Auto Collision Repair and Refinishing

Auto Collision Repair and Refinishing: Lesson Plan

Instructor: _____ *Date:*
Course: _____ *Unit:*

Chapter 1: Introduction to Collision Repair

Learning Outcomes

- 1.1 Summarize the typical steps involved in the collision repair process.
  - 1.1 The Repair Process
- 1.2 Explain the insurance process as it relates to collision-damaged vehicles.
  - 1.2 Insurance Claims
- 1.3 Identify and explain the various types of parts available.
  - 1.3 Ordering Parts
- 1.4 Explain the purposes and processes of pre-scanning and blueprinting.
  - 1.4 Pre-Scanning and Blueprinting
- 1.5 Describe the basic steps of collision repair and refinishing.
  - 1.5 Repair and Refinishing
- 1.6 Compare the various types of body shop ownership.
  - 1.6 Body Shop Types

Standards

The following ASE Collision Repair
- **VII.G.5:** Protect panels, glass, int

Instructional Resources

- Textbook/eBook: Chapter 1, page
- Instructor Resources: Chapter 1
  - Presentation for PowerP
  - Chapter 1 Answer Keys
- Other instructional resources:

Resources for Practice and Appli

- Digital Companion
  - E-Flash Cards
  - Interactive Glossary
  - Interactive Activities
- Textbook Image Gallery

Lesson Plans, PowerPoint Presentations, and Answer Keys

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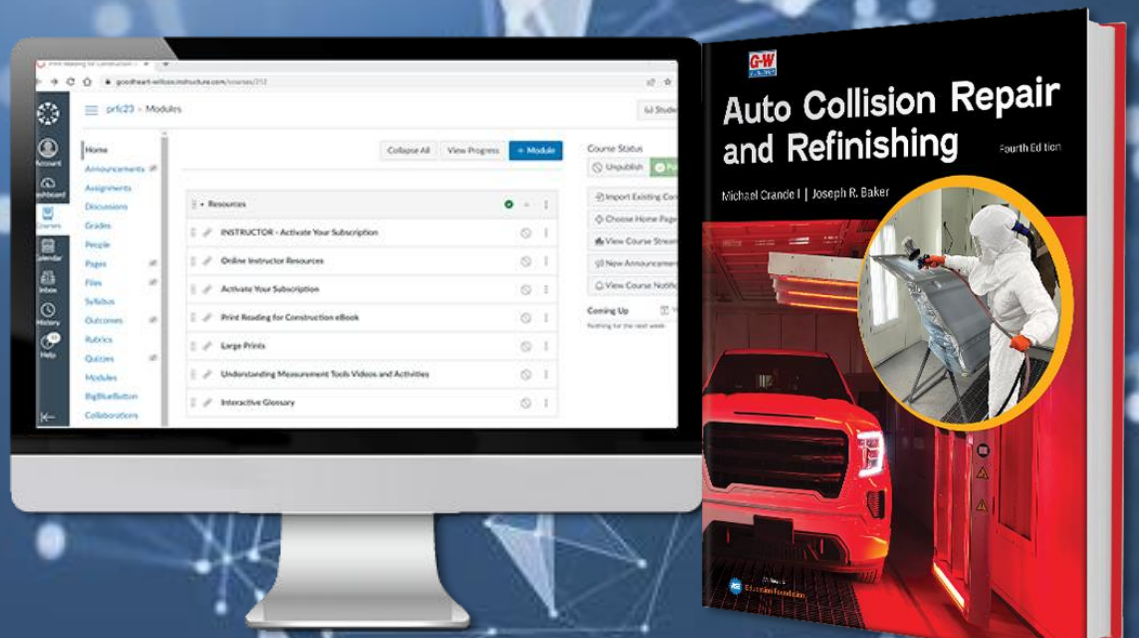

Print • Digital • Bundle Options Available

Blackboard
D2L BRIGHTSPACE
canvas
moodle
schoology
Additional LTI-Compliant Platforms
Clever
ClassLink
1EDTECH CERTIFIED
Google Classroom

LMS and CMS Integration Easy Navigation

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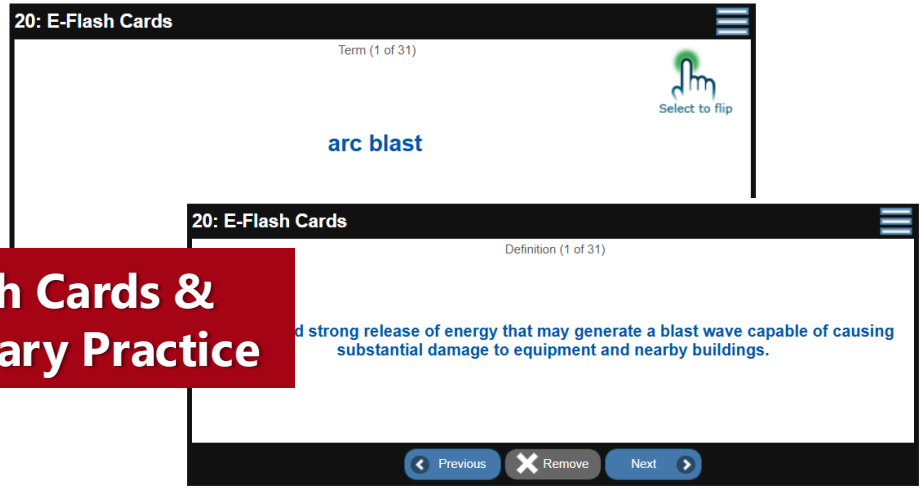
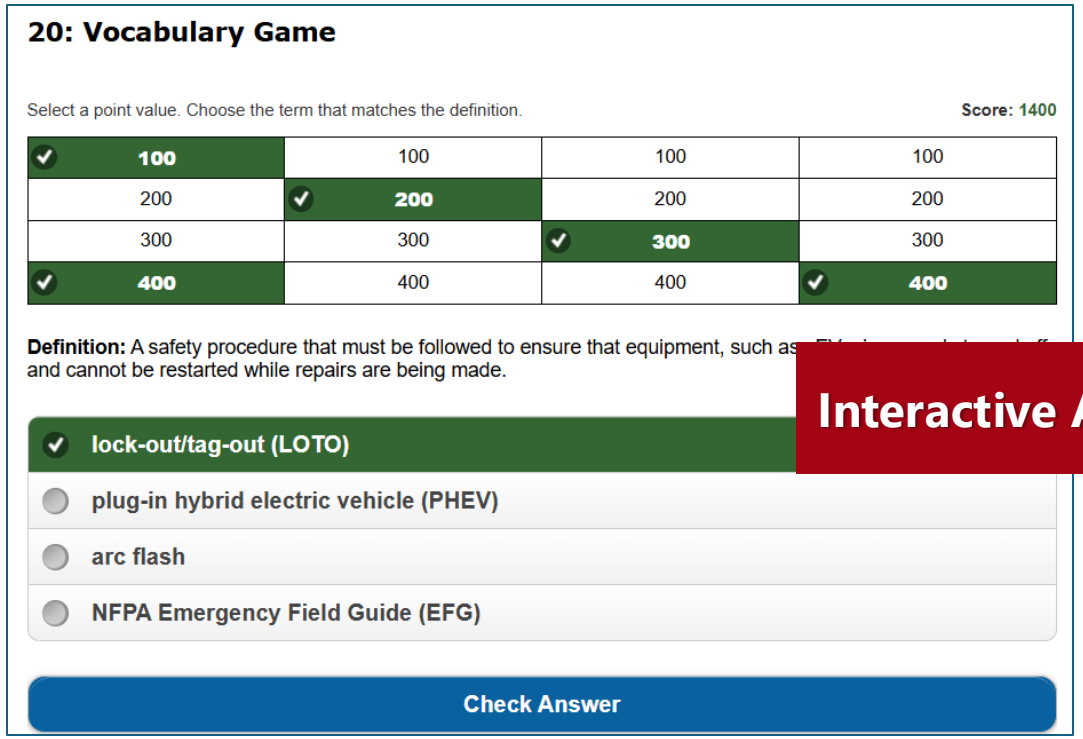
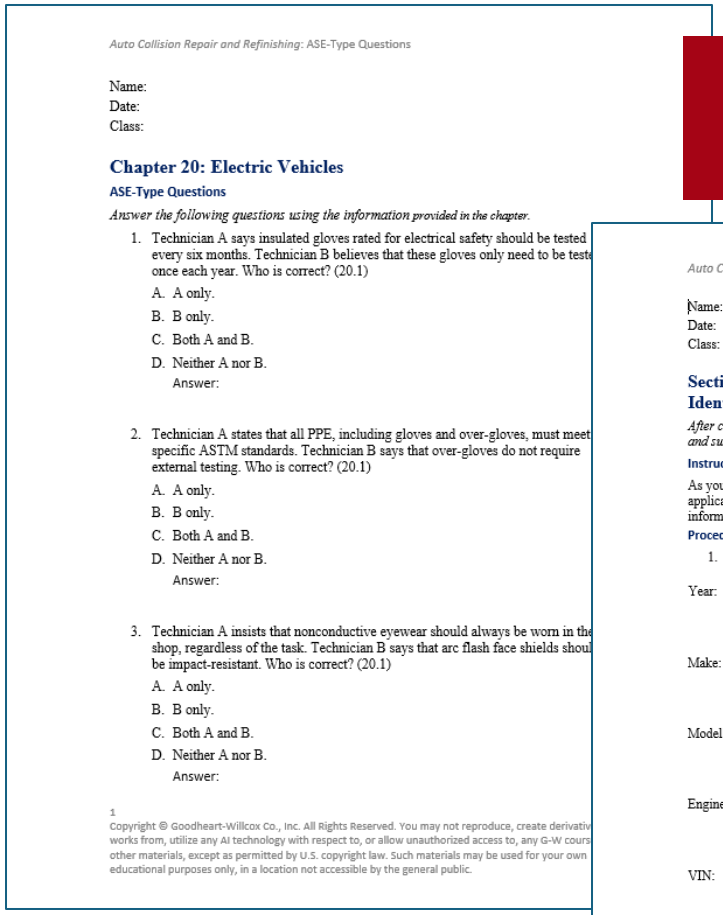


E-Flash Cards & Vocabulary Practice



Interactive Activities



Auto Collision Repair and Refinishing: ASE-Type Questions

Name:
Date:
Class:

Chapter 20: Electric Vehicles

ASE-Type Questions

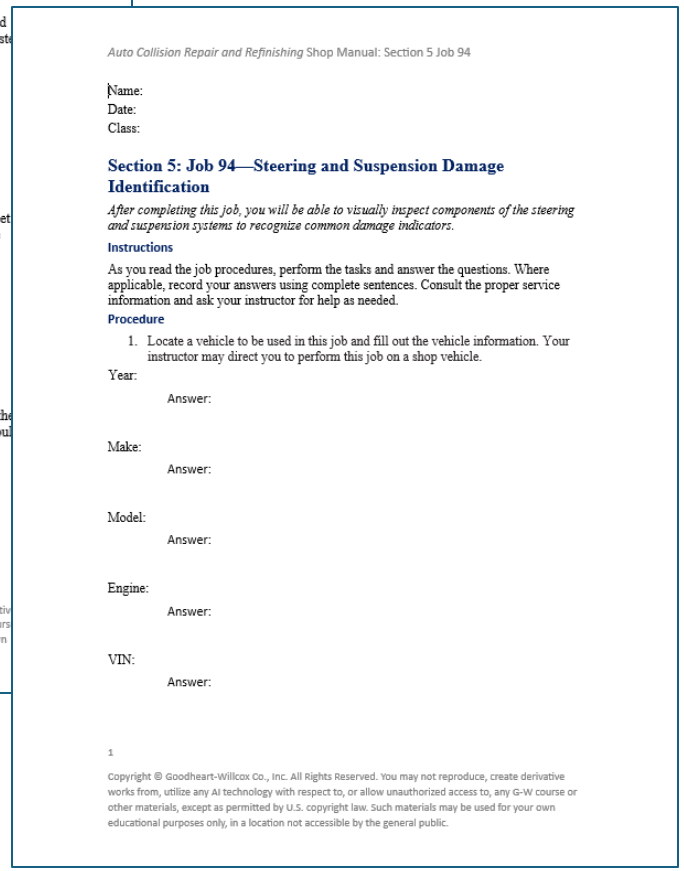
Answer the following questions using the information provided in the chapter.

1. Technician A says insulated gloves rated for electrical safety should be tested every six months. Technician B believes that these gloves only need to be teste once each year. Who is correct? (20.1)
   A. A only.
   B. B only.
   C. Both A and B.
   D. Neither A nor B.
   Answer:

2. Technician A states that all PPE, including gloves and over-gloves, must meet specific ASTM standards. Technician B says that over-gloves do not require external testing. Who is correct? (20.1)
   A. A only.
   B. B only.
   C. Both A and B.
   D. Neither A nor B.
   Answer:

3. Technician A insists that nonconductive eyewear should always be worn in the shop, regardless of the task. Technician B says that arc flash face shields shoul be impact-resistant. Who is correct? (20.1)
   A. A only.
   B. B only.
   C. Both A and B.
   D. Neither A nor B.
   Answer:

1



Auto Collision Repair and Refinishing Shop Manual: Section 5 Job 94

Name:
Date:
Class:

Section 5: Job 94—Steering and Suspension Damage Identification

After completing this job, you will be able to visually inspect components of the steering and suspension systems to recognize common damage indicators.

Instructions

As you read the job procedures, perform the tasks and answer the questions. Where applicable, record your answers using complete sentences. Consult the proper service information and ask your instructor for help as needed.

Procedure

1. Locate a vehicle to be used in this job and fill out the vehicle information. Your instructor may direct you to perform this job on a shop vehicle.

Year:
Answer:

Make:
Answer:

Model:
Answer:

Engine:
Answer:

VIN:
Answer:

1

Workbook and Shop Manual

Integrate G-W Digital Student Resources

©2027, 4th edition, 1,040 pp.
by Michael Crandell and Joseph R. Baker

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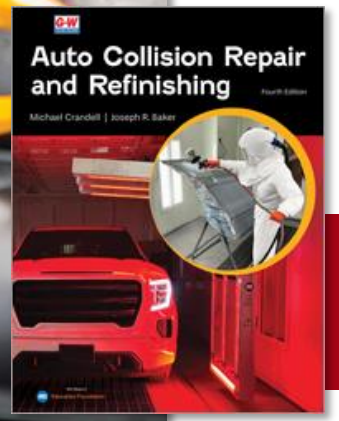

Student Textbook

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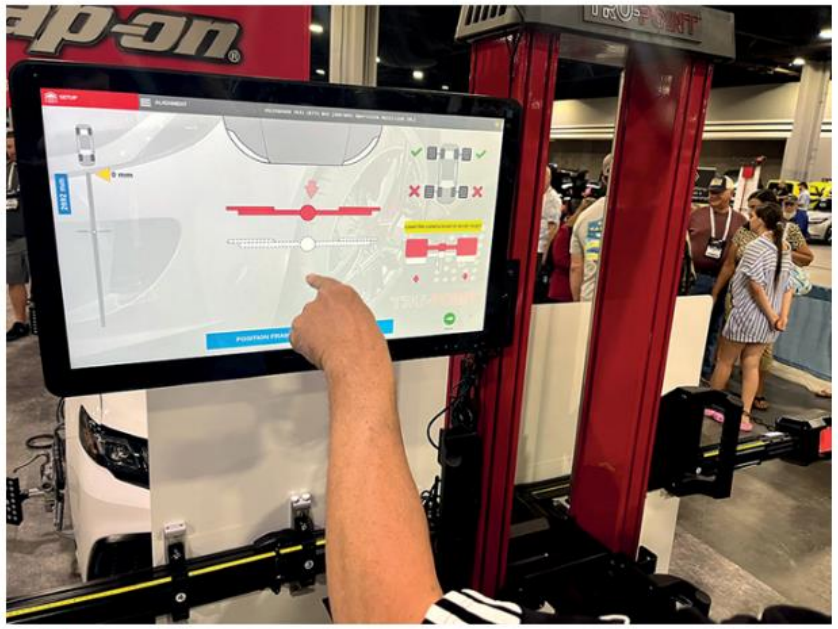

Joe Baker

Figure 21-38. ADAS calibration tools must first be accurately aligned with the targets before the calibration can begin.

CHAPTER 20 Electric Vehicles

FOCUS ON ALUMINUM

Aluminum Panel Repair Operations

PPE WARNING

The dust from sanding can irritate your lungs and be hazardous to your health. All aluminum work, including sanding and grinding, must be performed in an isolated area with a specialized dust extraction system to prevent airborne contamination. *Always* wear a respirator to protect yourself from harmful aluminum dust exposure.

Some vehicles are made entirely of aluminum, whereas others may have one or more aluminum panels, such as a deck lid or hood. Aluminum is popular because it is lighter than steel and does not compromise panel strength. However, it is softer than steel and requires modified processes and dedicated tools when repaired.

WARNING

Steel particles left on grinder disks, sandpaper, and files will contaminate bare aluminum. *Always* use dedicated tools and sandpaper when working on aluminum panels and make the repairs in a dedicated area isolated from the steel repair area.

TECH TIP

Glue pulling is the most effective technique for repairing dents in aluminum panels compared to typical hammer and dolly methods. It does not create extensive heat and maintains the integrity of the aluminum surface.

What's New to the Edition

ASE-TYPE QUESTIONS

1. Which of the following will cause an open? (21.1)
   A. A broken wire.
   B. A blown fuse.
   C. A melted fusible link.
   D. All are correct.
2. A DVOM is connected to a circuit to measure current flow. The meter reads OL. Technician A says that there is continuity in the circuit. Technician B says that there is no continuity. Who is correct? (21.1)
   A. A only.
   B. B only.
   C. Both A and B.
   D. Neither A nor B.
3. Technician A says that electrons flow from the battery's positive terminal to the negative terminal in an automotive circuit. Technician B says electrons flow from the negative terminal to the positive terminal. Who is correct? (21.1)
   A. A only.
   B. B only.
   C. Both A and B.
   D. Neither A nor B.
4. A wire in an electrical circuit shows infinite resistance when tested with a digital multimeter. What is the most likely problem? (21.1)
   A. The wire is broken.
   B. The circuit has continuity.
   C. There is no voltage source connected to the wire.
   D. The circuit is experiencing a short.
5. Technician A says that an increase in the temperature of a conductor will increase its resistance. Technician B says that the movement of free electrons in a conductor produces heat, which can affect resistance. Who is correct? (21.1)
   A. A only.
   B. B only.
   C. Both A and B.
   D. Neither A nor B.
6. A _____ is a magnetic switch that uses a low-voltage signal from a remote location to control the on-and-off operation of a high-voltage circuit. (21.2)
   A. magneto
   B. relay
   C. fusible link
   D. diode

ASE Education Foundation Task Lists

CHAPTER 22

Brakes

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CHAPTER 22 LEARNING OUTCOMES

After studying this chapter, you will be able to:

- **22.1** Explain the basic principles of hydraulic braking systems.
- **22.2** Identify and describe the major components of brake systems.
- **22.3** Apply proper safety and repair practices while replacing damaged or worn parts.

CHAPTER 22 TECHNICAL TERMS

- anti-lock brake system
- automatic emergency braking
- bleeder valve
- electronic stability control system
- friction
- hygroscopic
- metering valve
- Pascal's law
- power brakes
- pressure-differential valve
- proportioning valve
- regenerative braking
- traction control system
- tubing flare tool
- wheel lockup

CHAPTER 22 INTRODUCTION

Brake systems slow and stop a vehicle by applying fluid pressure to the brake mechanisms at each wheel when the brake pedal is pressed. Today's vehicles often include advanced systems such as anti-lock brakes, traction control, and electronic stability control to enhance safety and control during emergencies or slick conditions. Collision damage can affect brake components, making it essential for collision technicians to understand how these systems operate and how to inspect and repair them properly. This chapter covers the basics of brake system operation and repair.

Chapter-Opening Materials

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TECH TIP

Place a heavy tarp or blanket over the chain before applying tension. This will help prevent the chain from flying back if it breaks under tension.

WARNING

Never remove the ground from an extension cord or power tool cord.

A B

Yellow Cat/Shutterstock.com

PPE WARNING

MIG welding produces extremely bright light. This light is so intense th
permanently damage an unprotected eye and cause skin burns. *Alway*
welding helmet.

FOCUS ON ALUMINUM

Aluminum Dust

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Mixing aluminum and steel dust can pose a potential fire hazard due to the risk of thermite reactions. Thermite is a chemical reaction occurring when aluminum powder reacts with iron oxide (rust), producing intense heat and molten iron. Use a water extraction (wet mix) system to prevent an explosion when sanding an aluminum panel. A wet mix system safely captures aluminum dust by using water to keep the potentially explosive dust from becoming airborne inside the vacuum unit.

The wet-mix dust collector illustrated draws the aluminum dust into the unit and forces it down through a venturi, deep into the water. The water separates most of the dust particles, and they fall to the bottom of the unit.

Goodheart-Willcox Publisher

Special Features

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CHAPTER 3 **Review and Assessment**

SUMMARY

- The technician must be aware of the hazards encountered in the collision repair shop and take steps to minimize the associated dangers. (3.1)
- Chronic hazards cause problems after long-term exposure to a hazardous material. Acute hazards cause an immediate reaction. (3.1)
- Volatile liquids are the primary explosion hazard encountered in the shop. A volatile liquid evaporates readily when exposed to air. (3.1)
- Good housekeeping and careful use of equipment will help prevent fires. (3.1)
- Damaged or improperly used electric tools can cause an electric shock or electrocution. (3.1)
- Cuts, burns, and sprains are common collision repair shop injuries. (3.1)
- Hazardous waste produced in the collision repair shop includes leftover paint, contaminated solvent, and used spray booth exhaust filters. (3.2)
- The primary chemical hazards encountered in the collision repair shop are found in paint products. (3.2)
- Inhalation of isocyanates can lead to sensitization. Sensitization also occurs when isocyanates are absorbed through the skin or mucous membranes. (3.2)
- Following safe work practices will reduce the chances of accidents by eliminating or minimizing many of the hazards encountered in the shop. (3.3)
- When using straightening equipment, never stand beside or straddle a chain under tension. (3.4)
- Volatile organic compounds cause air pollution and health problems for technicians. (3.5)

REVIEW QUESTIONS

Answer the following questions using the information provided in the chapter.

Know and Understand

1. A(n) _____ health hazard is caused by long-term exposure to hazardous material. (3.1)
   A. acute
   B. chronic
   C. systematic
   D. unprotected
2. *True or False?* Isocyanates are an acute hazard. (3.1)
3. Which of the following are required to sustain a fire? (3.1)
   A. Carbon monoxide and heat.
   B. Combustible material, heat, and carbon dioxide.
   C. Oxygen, heat, and combustible material.
   D. All are correct.
4. *True or False?* A Class A fire is caused by electrical equipment. (3.1)
5. *True or False?* VOCs are the evaporating components in paint. (3.1)
6. _____ paint contains less solvent than previous types of paint. (3.1)
   A. Exempt
   B. HVLP
   C. Non-high solids
   D. High-solids
7. Inhalation of isocyanates will lead to _____. (3.1)
   A. sensitization
   B. color blindness
   C. ageusia
   D. loss of hearing
8. *True or False?* A paint suit, spray sock, neoprene gloves, safety glasses, and a cartridge respirator should be worn when welding and cutting. (3.2)
9. *True or False?* A half-full oxygen tank is under 250 psi (1,724 kPa) of pressure. (3.3)

Apply and Analyze

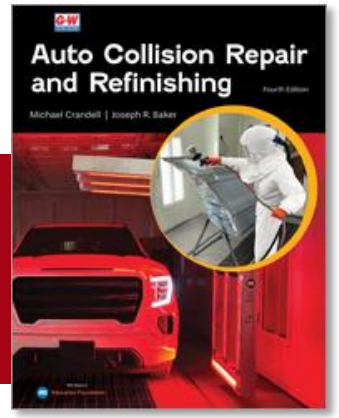
1. Sketch a floor plan of your shop and label the different areas. Based on your study of this chapter, determine if there are any potential safety hazards. Mark their location on the floor plan. On the same floor plan, mark the location of fire extinguishers, exits, and eye-flushing stations. (3.4)
2. Work with your instructor to establish a safety committee that includes several classmates. The committee should meet weekly to discuss ways to improve shop safety. Prepare an agenda before each meeting and follow basic parliamentary procedure during the meetings. (3.4)
3. Describe safety practices related to personal protection. This includes eye, ear, respiratory, and skin protection. (3.6)

Critical Thinking

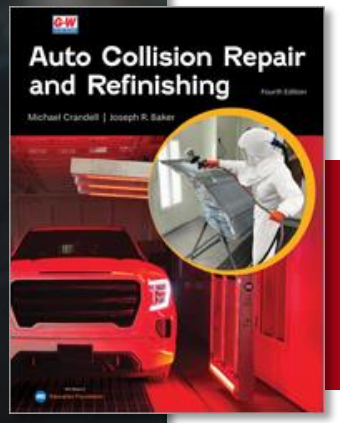
1. Let's say a classmate or technician becomes sensitized while in the shop environment but they want to continue working in the auto collision industry. What job positions would you suggest that minimize this hazard? (3.2)
2. Talk to your instructor about a specific brand of paint that you'll have the opportunity to spray. Locate the SDS for this product and list the personal protective equipment suggested for the application. (3.5)
3. Carbon monoxide is an extremely toxic, colorless, and odorless gas. What preventative steps could you take to prevent CO poisoning? (3.2)
4. OSHA violations can be very costly to a collision repair facility. Research recent OSHA violations online that pertain to the auto collision industry and document what could have been done to prevent the violation. (3.5)
5. Did you know you can taste garlic through your feet? Give it a try. Just rub some fresh garlic on the soles of your bare feet and wait a while. You should be able to taste it in your mouth within 10 minutes or less. How would you relate this exercise to PPE in the auto collision industry? (3.6)

ASE-TYPE QUESTIONS

1. Which of the following contains isocyanates? (3.1)
   A. Body filler.
   B. Paint catalyst.
   C. Welding fumes.
   D. Lacquer thinner.
2. Which of the following are symptoms of isocyanate sensitization? (3.1)
   A. Wheezing.
   B. Coughing.
   C. Shortness of breath.
   D. All are correct.
3. Technician A says that chemicals can enter the bloodstream through the skin. Technician B says that chemicals can enter the bloodstream by breathing in vapors. Who is correct? (3.1)
   A. A only.
   B. B only.
   C. Both A and B.
   D. Neither A nor B.
4. Burning paper is classified as a(n) _____ Type fire. (3.1)
   A. A
   B. B
   C. C
   D. D



End-of-Chapter Content



Name:
Date:
Class:

Chapter 21: Electrical System

Learning Outcomes

After studying this chapter, you will be able to:

- 21.1 Understand basic current flow.
- 21.2 Identify electrical system components.
- 21.3 Describe the key components and functions of modern vehicle electrical systems.
- 21.4 Demonstrate a systematic approach to diagnosing and repairing electrical issues.
- 21.5 Identify, service, and diagnose electrical problems in modern vehicles.

Carefully read Chapter 21 of the Auto Collision Repair and Refinishing *textbook. Then complete the following questions.*

1. An atom consists of ___, neutrons, and electrons. (21.1)

   Answer:

2. What type of charge do electrons carry? (21.1)

A. Positive.
B. Negative.
C. Neutral.
D. Alternating.

   Answer:

3. Technician A says that an atom has an equal number of protons and electrons. Technician B says that an atom has no charge because the protons and electrons cancel each other out. Who is correct? (21.1)

A. A only.
B. B only.
C. Both A and B.
D. Neither A nor B.

Name:
Date:
Class:

Section 2: Job 41—Spray Gun Use, Settings, and Technique

After completing this job, you will be able to demonstrate the process of adjusting spray gun settings and techniques for proper spray application.

Instructions

As you read the job procedures, perform the tasks and answer the questions. Where applicable, record your answers using complete sentences. Consult the proper service information and ask your instructor for help as needed.

Procedure

1. Locate the spray gun and paint materials to be used in this job and fill out the spray gun information. Your instructor may direct you to a specific spray gun and specific paint materials.

Manufacturer:

   Answer:

Model:

   Answer:

Tip Size:

   Answer:

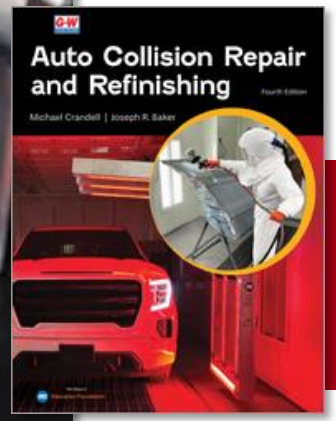
Efficiency Type:

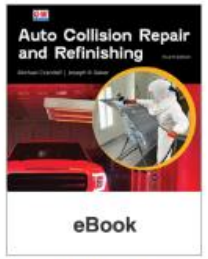
   Answer:

Spray Gun Settings

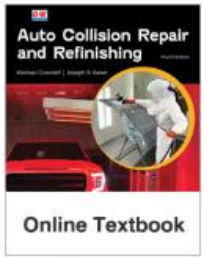
The adjustable controls on the spray gun enable the user to manipulate the spray pattern, the amount of material, and the air pressure level. The controls may be located in different locations based on the manufacturer or model.

Workbook and Shop Manual

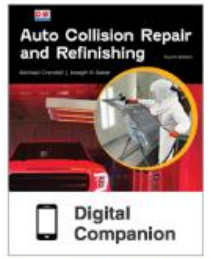




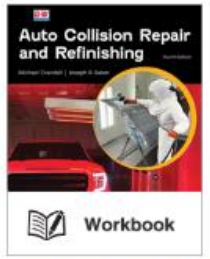
Auto Collision Repair and Refinishing 4e, eBook



Auto Collision Repair and Refinishing 4e, Online Textbook



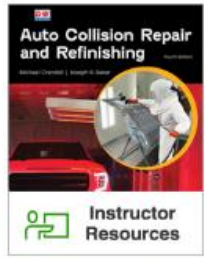
Auto Collision Repair and Refinishing 4e, Digital Companion



Auto Collision Repair and Refinishing 4e, Workbook

Collision Repair & Refinish Virtual Toolbox

Auto Collision Repair and Refinishing 4e, Shop Manual



Auto Collision Repair and Refinishing 4e, Instructor Resources

Auto Collision Repair and Refinishing 4e, G-W Assessment

Auto Collision Repair and Refinishing 4e, Image Library

Multimeter Simulations

Digital Assets

Joe Baker

Joe Baker

Joe Baker

Images and Illustrations

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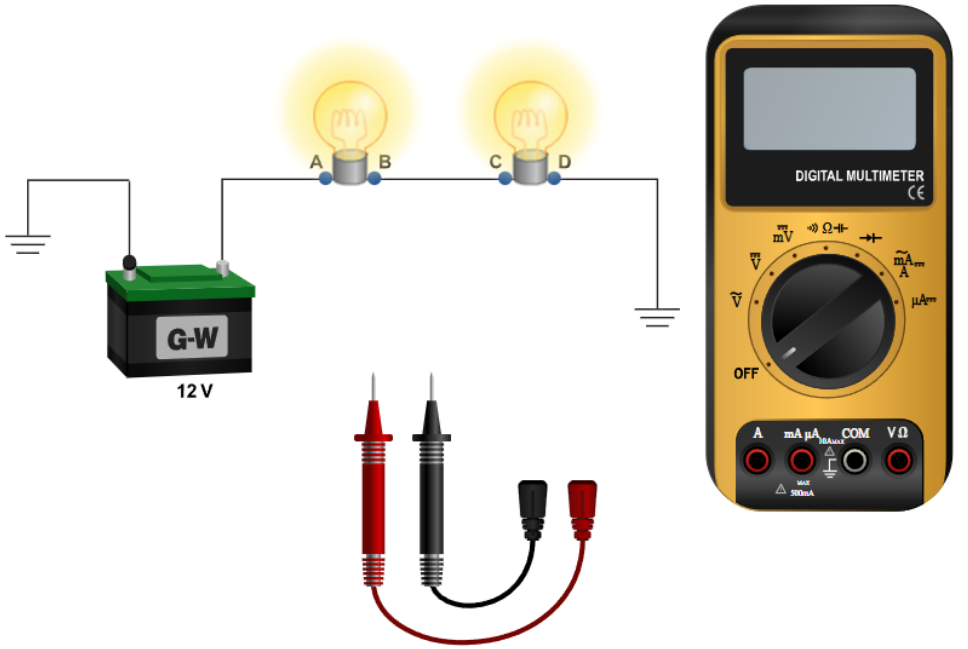
Measuring Resistance in a Series Circuit: Problem 1

Battery
- Connected
- Disconnected

Multimeter Red Lead
- A
- mAμA
- VΩ
- Disconnected

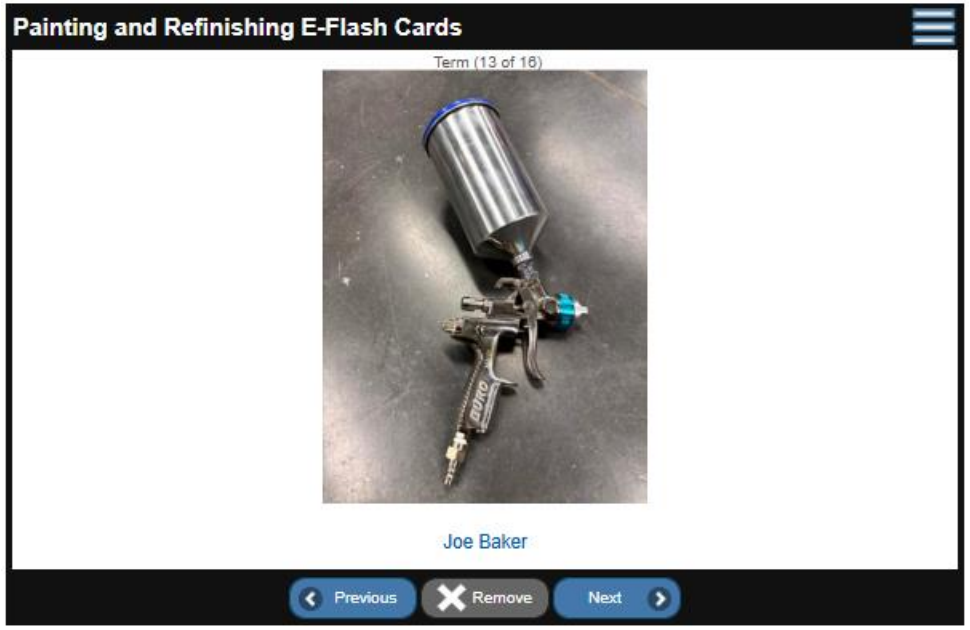
Multimeter Black Lead
- COM
- Disconnected



Multimeter Setting OFF

Multimeter Red Probe Disconnected

Multimeter Black Probe Disconnected



Virtual Toolbox and Simulations

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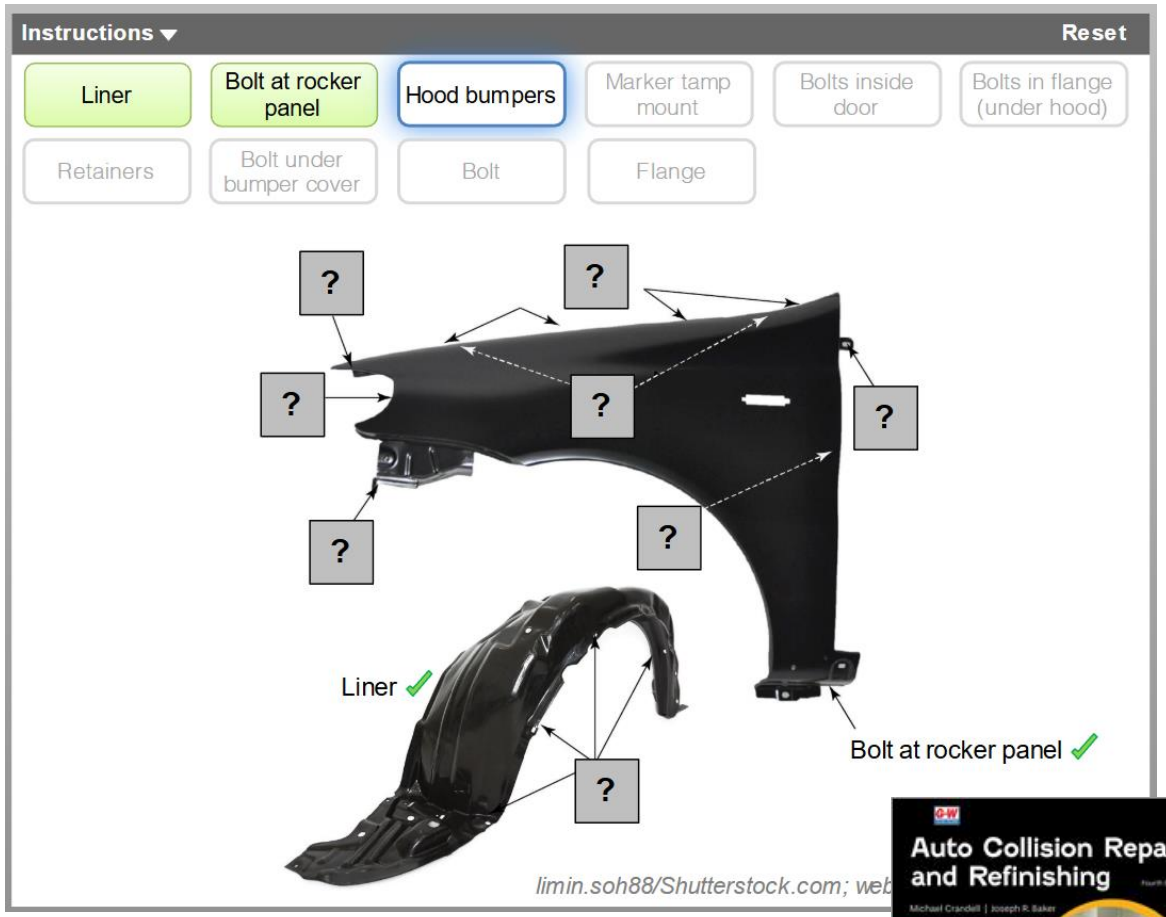
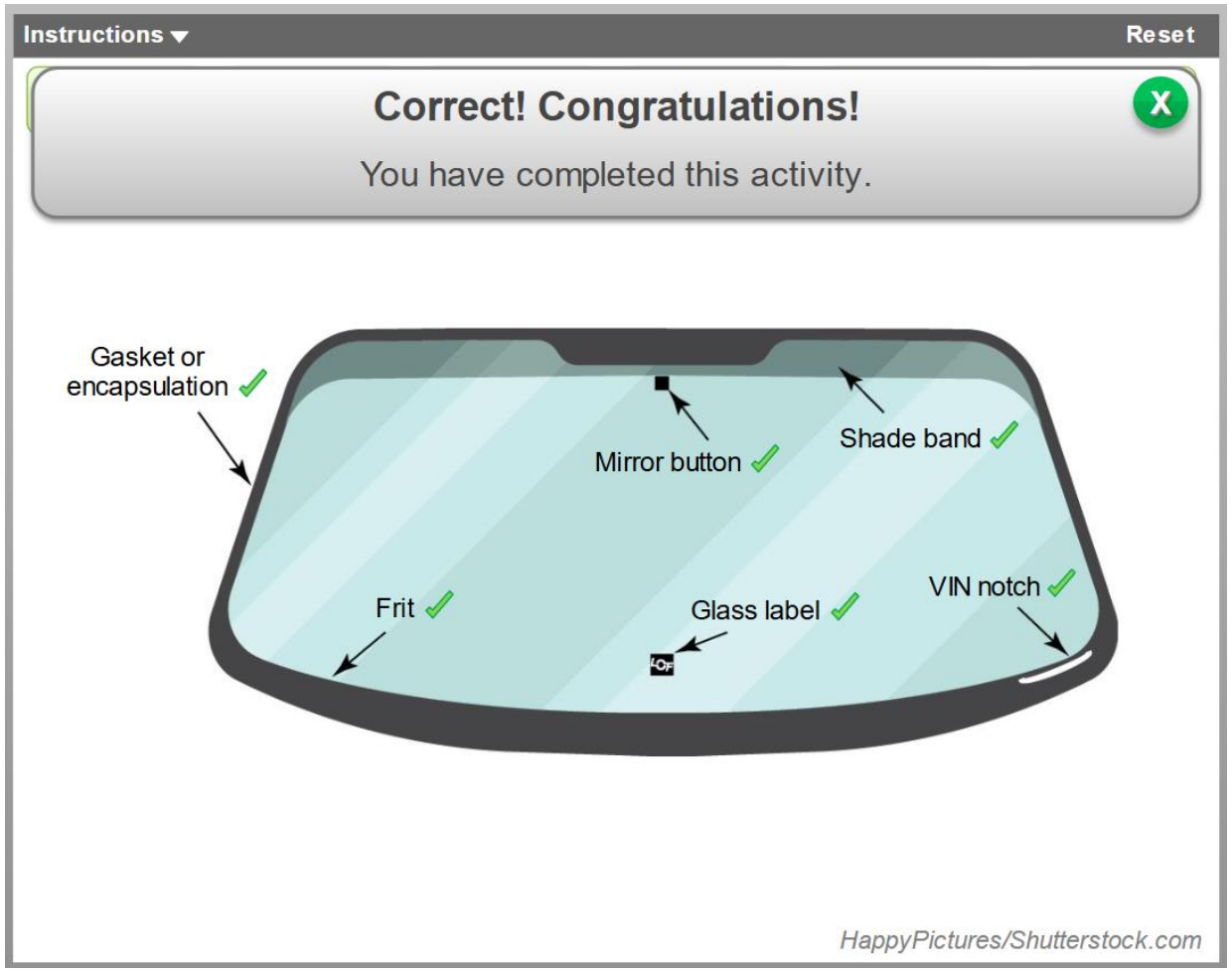
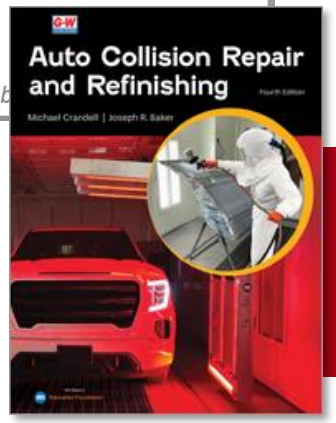






Drag and Drop Activities

G-W PUBLISHER

Home Favorite History New Narrated Goodheart-Willcox

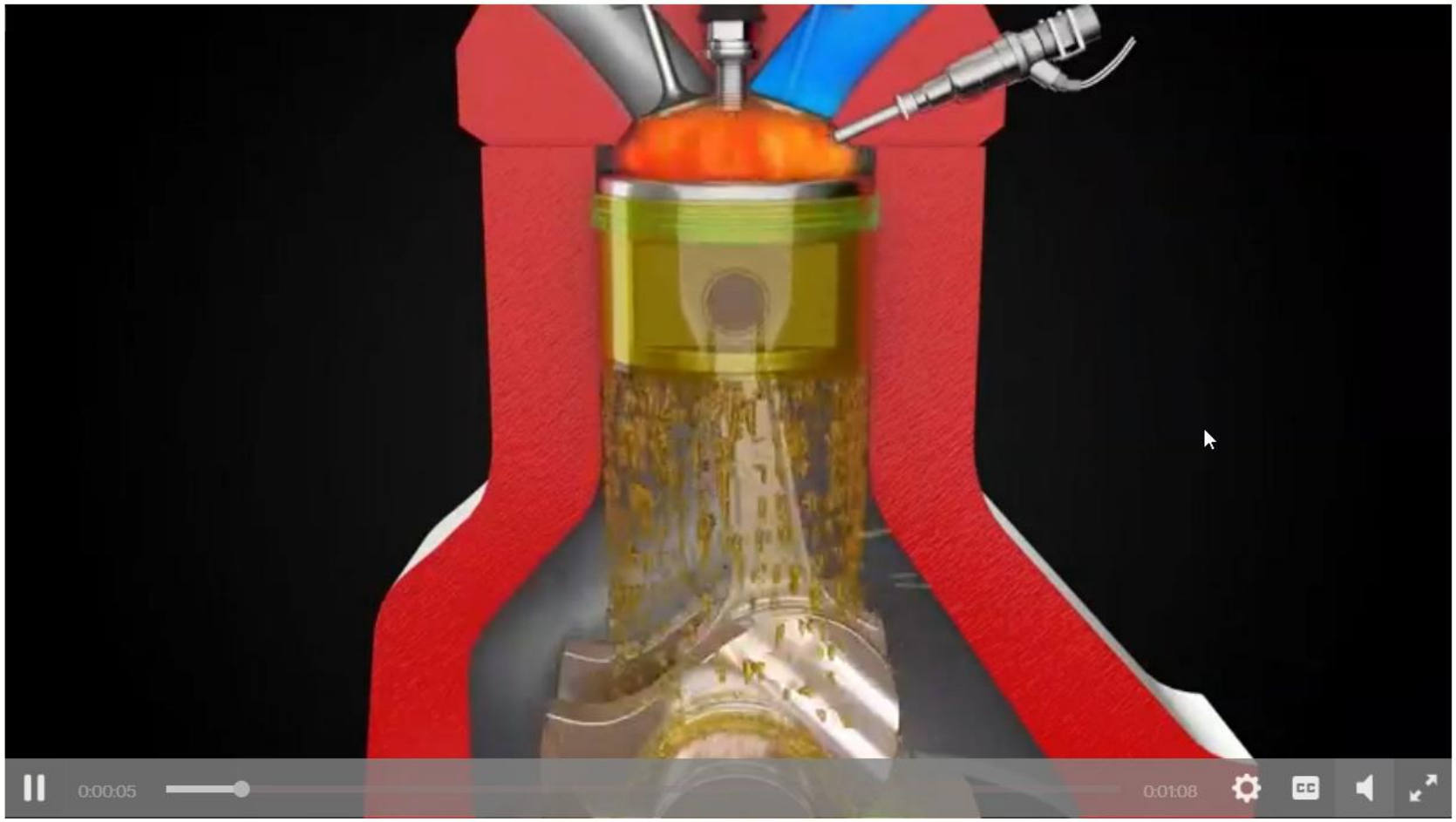
INTERACTIVE VIDEOS

Engine

Engine Oil System

Timing Belt

Timing Chain



NARRATED VIDEOS

Engine Oil S... 01:54

Timing Belt 01:17

Timing Chain

Engine

Basic Description

Internal combustion engines co
pistons, a crankshaft, and valve

MotoVisuals from Advance Auto Parts