



AUTO BODY REPAIR

AUTO BODY REPAIR BASICS



TEACHER'S GUIDE

SHOPWARE®

INTRODUCTION

This Teacher's Guide provides information to help you get the most out of *Auto Body Repair Basics*. The contents in this guide will allow you to prepare your students before using the program and present follow-up activities to reinforce the program's key learning points.

As the first program in the 12-part series *Auto Body Repair*, *Auto Body Repair Basics* introduces basic auto body repair concepts, shop areas and equipment, general shop safety procedures, career opportunities, and service ethics. After viewing this video, students will have a more detailed understanding of the types of jobs available in the auto body repair field, as well as of the tools and work areas that are typical in auto body repair shops. Use the *Auto Body Repair Basics* video and accompanying activities provided in this guide to provide students with an introduction to the automotive body repair industry, and to peak interest in career opportunities in the field.

LEARNING OBJECTIVES

After viewing the program, students will be able to:

- Identify the different areas of an auto body repair shop.
- Explain general shop safety procedures.
- Recognize general shop equipment.
- Describe potential career areas and opportunities in auto body repair.
- List standards for ethics in service delivery.

EDUCATIONAL STANDARDS

The primary certifying body for automotive technician training programs is the National Institute for Automotive Service Excellence (ASE). ASE is a non-profit organization established in 1972 by the automotive industry to improve the quality of vehicle repair and service through the voluntary testing and certification of automotive repair technicians. The National Automotive Technicians Education Foundation (NATEF) is a separate non-profit foundation within ASE. The mission of NATEF is to improve the quality of automotive technician training programs nationwide through voluntary certification. The State Departments of Education in all 50 states support ASE/NATEF certification of automotive programs.

National Standards

This program correlates with the Program Certification Standards for Automobile Technician Training Programs from the National Institute for Automotive Service Excellence (ASE) and the National Automotive Technicians Education Foundation (NATEF). The content has been aligned with the following educational standards which reflect the tasks in the ASE Program Certification Standards for Automobile General Service Technician Programs.



Introduction to Auto Shop and Personal Safety

- Identify general shop safety rules and procedures.
- Utilize safe procedures for handling of tools and equipment.
- Identify and use proper procedures for safe lift operation.
- Utilize proper ventilation procedures for working within the lab/shop area.
- Identify marked safety areas.
- Identify the location and use of fire blankets.
- Identify the location and the types of fire extinguishers; demonstrate knowledge of the procedures for using fire extinguishers.
- Identify the location and use of eye wash stations.
- Identify the location of the posted evacuation routes.
- Comply with the required use of safety glasses, gloves, shoes during lab/shop activities.
- Identify and wear appropriate clothing for lab/shop activities.
- Comply with appropriate hairstyles for lab/shop activities.

Tools and Equipment

- Identify tools and their usage in automotive applications.
- Demonstrate safe handling and use of appropriate tools.
- Demonstrate proper cleaning, storage, and maintenance of tools and equipment.

2002 Automobile Program Standards, by the National Automotive Technicians Education Foundation, Copyright 2002 by the National Automotive Technicians Education Foundation. Reprinted with permission.

Language Arts and Communication Standards

According to ASE/NATEF standards, the automobile technician must be proficient in the following Language Arts and Communications related academic skills that are embedded in the occupation. The activities and information presented in this program and accompanying teacher's guide are aligned to the following standards from the National Automotive Technicians Education Foundation from the National Institute for Automotive Service Excellence.

- Request, collect, comprehend, evaluate, and apply oral and written information gathered from customers, associates, and supervisors regarding problem symptoms and potential solutions to problems.
- Identify the purpose for all written and oral communication and then choose the most effective strategies for listening, reading, speaking, and writing to facilitate the communication process.
- Adapt a reading strategy for all written materials, e.g. customer's notes, service manuals, shop manuals, technical bulletins, etc., relevant to problem identification, diagnosis, solution, and repair.
- Use study habits and techniques, i.e. previewing, scanning, skimming, taking notes, etc., when reviewing publications (shop manuals, references, databases, operator's manuals, and text resources) for problem solving, diagnosis, and repair.
- Write clear, concise, complete, and grammatically accurate sentences and paragraphs.
- Write warranty reports and work orders to include information regarding problem resolution and the results of the work performed for the customer or manufacturer.



- Comprehend and apply industry definitions and specifications to diagnose and solve problems in all automotive systems and components.
- Scan service manuals and databases to locate specific information for problem-solving purposes.
- Use the service manual to identify the manufacturer's specifications for system parameters, operation, and potential malfunctions.
- Supply clarifying information to customers, associates, parts supplier, and supervisors.

Technology Standards

The activities in this Teacher's Guide were created in compliance with the following National Education Technology Standards from the National Education Technology Standards Project. The content has been aligned with the following educational standards and benchmarks.

- Use a variety of media and formats to communicate information and ideas effectively to multiple audiences.
- Use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.
- Use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.
- Use technology tools to enhance learning, increase productivity, and promote creativity.
- Use technology to locate, evaluate, and collect information from a variety of sources.

The National Education Technology Standards reprinted with permission from the International Society for Technology Education.

Career Standards

This program also correlates with the National Career Development Guidelines from the National Occupational Information Coordinating Committee. The content has been aligned with the following standards from this organization.

- Understand the relationship between educational achievement and career planning.
- Demonstrate how to apply academic and vocational skills to achieve personal goals.
- Describe the relationship of academic and vocational skills to personal interests.
- Describe how skills developed in academic and vocational programs relate to career goals.
- Describe how learning skills are required in the workplace.
- Locates evaluate, and interpret career information.
- Describe the educational requirements of various occupations.
- Identify how employment trends relate to education and training.
- Demonstrate academic or vocational skills required for a full or part-time job.
- Demonstrate employability skills necessary to obtain and maintain jobs.
- Understand how societal needs and functions influence the nature and structure of work.
- Describe how occupational and industrial trends relate to training and employment.
- Describe career plans that reflect the importance of lifelong learning.
- Demonstrate knowledge of postsecondary vocational and academic programs.

The National Career Development Guidelines reprinted with permission from the Center for Civic Education.



PROGRAM OVERVIEW

What is it like to work in an auto body repair shop? What types of tools do the technicians use? What types of safety precautions are taken in a shop? These are some of the questions answered in *Auto Body Repair Basics*, introducing basic auto body repair concepts, including shop areas and equipment, general shop safety procedures, career opportunities, and service ethics. Students will have the opportunity to see actual technicians working in a shop, and see up-close the tools and safety procedures used while on the job. After viewing this program, students will have a much better understanding of the career options available in the field of auto body repair.

MAIN TOPICS

Topic 1: Career Opportunities in Auto Body Repair

Within this topic, students will learn about the various career opportunities available in the field of auto body repair. They will also find out how the size of the shop makes a difference in the types of job opportunities available.

Topic 2: Work Areas in an Auto Body Repair Shop

This section of the program introduces students to the different work areas found within typical auto body repair shops, and explores the differences between small, medium, and large shops. Students will also have an opportunity to see the types of processes and tools used for various repairs in an auto body shop.

Topic 3: Safety Procedures for Auto Body Repair

In this section, students will learn about the necessary safety procedures within an auto body repair shop. Students will be introduced to procedures used when dealing with hazardous materials, and will be taught the importance of following safety rules to prevent and respond to accidents.

Topic 4: Service Ethics

In this section, students will be taught the thirteen customer service guidelines that should be observed by any business or person involved in auto body repair, as developed by the National Dealers Association, a professional association for auto dealers.

FAST FACTS

- Before any auto body repairs can begin, an estimate of the repairs needed and repair costs must be made. Estimating involves assessing damage, then determining which parts must be replaced and which ones can be repaired.
- Collisions and the repair process itself compromise a vehicle's corrosion protection. Your job as an auto body repair technician is to make sure that corrosion protection is fully restored during the repair process. If it isn't, rust and other corrosive forces can seriously weaken the vehicle's structure and damage its appearance.



- Because of the toxic nature of many paints, paint suits with ventilated masks or hoods are essential whenever you're spraying finishes of any kind.
- Hydrogen gas that hangs around batteries can ignite, causing the battery to explode. To avoid this problem, always charge batteries in a well-ventilated area.
- In case of a gasoline fire, never use water. Water can actually spread the flames rather than put them out.
- Use pneumatic tools and compressed air with caution. A burst of compressed air, if directed at your bare skin, can sometimes force air into your blood stream and cause death.
- Hazardous materials like solvents and paint, heavy metals, and corrosive liquids cannot be flushed down floor drains or put into normal garbage containers. It's against the law and can result in heavy fines.
- Most of today's vehicle frames are built in one piece called a unibody. The benefit of a unibody to passengers is that, in a collision, the frame absorbs most of the impact, protecting the passengers inside. However, when vehicles absorb an impact, the frame can sustain damages that can be overlooked during initial inspection, so it is critical that all damages be located and repaired for the safety of passengers.
- Most automotive body repairers work a standard 40-hour week, although some, including the self-employed, work more than 40 hours a week. (Source: Bureau of Labor Statistics)
- Automotive body and related repairers held about 220,000 jobs in 2002; about 1 in 10 specialized in automotive glass installation and repair. Most repairers worked for automotive repair and maintenance shops or automobile dealers. (Source: Bureau of Labor Statistics)
- More than 1 automotive body repairer in 10 is self-employed, almost twice the proportion for all installation, maintenance, and repair occupations. (Source: Bureau of Labor Statistics)

VOCABULARY TERMS

asphyxiation: Unconsciousness or death from lack of oxygen. In the shop, asphyxiation can result from contact with an airborne substance that inhibits normal breathing.

Class A Fire: Green fire extinguishers are for Class A fires. Burning wood, paper, cloth, upholstery, rubber, plastics, or rubbish produces these fires.

Class B Fire: Red fire extinguishers are for Class B fires. Class B fires are produced by flammable liquids such as gasoline, oil, grease, paint, or lighter fluid.

Class C Fire: Blue fire extinguishers are for Class C electrical fires. They should be used on fires in electrical motors, appliances, wiring, fuse boxes and switchboards.

Class D Fire: Class D fire extinguishers are yellow, and are designed to be used on fires of combustible metals such as aluminum, titanium, or magnesium.

dealership body shop: A body shop in a dealership is owned and operated under the direction of one of the major automobile manufacturers. This type of shop often concentrates on repairing the makes and models of cars sold by the dealership.

estimating: Estimating involves assessing damage, then determining which parts must be replaced and which ones can be repaired. A cost figure is applied to each part and the labor required to repair or to replace it. Today most shops use some kind of computerized system to help with this.



franchise body shop: A franchise body shop can be owned and managed locally, but operates under a set of rules or guidelines established by the franchise company. These rules and operating procedures may specify the brands of parts to be used and pricing for services.

hydraulic frame rack: A hydraulic frame rack is used for straightening bent frames. The vehicle frame is clamped to the rack, so it can't move. Then chains are attached, and the frame is pulled or pushed back into alignment.

independent body shop: An independent body shop is locally owned and operated. That means that it doesn't have any ties with a national company. The local owner/operator sets the rules and the prices for work.

paint booth: The paint booth is a large enclosure with its own ventilation system. The ventilation system removes a lot of the paint overspray from the booth and keeps out the dust and dirt from other areas of the shop.

pneumatic tool: A tool that is powered by compressed air.

PRE-PROGRAM DISCUSSION QUESTIONS

1. What jobs are available in the auto body repair industry? Which jobs are you most interested in?
2. How many areas in an auto body repair shop can you name?
3. What are some tools that are used in an auto body repair shop?
4. What safety procedures should be taken when working in an auto body repair shop?
5. What do you think are the differences in responsibilities for auto body repair technicians in small shops as opposed to large shops?

POST-PROGRAM DISCUSSION QUESTIONS

1. Now that you have seen the *Auto Body Repair Basics* video, were there any careers in the automotive industry of which you were not aware? If so what were they? Can you think of any careers in the automotive industry that were not included in this program?
2. Describe the pros and cons of working in a large, medium, and small auto shop. In which type of shop would you most enjoy working?
3. How are the different areas of a body shop related? Is there any area in which you would not want to work? In which area do you think you would most enjoy working?
4. List the tools found in each area of a body shop. What types of skills do you think are needed to operate these tools?
5. Based on the information learned in the video, what classes do you think you should take to prepare for a job in auto body repair?
6. In your opinion, which areas within an auto body repair shop require the most attention to safety? What safety measures should be taken in these areas?
7. Why do you think the National Dealers Association created a list of ethics for auto body repair shops? How do these ethics help the customer? How do they help the repair shop?



GROUP ACTIVITIES

Design Your Own Body Shop!

Your group has decided to join forces and open a body shop. You have sufficient capital to buy the necessary equipment and lease space for your shop. As a group, decide whether to open a franchised body shop or an independent one, after weighing the pros and cons of both. Prepare a written document for your investors explaining why you made the choice that you did. Then, prepare a detailed floor plan of what your body shop will look like. Be sure to include the appropriate areas for all the needs of your business. Describe or sketch a logo for your business, and put it at the top of all documents submitted for this assignment.

Auto Body Career Presentation

Your group needs to teach the class about a specific career within the auto body repair field. As a group, decide upon a career that you think many people in your class would be interested in. Then, research the requirements of the career. You may want to start at www.bls.gov, then answer the following questions:

- What education and experience is necessary for the career?
- What tasks is someone in this career responsible for?
- What kind of salary does someone in this career make? How many jobs are available for someone in this career?

As a group, prepare a large poster or tri-fold display, including photographs or illustrations, which provide the answers to these questions. Your group should also prepare a presentation designed to persuade others to choose this career. Each group should have the opportunity to present their career to the class, and answer questions about the career.

Auto Body Repair Tools

As a group, prepare a list of the tools that you will need in an auto body repair shop. Consult the *Auto Body Repair Basics* video, the Internet, and any other sources that you have available. Divide the list into hand tools, electric tools, and hydraulic tools. Then, find or illustrate pictures of each tool. Prepare a poster for each group of tools, labeling each tool with its name and its use. Be prepared to share your posters with the class.

INDIVIDUAL STUDENT PROJECTS

Field Research

Prepare a list of jobs in the field of auto body repair, and select two or three that interest you most. Then, go and visit some shops, including a dealership shop, a franchise shop, and an independent shop. Interview the owners and employees about the jobs that interest you. What jobs are available in their shops? Do they match your list? What are the salaries associated with the jobs you are interested in? What are the tasks you would be required to do? If possible, spend time observing people doing the jobs you are interested in, and take photographs. Prepare a written report which includes your observations, interviews, and photographs, describing what you've learned about the jobs you selected.



Safety in the Shop: Safety Manual

There are many safety rules that must be observed in an auto body repair shop. Review the rules taught in the *Auto Body Repair Basics* video, research safety rules in other places such as books and on the Internet, and, if possible, visit some auto body repair shops and write down the safety rules observed in these shops. After completing your research, prepare a safety manual with at least one page for each area of a comprehensive auto body repair shop. Write down the rules that should be observed in each area of the shop, and illustrate with pictures to help readers remember the rules.

Ethics in the Shop

The National Dealers Association has produced thirteen customer service guidelines that auto body repair shops should abide by. Go to the Internet and find these rules. Then prepare a written document that explains, for each guideline, why you think the rule is necessary, and what might happen if the guideline is not abided by. Do you think any other guidelines are necessary? If so, include these in your document as well.

INTERNET ACTIVITIES

Job Search

Pick an auto body repair career that is of interest to you, and then go to at least three job sites on the Internet, such as Monster.com, Hotjobs.com, and a local or statewide job site, and search for jobs in the field that interests you. Compile the listings, and for each listing, answer the following questions:

- What kind of education do you need for this job?
- What kind of experience is required?
- Do the listings provide a salary range? What is it?
- What tasks would you be responsible for doing in this job?
- Where is the job located?
- In which kind of shop is the job located—dealership, franchise, or independent?

1969 Alpha Romeo Repair

Imagine that you own an independent body shop, and you've been asked to repair a 1969 Alpha Romeo after it's been in an accident. There is damage to the nose of the car, and the frame is out of alignment. You've also noticed some rusting. Your job is to get it back into as near perfect condition as possible. Go to the Internet and find as much information as you can about the body of the 1969 Alpha Romeo. You can start at www.diy.net.com. Then, prepare an estimate for the owner detailing the repairs that need to be made (be creative), as well as how much it will cost to make each repair. Use the Internet to find the cost of labor, part replacements, and any other materials you need to do the repair. Remember, your pricing must be competitive in order to get the job! Be sure to include your company's logo (from the "Design Your Own Body Shop!" Group Activity) on the estimate.



Discussion Forums

Visit www.autobodyonline.com and enter the discussion forums. Post a question asking about the auto body career of your choice. Ask about duties and salaries, and ask for advice about breaking into the field. Also, review the other posts within the forums and see if you can gather any other information about the career you are considering. After a week, copy all your responses, as well as any other posts you have seen that are relevant, into a word processing document. Then answer the following questions: What have you learned as a result of the answers you received to your post? What have you learned from reading other posts? Has any of the information you read changed your mind about your career choice, or has it affirmed that you made a good choice?

ASSESSMENT QUESTIONS

Q: Which of the following is NOT a type of auto body repair shop?

- (a) Dealership
- (b) Franchise
- (c) Government
- (d) Independent

A: (c)

Feedback: Dealerships often have auto body repair shops that are owned and operated under the direction of one of the major automobile manufacturers. This type of shop often concentrates on repairing the makes and models of cars sold by the dealership. Franchise auto body repair shops can be owned and managed locally, but operate under a set of rules or guidelines established by the franchise company. Independent body shops are locally owned and operated, and the owner sets the rules and pricing.

Q: If you are interested in specializing in a particular part of the auto body repair business, you will most likely want to work in a _____ auto body repair shop.

A: large

Feedback: Many of the larger auto body repair shops are looking for people who specialize in a particular part of the business like painting and refinishing, bodywork, or mechanical and electrical repairs.

Q: Before any repairs can be made to a vehicle, what must be done first?

A: An estimate of the repairs needed and repair costs must be made.

Feedback: Estimating involves assessing damage, then determining which parts must be replaced and which ones can be repaired. A cost figure is applied to each part and the labor required to repair or to replace it.

Q: After the insurance company provides approval for the repairs, which of the following is the first step in the auto body repair process?

- (a) Bodywork
- (b) Washing
- (c) Painting
- (d) Welding

A: (b)



Feedback: When it is time to begin repairs, the vehicle first enters the wash-up area. Washing the vehicle removes any dirt, wax, oil, grease, and water-soluble contaminants that may interfere with repairs and refinishing.

Q: The bodywork area is usually the largest area in the auto body repair shop. (*True or False*)

A: True

Feedback: The bodywork area is usually divided into individual repair stalls or bays, each of which can accommodate one vehicle. Here is where most of the metal work is done—everything from repairing minor dents and scratches, to frame straightening, to application of the finishing touches before the vehicle is returned to its owner.

Q: Most bodywork areas contain a _____ for straightening bent frames.

A: hydraulic frame rack

Feedback: When a hydraulic frame rack is used for straightening bent frames, the vehicle frame is clamped to the rack so it can't move. Then chains are attached, and the frame is pulled or pushed back into alignment.

Q: What must be done before applying a final finish on a vehicle?

A: The surface of the vehicle must be properly prepared, or the paint won't adhere properly.

Feedback: Proper preparation means making sure all surfaces are clean of wax, dirt, grease, and silicone, and that bare metal is properly primed. Surface scratches and pinholes must be filled and sanded smooth. Any painted areas that are to be refinished must be scuff-sanded, cleaned of all dirt and grit, and sealed.

Q: What is a paint booth?

A: A paint booth is a large enclosure with its own ventilation system where a vehicle is painted after repairs have been made.

Feedback: The ventilation system removes a lot of the paint overspray from the booth and keeps out the dust and dirt from other areas of the shop.

Q: Which of the following should be done to prevent static electricity from causing an explosion when transferring flammable liquids?

- (a) Ground the drum
- (b) Use a red gasoline container for all flammable liquids
- (c) Wipe up spills immediately with water
- (d) Pour the liquid directly into the container without using any other devices

A: (a)

Feedback: Use only a UL approved drum transfer pump when transferring flammable liquids. Ground the drum to prevent static electricity from causing an explosion.

Q: Which of the following colors indicates the type of fire extinguisher that should be used for Class C electrical fires?

- (a) Green
- (b) Red
- (c) Yellow
- (d) Blue



A: (d)

Feedback: Blue extinguishers are for Class C electrical fires. They should be used on fires in electrical motors, appliances, wiring, fuse boxes, and switchboards.

ADDITIONAL RESOURCES

WEB SITES

Auto Body Online

www.autobodyonline.com

Auto Body Pro

www.autobodypro.com

Auto Body Tool Mart Repair and Restoration Tutorials

www.autobodytoolmart.com/restorations.html

Auto Glossary

www.autoglossary.com

Automotive Body Repair News

www.abrn.com/abrn

Automotive Services Association

www.asashop.org

Automotive Youth Educational Systems (AYES)

www.eyes.org

How Stuff Works—Auto Stuff Page

<http://auto.howstuffworks.com>

I-car

www.i-car.com

National Automobile Dealers Association Ethics Guide

www.nada.org

National Automotive Technicians Education Foundation

www.natef.org/program_standards/collision/index.cfm

Society of Collision Repair Specialists

www.scrs.com



Vocational Information Center: Auto Body Career Resources

www.khake.com/page11.html

Bureau of Labor Statistics—Automotive Body and Related Repairers

www.bls.gov/oco/ocos180.htm

BOOKS

Duffy, James E. *I-CAR Professional Automotive Collision Repair*. Albany, NY: Delmar Thomson Learning, 2001. ISBN: 0766813991

Duffy, James E. *Auto Body Repair Technology, 4th Edition*. Clifton Park, NY: Thomson/Delmar Learning, 2003. ISBN: 0766862747

Freund, Ken, et al. *The Haynes Automotive Electrical Manual*. Newbury Park, CA: Haynes Pub. Group, 2000. ISBN: 1850106541

Killingsworth, Jeff, Eric Godfrey, and John H. Haynes. *The Haynes Suspension, Steering And Driveline Manual*. Newbury Park, CA: Hayes North America, 1998. ISBN: 1563922932

Scharff, Robert, and James E. Duffy. *Motor Auto Body Repair, 3rd Edition*. Albany, N.Y.: Delmar Publishers, 1998. ISBN: 0827368585

OTHER PRODUCTS

Auto Shop Safety, VHS/DVD, Meridian Education

Stresses that if safety rules are not followed in an auto shop, serious injury or death can occur. Running engines, moving cars, cars on jack stands or floor jacks, open fuel lines, and other things all have the potential to cause a catastrophe. Methods for preventing accidents are shown and emphasized.

Order #: 24746, www.meridianeducation.com, 1-800-727-5507

Multimedia Auto Shop Safety, CD-ROM, Shopware

This multimedia CD-ROM uses video, animation and still photos to examine the topics of general shop safety, fire safety and prevention, first aid, and safe tool use for mechanics. The segment dealing with overall shop safety emphasizes the link between cleanliness and organization, as well as personal safety considerations of glasses, earplugs, shoes, and clothes. The first aid portion suggests that a certified first aid class be taken, but it offers an excellent survey of first aid practices, including what NOT to do. Correct fire extinguisher usage is illustrated by memorable graphics. The auto workshop is portrayed as a work site of numerous potential hazards, while at the same time the viewer is taught how to cope with the challenges of volatile auto products, damaged electrical cords, and welding cylinders and their contents. The mechanic's tools are shown to be a statement of their owner's professionalism. It seeks to foster that professionalism by describing the safe care and use of hand and power tools, wrenches, auto body tools, and measuring devices. (Windows/Macintosh)

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