Automotive Service Technician

SAMPLE PAGES

Hands-On-Academics™

Helping students connect learning to real life

Career Information—Automotive Service Technician

What I do every day

Customers come to the garage where I work to have their cars serviced or repaired. I change the oil and filter, check fluid levels; inspect tires, brakes, and batteries; and perform other preventive maintenance. When a vehicle develops mechanical or electrical trouble, the owner usually describes the problem to me. I often take the vehicle for a test drive to see for myself what's going on before I use diagnostic computers, compression gauges, and other testing equipment to locate the problem. Once I know why the vehicle isn't working properly, I make the repair or adjustment. If I can't repair a part, I check with the owner before ordering a replacement.

The best part of my job

What I enjoy most about my job is diagnosing a problem. I think of myself as part detective and part doctor. Sometimes I can tell immediately from a sound or a smell what the problem is. Other times an automobile's symptoms present me with a tricky puzzle to solve. Finding the correct solution is a satisfying challenge.

The worst part of my job

Most people are unhappy when they come to me because they have waited until their car has a serious problem before bringing it to a garage. Calming a cranky customer whose car is out of commission, and who fears an expensive repair bill, can be difficult.

Career Information presents a short overview of each career.

Career Vocabulary

biomass — plant material, vegetation, or agricultural waste used as a fuel or energy source.

biosphere — the part of the earth and its atmosphere in which living organisms exist or that is capable of supporting life.

emissions — a substance discharged into the air, especially by an internal combustion engine.

fuel cell — an electrochemical device that creates electrical energy to pow motor; for example, a fuel cell can convert chemicals such as hydrogen (or other fuel) and oxygen (from air) into electricity.

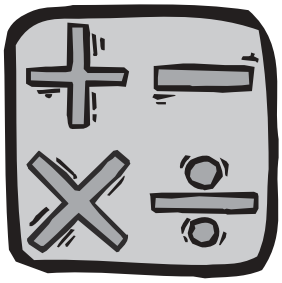
greenhouse effect — warming that results when solar radiation is trapped by the atmosphere.

greenhouse gases — a group of gases which act to trap solar energy or heat near the earth. Automobiles emit greenhouse gases, including carbon dioxide, methane, and nitrous oxide.

hybrid electric vehicle — a car that combines an internal combustion engine and an electric motor to increase mileage and lower emissions of toxic gases.

Career Vocabulary presents key words and definitions.

Math Activities



Hot Wheels

Customers sometimes think their cars are in need of repair when they don't handle well on the road; however, attention to simple preventive maintenance is often the answer to the problem. You should always try to educate your customers that their cars will handle better and their tires will last longer if tire pressure is monitored and adjusted as needed. In fact, if the air pressure in a car's tires is not correct, a dangerous situation could result.

Part I Time and the Life of a Tire

Last week when Jane Hurley brought her car in for a tune-up, you noticed that her tires were seriously underinflated. Jane couldn't remember the last time she checked her tire pressure. You explained that tires lose pressure over time.

A. On an average, tires lose one pound of pressure per month. The manufacturer of Jane's tires recommends that the tires be inflated to 32 pounds of pressure per square inch (PSI). When you measured the pressure of the tires, one tire was dangerously low at 26 PSI. Determine the pounds of pressure lost, and estimate how much time had passed since Jane had her tire pressure checked last.

1. _____ - _____ = _____
   Recommended PSI Measured PSI No. of PSI lost

Academic activities are integrated with careers.

Science Activities

Fill It Up!

The garage you work in is well ventilated. It needs to be! Automobile emissions are dangerous. Both consumers and international governments worry about the effects of automobile emissions in our atmosphere.

The internal combustion engine used in automobiles is considered a wonderful invention. It provides people with an inexpensive method of transportation that greatly increases their freedom and mobility. But the internal combustion engine, so far, has relied on fossil fuels as an energy source, and it turns out there is a heavy price to be paid for using fossil fuels.

Use the Internet or library to complete the following activities:

Part I Why Do They Call Them "Fossil" Fuels?

A. List the three primary fossil fuels that society has come to depend on for energy.

1. _____
2. _____
3. _____

B. Explain how fossil fuels were formed.

_____

Social Studies Activities

On the Road

"By all accounts, the automobile is the nearest thing to an ideal transportation system. No transport technology offers people more convenience, comfort, security, and privacy. The auto serves its users on demand, from door to door, with no transfers, no waiting, and at an acceptable price. Widespread car ownership has given millions of people more options of where to live and work and opened up access to greater social and economic opportunity."

—Urban Mobility Corporation, 1999

This description of the automobile is one most people would agree with. How do you think affordable automobiles have changed the American lifestyle?

Part I Progress

Describe one way in which the invention of automobiles affected each of the following aspects of people's daily lives.

A. Cost and availability of goods

_____

_____

B. Employment

English/Communications Activities

Doctor! Doctor!

It's 11:00 a.m. and Mrs. McComb just brought her 1997 Ford Explorer in for an oil change. She says that her car has been "acting funny," and she wants you to check it over and to see what the problem is. You ask her to leave her car in the shop. You explain to her that only you and one other person are on duty. There are three jobs ahead of her, and you're not sure how long it will take to diagnose the problem. She agrees to leave the car and expects you to call her when you know what the problem is, what kind of repair needs to be made, and how much it will cost. Before Mrs. McComb leaves her car, you ask her for a description of the problem.

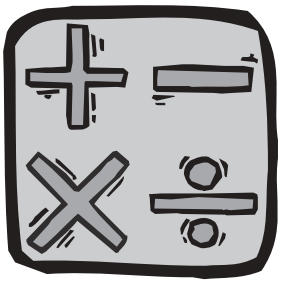
Part I Tell Me Where It Hurts

Choose a partner to play the role of Mrs. McComb as she explains her car's problem. Because Mrs. McComb is unfamiliar with the way cars work, she cannot give you a technical description of the problem. You must ask her specific questions that will save your time in locating the source of the problem. For example, if Mrs. McComb tells you there is a banging sound, ask her if the sound is coming from the front of the car or the back of the car. If Mrs. McComb tells you the car stalls, ask her if this happens when she first starts the car, or when she is driving down the road.

The student playing Mrs. McComb must describe sounds, smells, and actions about the car that alarm her. For example, Mrs. McComb might say, "It makes a noise when I press the brake," or she might say, "I smell gas when I start the car up." The

Academic activities are integrated with careers.

Challenge Level Activities (Math)



In your position as head mechanic at Kelly's Garage, you are responsible for preparing customers' bills. Mr. Joe Morrow's 1999 Chevrolet Suburban is ready for him to pick up, So you need to get his bill ready. The Suburban needed the brakes checked and the oil changed. In addition the "Check Engine" light was flashing on and off.

Use the following price list when making up Mr. Morrow's bill. Use the invoice form to enter and calculate the cost of the services performed on Mr. Morrow's vehicle.

Inventory #	Description	Price
26296a3	Brake pad kit	$ 72.50
15208ac	Oil filter	$ 6.95
1 Quart	10/30 oil	$ 1.60
11126r7	Gasket	$ .68
22630a1	Temperature sensor	$ 21.27

Part I Service No. 1 — Lube and oil change

Service No. 1 on Mr. Morrow's bill is for a lube and oil change. In the Unit Price column enter the price of each item used for this service.

Calculate the costs of these items by multiplying the quantity of each item used by the unit price. Enter the amount in the Charges column.

A challenge activity expands one academic subject to a more advanced level.

Critical Thinking:

Race City USA

Mooresville, North Carolina was a town that relied on the textile industry for its paychecks. Cheap labor in other countries put an end to that. The mills closed, and you could see windows covered with plywood. The town needed a new "economic engine." NASCAR racing proved to be the industry that revved up Mooresville's motor.

Home to approximately 50 race teams, Mooresville is often called Race City USA. Thanks to an active Chamber of Commerce, an ambitious development group, and the leaders of the NASCAR racing community, Mooresville is now a thriving center of race car activity.

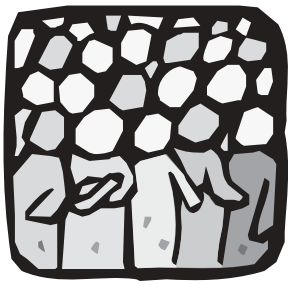
Originally, some expressed doubt about the industry, fearful that it would be noisy and dirty. Dale Earnhardt Sr., before his fatal accident, was one of the many famous race car figures to build headquarters in Mooresville. Earnhardt, Roger Penske, and others proved they could operate sophisticated, spotlessly clean, state-of-the-art facilities.

Mooresville could be the ideal town for an automotive service technician. Now that employment is high and the economy is humming, what do you think the advantages of moving to Mooresville would be for your entire family?

Discuss the effects of a healthy town economy on education, quality of life, home ownership, employment, and business opportunities. Talk about some of the other

Career-related topics require students to use critical thinking skills.

Workplace Politics and Personalities



On your new job at Rosie's Auto Repair you have been assigned to assist Max, an experienced mechanic. Today you are helping him replace a leaking fuel pump in a two-year-old car. You ask Max where the leak is because you don't understand why you can't see it, and you want it pointed out to you.

"Listen," Max whispers, "There's no leak in this fuel pump, but it's still under warranty. Don't worry, it won't cost the customer a penny, and it's good work for us. Got it?"

You nod your head; you're relieved that the customer won't be charged for this job, but you didn't think you would have to be dishonest to make a living. You know that some how, some way, somebody has to pay for this expensive part that isn't broken, and the price probably will get passed on to car buyers.

You're uncomfortable and unhappy, but you don't want to "rock the boat" on you new job.

What would you do?

_____

_____

_____

Students solve a **short dilemma** based on a real workplace situation.

Biomass Energy: It's Not Just for Breakfast Anymore

http://www.fuelcells.org/
The Online Fuel Cell Information Center

http://news.nationalgeographic.com/news/2001/10/1016_TVhypercar.html
National Geographic News Report on Hydrogen Cars

http://www.api.org/globalclimate/thescience.htm
American Petroleum Institute
Greenhouse Gases

A **light exercise** stimulates student interest.

Just for Fun: Dream Machine

Cars! They're beautiful; they're powerful; they make a statement about you. While you may never own the car of your dreams, you can picture it in your mind. Maybe you've seen a car that with a few changes could be "The One."

Write a description of your dream car. Why is it the dream machine? What does it say about who you are? Where would you like to travel in it? Why would you like to go to this place?

In the News

And the winner is.....California !!!!!

You've heard of an SUV or sports utility vehicle, but have you heard of the HEV, hybrid electric vehicle, or the FFV, flex-fuel vehicle. Don't forget the AFV, alternative fuel vehicle, and the EV, electric vehicle. These might be the automobiles in your future.

On July 22, 2002 Governor Gray Davis of California signed a new bill directing the California Air Resources Board to come up with regulations by 2005 that "achieve the maximum feasible reduction of greenhouse gases." The new standards would apply to vehicles from model year 2009 onward.

California has always been in the forefront of the effort to reduce toxic emissions from automobiles and industry. This is not the first time that the state of California has demanded higher standards and achieved them. Where California leads, others follow. New York is next in line to enact stricter regulations, and Massachusetts is not f[illegible]hind.

The Federal Government has not taken actions as strong as California, but they have initiated tax incentives for buying "Green" automobiles.

Classroom Discussion

How far do you think federal and state governments should go to regulate emissions?

Do you think consumers will use their buying power to demand stricter emission

A **news item** encourages classroom discussion.

Related Web Sites

http://www.autoshop-online.com/auto101.html
Automotive Information Index

http://www.asecert.org/subchannels/pro_cert_general.cfm
National Institute for Automotive Service Excellence
General ASE Certification Information

http://www.natef.org/
National Automotive Technicians Education Foundation
Career and Certification Information

http://evworld.com/index.cfm
EV World
Read the latest news on electric vehicles.

http://www.evworld.com/archives/reports/inside_insight.html
EV World's Review of the Honda Insight Gas-Electric Hybrid

Abundant **Web sites** relate to the book topic.

Hands-On-Academics™

Helping students connect learning to real life

Hands-On-Academics offers you the easiest way yet to link a subject area to careers. You can have everything you need to connect math, English, science and social studies to traditional and emerging careers. Correlated to the sixteen career clusters identified by the U.S. Department of Education, Hands-On-Academics is packed with comprehensive and motivating materials.

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- Six 32-page text workbooks shown below
- Six accompanying PowerPoint™ presentations described below
- Series I and II CD-ROM featuring 16 different careers per series. Contact us for titles.
- Series III and IV e-mail featuring 16 additional careers per series. Contact us for titles.

These titles are presently available as text workbooks. Contact us for upcoming titles.

PowerPoint presentations currently available for purchase. Contact us for upcoming titles.

- Automotive Service Technician
- Carpenter
- Chef
- Cosmetologist
- Customer Service Representative
- Medical Assistant

Each PowerPoint presentation includes:

- Important highlighted information from the text workbook
- Icons to match the text workbook
- Colorful motivating slides
- Easy-to-use

Visit us frequently on the Internet at www.careersolutionsgroup.com to learn of our other career and academic resources or contact us for additional titles in all media.

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