12.C.CS2 8.2.12.B.CS1 8.2.12.A.CS2 8.1.12.A.1

Heating System 5 Days	● Students will identify what is the purpose of the heating system	● Discuss the purpose of and show major components of a vehicles heating system ● Students will be able to locate and identify the heating system in a vehicle	● Class participation ● Homework, reading assignments and preliminary exercises ● Written tests and quizzes ● Performance tests ● Instructor assigned and student initiated projects ● Cooperative activities ● Skills application	8.2.12.B.CS4 8.2.12 8.2.12.A 8.2.12.B 8.2.12.A.CS1 8.2.12.B.3 8.2.12.B.CS2 8.2.12.B.1 8.2.12.C.CS2 8.2.12.B.CS1 8.2.12.A.CS2 8.1.12.A.1
Diagnosing/Replacing/ Repairing Air Conditioning and Heating Systems 10 Days	● Students will apply their understanding to diagnose and replace air conditioning and heating system components.	● Diagnose and replace a vehicles heating and air conditioning systems ● Discuss and show major components of a vehicle's heating and air conditioning systems ● Students will be able to locate and identify heating and air conditioning systems in a vehicle ● Discuss and demonstrate how to test heating and air conditioning systems function ● Demonstrate how to safely replace a	● Class participation ● Homework, reading assignments and preliminary exercises ● Written tests and quizzes ● Performance tests ● Instructor assigned and student initiated projects ● Cooperative activities ● Skills application	8.2.12.B.CS4 8.2.12 8.2.12.A 8.2.12.B 8.2.12.A.CS1 8.2.12.B.3 8.2.12.B.CS2 8.2.12.B.1 8.2.12.C.CS2 8.2.12.B.CS1 8.2.12.A.CS2 8.1.12.A.1

		vehicles heating and air conditioning systems		

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.2	Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.
TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
TECH.8.1.12.A.5	Create a report from a relational database consisting of at least two tables and describe the process, and explain the report results.
TECH.8.1.12.B	Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
TECH.8.1.12.C.1	Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
TECH.8.1.12.C.CS1	Interact, collaborate, and publish with peers, experts, or others by employing a variety of digital environments and media.
TECH.8.1.12.C.CS2	Communicate information and ideas to multiple audiences using a variety of media and formats.
TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.

Suggested Modifications for Special Education, ELL and Gifted Students

Students with individual learning styles can be assisted through:

Adjustments in assessments standards

One-to-one teacher support

Additional project time

Use of visual and auditory teaching methods

A wide variety of assessments and strategies complement the individual learning experience.

Suggested Technological Innovations/Use

TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and

	resources.
TECH.8.1.12.A.2	Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.
TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
TECH.8.1.12.A.5	Create a report from a relational database consisting of at least two tables and describe the process, and explain the report results.
TECH.8.1.12.B	Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
TECH.8.1.12.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.12.D.1	Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.
TECH.8.1.12.D.3	Compare and contrast policies on filtering and censorship both locally and globally.
TECH.8.1.12.D.4	Research and understand the positive and negative impact of one's digital footprint.
TECH.8.1.12.D.5	Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address personal, social, lifelong learning, and career needs.
TECH.8.1.12.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.12.D.CS2	Demonstrate personal responsibility for lifelong learning.
TECH.8.1.12.D.CS3	Exhibit leadership for digital citizenship.

Cross Curricular/21st Century Connections

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.
CRP.K-12.CRP1.1	Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.

CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP3.1	Career-ready individuals understand the relationship between personal health, workplace performance and personal well-being; they act on that understanding to regularly practice healthy diet, exercise and mental health activities. Career-ready individuals also take regular action to contribute to their personal financial well-being, understanding that personal financial security provides the peace of mind required to contribute more fully to their own career success.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP9.1	Career-ready individuals consistently act in ways that align personal and community-held ideals and principles while employing strategies to positively influence others in the workplace. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the directions and actions of a team or organization, and they apply insights into human behavior to change others' action, attitudes and/or beliefs. They recognize the near-term and long-term effects that management's actions and attitudes can have on productivity, morals and organizational culture.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.

Unit 80 Engine Troubleshooting

Content Area: **Science**
Course(s): **Auto Tech. 3**
Time Period: **June**
Length: **4 weeks**
Status: **Not Published**

Summary of the Unit

● Students will be able to identify types of engines used in Automotive applications by decoding Vehicle Identification Numbers

● Students will be able to effectively use terms related to computer controlled engines and emissions systems

● Students will be able to demonstrate use of terms associated with different types of engines (such as gas,diesel,rotary, fuel cell)

Enduring Understandings

● Students will know how to decode a VIN

● Students will be able to know the emissions produced by different types of engines

● Students will understand the effects of emissions on the environment

Essential Questions

● What do all the characters in a VIN mean?

● How do different types of engines produce emissions?

● What are the 5 emissions produced?

● What purpose do the components of the engine serve to reduce emissions?

Summative Assessment and/or Summative Criteria

● Class participation

● Homework, reading assignments and preliminary exercises

● Written tests and quizzes

● Performance tests

● Instructor assigned and student initiated projects

● Cooperative activities

● Skills application

Resources

- Alliance of Automobile Manufacturers. www.autoalliance.org.
- "Aqueous Parts Cleaning." Best Environmental Practices for Auto Repair, November 1999.Environmental Protection Agency.
- Automotive Lift Institute. www.autolift.org

- Automotive Encyclopedia, 2006 Edition.
- "Battery Safety." National Ag Safety Database (NASD). www.cdc.gov/nasd.
- Chrysler. www.chrysler.com.
- Dodge. www.dodge.com.
- Duffy, James E. Modern Automotive Technology. Tinley Park, IL: The Goodheart-Willcox Company, Inc., 2000.
- "Floor Cleanup." Best Environmental Practices for Auto Repair, November 1999. Environmental Protection Agency.
- Ford Motor Company. www.ford.com.
- General Motors. www.gm.com.
- National Automotive Technicians Education Foundation (NATEF). www.natef.org.
- National Institute for Automotive Service Excellence (ASE). www.asecert.org.
- Occupational Outlook Handbook, 2006–07 Edition. United States Department of Labor. Bureau of Labor Statistics. www.bls.gov/oco.
- Screw Drive Systems. Sizes.com. www.sizes.com.
- Sunkin, Ed. "Trends and Traits of Today's Technicians: The 2001 Professional Automotive Technicians Survey." Underhood Service, March 2001.
- Tobolt, William K, Larry Johnson, and W. Scott Gauthier. Automotive Encyclopedia. Tinley Park, IL: The Goodheart-Willcox Company, Inc., 2000.
- United States Department of Labor, Occupational Safety and Health Administration. www.osha.gov.
- United States Environmental Protection Agency. www.epa.gov.

Unit Plan

Topic/Selection Timeframe	General Objectives	Instructional Activities	Benchmarks/Assessments	Standards
VIN purpose	● Students will be able to know the purpose of all characters in a VIN	Discuss and/or demonstrate the steps necessary to diagnose vehicle emissions and efficiency Students will use a scan tool to monitor engine operations and compare to manufacturers specifications Students will use a 5 gas analyzer to monitor vehicle emissions and compare to manufacturers specifications	● Class participation ● Homework, reading assignments and preliminary exercises ● Written tests and quizzes ● Performance tests ● Instructor assigned and student initiated projects ● Cooperative activities ● Skills application	8.1.12 8.1.12.A 8.1.12.A.1 8.1.12.A.2 8.1.12.A.3 8.1.12.A.4 8.1.12.A.CS1 8.1.12.A.CS2 8.1.12.B.CS1 8.1.12.C.1 8.1.12.C.CS1 8.1.12.C.CS3 8.1.12.C.CS4
Emissions	● Students will understand how different vehicles produce	Discuss and/or demonstrate the steps necessary to diagnose vehicle emissions and efficiency	● Class participation ● Homework, reading assignments and preliminary exercises ● Written tests and quizzes	8.1.12 8.1.12.A 8.1.12.A.1 8.1.12.A.2 8.1.12.A.3 8.1.12.A.4

	different emissions	Students will use a scan tool to monitor engine operations and compare to manufacturers specifications Students will use a 5 gas analyzer to monitor vehicle emissions and compare to manufacturers specifications	● Performance tests ● Instructor assigned and student initiated projects ● Cooperative activities ● Skills application	8.1.12.A.CS1 8.1.12.A.CS2 8.1.12.B.CS1 8.1.12.C.1 8.1.12.C.CS1 8.1.12.C.CS3 8.1.12.C.CS4
Emissions terminology	● Students will be able to use correct terminology to identify vehicle emissions	Discuss and/or demonstrate the steps necessary to diagnose vehicle emissions and efficiency Students will use a scan tool to monitor engine operations and compare to manufacturers specifications Students will use a 5 gas analyzer to monitor vehicle emissions and compare to manufacturers specifications	● Class participation ● Homework, reading assignments and preliminary exercises ● Written tests and quizzes ● Performance tests ● Instructor assigned and student initiated projects ● Cooperative activities ● Skills application	8.1.12 8.1.12.A 8.1.12.A.1 8.1.12.A.2 8.1.12.A.3 8.1.12.A.4 8.1.12.A.CS1 8.1.12.A.CS2 8.1.12.B.CS1 8.1.12.C.1 8.1.12.C.CS1 8.1.12.C.CS3 8.1.12.C.CS4

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.2	Produce and edit a multi-page digital document for a commercial or professional audience and present it to peers and/or professionals in that related area for review.
TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions,

	charts and data from all worksheets to convey the results.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.12.C.1	Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
TECH.8.1.12.C.CS1	Interact, collaborate, and publish with peers, experts, or others by employing a variety of digital environments and media.
TECH.8.1.12.C.CS3	Develop cultural understanding and global awareness by engaging with learners of other cultures.
TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.

Suggested Modifications for Special Education, ELL and Gifted Students

Students with individual learning styles can be assisted through:

Adjustments in assessments standards

One-to-one teacher support

Additional project time

Use of visual and auditory teaching methods

A wide variety of assessments and strategies complement the individual learning experience.

Suggested Technological Innovations/Use

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A.1	Create a personal digital portfolio which reflects personal and academic interests, achievements, and career aspirations by using a variety of digital tools and resources.
TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.12.D.1	Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.
TECH.8.1.12.D.3	Compare and contrast policies on filtering and censorship both locally and globally.

TECH.8.1.12.D.4	Research and understand the positive and negative impact of one's digital footprint.
TECH.8.1.12.D.5	Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address personal, social, lifelong learning, and career needs.
TECH.8.1.12.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.12.D.CS2	Demonstrate personal responsibility for lifelong learning.
TECH.8.1.12.D.CS3	Exhibit leadership for digital citizenship.

Cross Curricular/21st Century Connections

CRP.K-12.CRP1.1	Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP3.1	Career-ready individuals understand the relationship between personal health, workplace performance and personal well-being; they act on that understanding to regularly practice healthy diet, exercise and mental health activities. Career-ready individuals also take regular action to contribute to their personal financial well-being, understanding that personal financial security provides the peace of mind required to contribute more fully to their own career success.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP5.1	Career-ready individuals understand the interrelated nature of their actions and regularly make decisions that positively impact and/or mitigate negative impact on other people, organization, and the environment. They are aware of and utilize new technologies, understandings, procedures, materials, and regulations affecting the nature of their work as it relates to the impact on the social condition, the environment and the profitability of the organization.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.