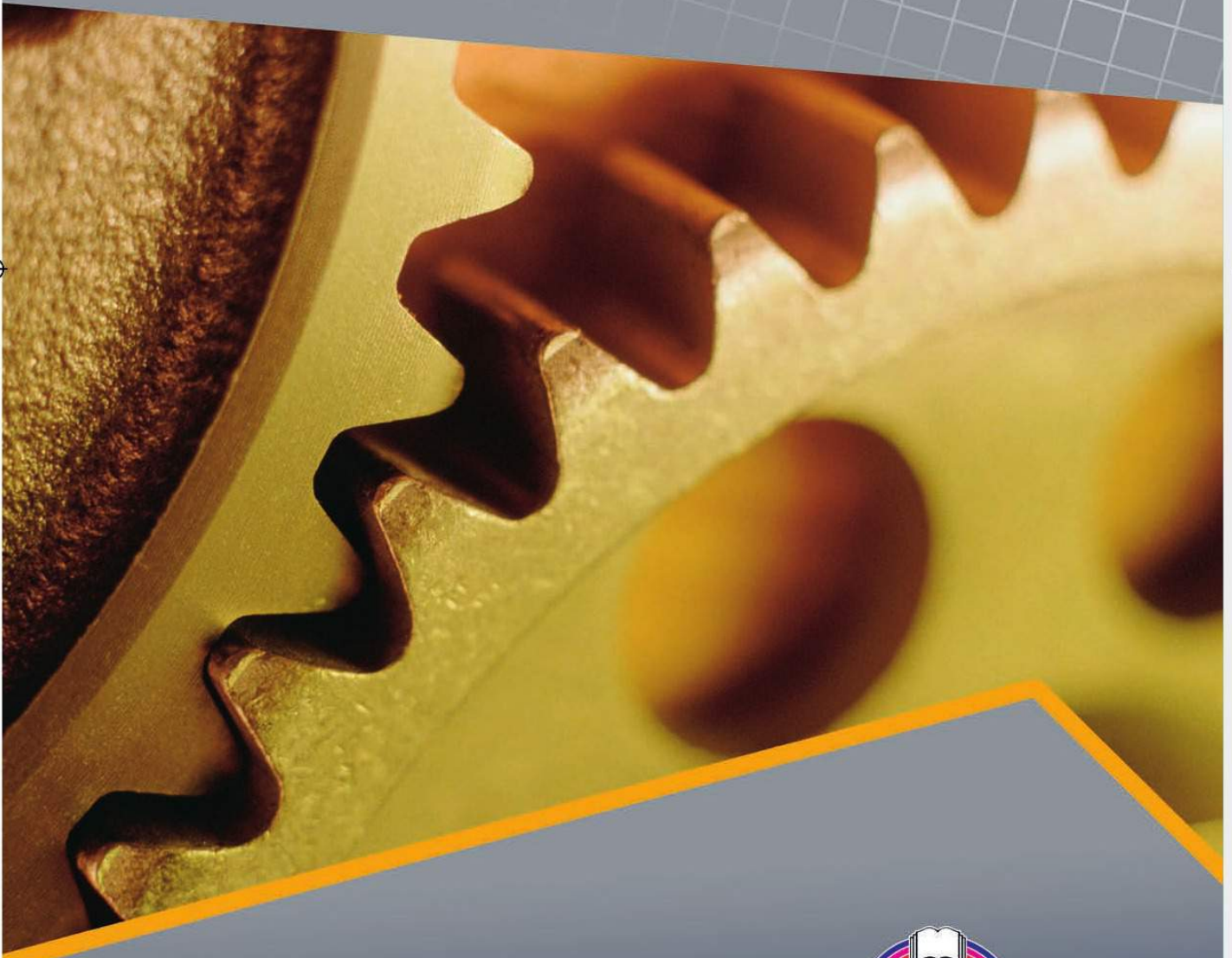


**CAREER
PATHS**

Mechanics



Express Publishing



Mechanics

Book
1

Jim D. Dearholt



Express Publishing

Table of contents

Tools

Unit 1 - Hand tools 1	4
Unit 2 - Hand tools 2	6
Unit 3 - Fasteners	8
Unit 4 - Power tools	10
Unit 5 - Bench and machine tools	12

Mechanic basics

Unit 6 - Basic actions	14
Unit 7 - Materials	16
Unit 8 - Numbers	18
Unit 9 - Measurements	20
Unit 10 - Around the shop	22

Auto basics

Unit 11 - Types of cars	24
Unit 12 - Parts of a car: Exterior	26
Unit 13 - Parts of a car: Interior	28
Unit 14 - Gauges and meters	30
Unit 15 - Tires	32

Appendix

Glossary	34
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1 Hand tools 1



Question: I recently bought a house, and something breaks every month. I want to fix things myself. What do I need?

– Frank G.

Mr. Fix it! Answers:

Sometimes things break in houses. Calling a repair man is expensive. As a homeowner, you need tools. Go to the local hardware store. Most sell **tool kits** with the basic **hand tools**. They usually include a couple of **Phillips screwdrivers**, **flathead screwdrivers**, and an **adjustable wrench**. Some tool kits also have **slip-joint pliers** and **long-nose pliers**. Then buy a tape measure, a **claw hammer**, and a **utility knife** separately. Utility knives have **retractable** blades, so they last a long time. And these separate items can be found for less than ten dollars. Read about how to use these tools, and home improvement projects are easy.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some common hand tools?
- 2 What repairs and tasks do you use hand tools for?

Reading

2 Read the advice column. Then, choose the correct answers.

- 1 What is the column mostly about?
 - A an expensive repair man
 - B a recommendation for tools
 - C a local hardware store
 - D a description of how long tools last
- 2 What are NOT included in tool kits?
 - A tape measures
 - B adjustable wrenches
 - C Phillips screwdrivers
 - D flathead screwdrivers
- 3 According to the columnist, what is true about utility knives?
 - A The blades break frequently.
 - B They are included in tool kits.
 - C The blades are not always out.
 - D They cost less than hammers.

Vocabulary

3 Match the words (1-5) with the definitions (A-E).

- | | |
|-----------------|-------------------|
| 1 — wrench | 4 — utility knife |
| 2 — retractable | 5 — hand tool |
| 3 — adjustable | |

- A a manual device used for home improvement projects
- B being able to pull back in
- C a small cutting device
- D a hand tool that tightens and loosens nuts and bolts
- E being able to change sizes

- 4 Read the sentence pair. Choose where the words best fit the blanks.

1 Phillips screwdriver / flathead screwdriver

- A A screw with a flat slot needs a _____.
B A screw with a cross-shape on the head needs a _____.

2 slip-joint pliers / long-nose pliers

- A _____ are adjustable.
B _____ have needle-like pincers.

3 claw hammer / tool kit

- A A _____ can drive in or remove nails.
B Many tools are included in a _____.

- 5 Listen and read the advice column. What kind of measuring device does it recommend homeowners' buy?

Listening

- 6 Listen to a conversation between a sales associate and a customer. Mark the following statements as true (T) or false (F).

- 1 _ The customer needs Phillips and flathead screwdrivers.
2 _ They do not sell hand tools individually.
3 _ Buying tools in a set is less expensive than buying them one at a time.

- 7 Listen again and complete the conversation.

Sales Associate: 1 _____, welcome to Bob's Hardware.
Customer: Hi. Can you tell me where the hand tools are?
Sales Associate: Sure. They're right 2 _____. What are you looking for?
Customer: Well, I need some 3 _____ screwdrivers.
Sales Associate: Okay. 4 _____ full sets or individual screwdrivers.
Customer: Oh, okay. But I only need a few sizes. What do you recommend?
Sales Associate: I 5 _____ a full set.
Customer: Really? Why is that?
Sales Associate: It's cheaper than buying them separately. Plus, 6 _____ the sizes some day.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Can you tell me ...?

What do you ...?

I recommend ...

Student A: You are a sales associate. Talk to Student B about:

- location of hand tools
- full sets and individual tools
- costs of purchasing tools

Student B: You are a customer. Talk to Student A about purchasing hand tools.

Writing

- 9 Use the conversation from Task 8 to fill out the customer feedback form.

Bob's Hardware

Customer Feedback Form

Customer name: _____

Date of purchase: _____

Items purchased: _____

What did our employee help you with?

Was our employee helpful? Y / N

2 Hand tools 2



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What tool can be used to cut pipes?
- 2 What are some different types of wrenches?

Reading

2 Read the tool manufacturer's website. Then, choose the correct answers.

- 1 What is the purpose of the website?
 - A to advertise an upcoming sale
 - B to explain product functions
 - C to compare hand and power tools
 - D to take online customer orders
- 2 What tool should be used to cut wood?
 - A wire cutter
 - B hand saw
 - C hacksaw
 - D ball peen hammer
- 3 Which tool CANNOT work on different sizes of bolts?
 - A Allen key
 - B pipe wrench
 - C combination wrench
 - D ratchet wrench and socket set

GRASSER Hand Tools

Use the right tool for the job. Consult our product list before starting any project.

Product	Function: Use it to ...
wire cutter	strip and cut light to medium gauge wire
ball peen hammer	shape metal and drive chisels
hand saw	cut wood
hacksaw	cut metal or plastic pipes
sawhorse	support materials while cutting
ratchet wrench (includes socket set and 2 socket extensions)	tighten or loosen bolts or nuts
combination wrench	work with multiple sizes of bolts
spanner wrench	access hard to reach bolts
Allen wrench	turn Allen key bolts
nut driver	insert or remove nuts
pipe wrench	turn multiple size pipe connections

Vocabulary

3 Place the words and phrases from the word bank under the correct heading.

word BANK

hack saw nut driver hand saw
socket wire cutter spanner

Tools for cutting	Tools for turning
_____	_____
_____	_____
_____	_____

- 4 Fill in the blanks with the correct words and phrases from the word bank.

Word Bank

pipe wrench Allen wrench
ratchet wrench combination wrench
ball pein hammer

- See which _____ fits the hexagonal recess in this bolt.
 - Tom used the open end of the _____.
 - The plumber used an adjustable _____.
 - Sue shaped the metal fitting with a _____.
 - Where are the sockets for this _____?
- 5 Listen and read the tool manufacturer's tool manufacturer's website again. What does the ratchet wrench come with?

Listening

- 6 Listen to a conversation between a customer and a tool company employee. Mark the following statements as true (T) or false (F).

- ___ The man calls to get help choosing tools.
- ___ The man orders several pipe wrenches.
- ___ The man needs hand saws and hacksaws.

- 7 Listen again and complete the conversation.

Employee: Grasser Hand Tools, how can I help you?

Customer: Hi, this is Tom from Russet Hardware. I'd like to 1 _____.

Employee: Hi, Tom. What can I put you down for?

Customer: Well, I need five 2 _____, a case of Allen wrench sets, and a box of adjustable hook spanner wrenches.

Employee: Okay. 3 _____?

Customer: Yes. I need three more of the small 4 _____ with replaceable blades.

Employee: 5 _____ the hand saws, or the hacksaws?

Customer: Oh, 6 _____.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

I'd like to place ...

I need ...

Do you mean the ... or the ...?

Student A: You work for a tool manufacturer. Talk to Student B about:

- placing an order
- tools needed
- specifying a tool

Student B: You are ordering tools. Talk to Student A about your order.

Writing

- 9 Use the conversation from Task 8 to fill out the tool company order form.



Grasser HAND TOOLS Order Form

Customer name _____ Date _____

Qty	Item
_____	_____
_____	_____
_____	_____

3 Fasteners



Which fastener is right for your job?

If you need a temporary fastener, go with a **pin** or **clamp**.

Nails are a quick and long-lasting fastener. They are ideal for walls and wood surfaces.

Screws are a more secure fastener. **Wood screws** are best for solid wood surfaces. But **sheet metal screws** work on wood as well as other surfaces. Remember to check the correct **thread** for your project. This store carries both **UTS thread** and **metric thread** measurements. Use an **anchor** for situations requiring extra support.

Use **bolts** when pressing pieces together from both sides. Select a bolt with the appropriate **grade**. Otherwise, the bolt may break. Get the right **washers** and **nuts** to add strength and prevent damage to surfaces.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some different parts used to attach two things together?
- 2 What type of fastener requires a hammer?

Reading

2 Read the poster. Then, mark the following statements as true (T) or false (F).

- 1 ☐ Clamps are long-lasting fasteners.
- 2 ☐ Sheet metal screws will damage wood surfaces.
- 3 ☐ Washers protect surfaces from damage.

Vocabulary

3 Match the words (1-7) with the definitions (A-G).

- | | |
|-----------------------------------|--|
| 1 <input type="checkbox"/> anchor | 5 <input type="checkbox"/> clamp |
| 2 <input type="checkbox"/> nut | 6 <input type="checkbox"/> metric thread |
| 3 <input type="checkbox"/> nail | 7 <input type="checkbox"/> sheet metal screw |
| 4 <input type="checkbox"/> grade | |

- A a piece of metal with a hole in the middle
- B a long, narrow fastener with a smooth rod
- C a device that tightly presses things together
- D a thread measured in millimeters
- E the measurement of a bolt's strength
- F a device that adds support to a screw
- G a fastener with threads along the entire rod



4 Read the sentence pair. Choose where the words best fit the blanks.

1 screw / washer

- A Place a _____ between the nut and surface.
- B The hook is attached to the wall with a _____.

2 bolt / thread

- A Jules attached the table leg with a _____.
- B I don't know the best _____ size for the screws.

3 fastener / UTS thread

- A The mechanic was only familiar with _____ sizes, not metric.
- B The hardware store was known for having a _____ for every project.

4 pin / wood screw

- A A _____ is not effective on metal.
- B Albert used a _____ to hold the boards together temporarily.

- 5 Listen and read the poster again. What different thread measurements exist?

Listening

- 6 Listen to a conversation between a mechanic and a customer. Choose the correct answers.

- 1 What is the conversation mainly about?
 - A an explanation of a repair
 - B an estimate of repair costs
 - C a set of maintenance instructions
 - D a description of a broken appliance
- 2 What can you infer about the new bolts?
 - A They do not require washers.
 - B They cost less than the old bolts.
 - C They are a higher grade than the old bolts.
 - D They are specially made for air conditioners.

- 7 Listen again and complete the conversation.

Mechanic: All right, Mr. Zane. Your air conditioner is fixed.

Customer: Oh, I'm 1 _____! What was the problem?

Mechanic: Well, that rattling you heard was 2 _____ loose nuts.

Customer: Really? 3 _____ they come loose?

Mechanic: The bolts were the wrong grade. The weight of the unit damaged the bolt's thread. You needed something 4 _____.

Customer: Oh, I see. Did you replace them?

Mechanic: 5 _____. You have all new bolts, nuts, and washers.

Customer: That sounds good. 6 _____ so much.



Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

I repaired ...
How did ...
You needed ...

Student A: You are a mechanic. Talk to Student B about:

- an air conditioner
- loose fasteners
- your repairs

Student B: You are a customer. Talk to Student A about an air conditioner.

Writing

- 9 Use the conversation from Task 8 to fill out the mechanic's invoice.



Granderson Mechanics and Repair

Summary of Services

Item repaired: _____

Problem with item: _____

Description of repairs: _____

4 Power tools



impact wrench



drill



angle grinder



air ratchet



drill bit

Larry's Auto Shop Inventory Checklist

Unit	In Working Condition?	Damaged Parts?	Notes
Drill	✓		
Drill Bits			missing 1/8 inch bits
Air Compressor		✓	worn piston rings
Sander	✓		
Shop Vac		✓	damaged filter
Air Ratchet	✓		
Pneumatic Torque Wrench	✓		
Heat Gun	✓		
Impact Sockets	✓		
Impact Wrench	✓		
Angle Grinder	✓		

We are missing most of the 1/8 inch drill bits from the tool box. Add one 10-count box to the purchase order.

The air compressor is consuming too much oil. The piston rings need to be changed before using it again.

The shop vac is discharging dust from the exhaust because of the torn filter. It needs to be replaced. Add filters to the purchase order.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some types of power tools?
- 2 What is one power tool that is used when working on cars?

Reading

2 Read the inventory checklist. Then, mark the following statements as true (T) or false (F).

- 1 ☐ The impact sockets are missing pieces.
- 2 ☐ The impact wrench is damaged.
- 3 ☐ The pneumatic torque wrench is in working condition.

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | |
|--------------------------------------|---|
| 1 <input type="checkbox"/> drill | 4 <input type="checkbox"/> heat gun |
| 2 <input type="checkbox"/> drill bit | 5 <input type="checkbox"/> impact socket |
| 3 <input type="checkbox"/> shop vac | 6 <input type="checkbox"/> air compressor |

- A a power tool used to bore holes
- B a durable socket for an impact wrench
- C a vacuum that can clean wet substances
- D a cutting tool that rotates in a drill
- E a machine that pressurizes air
- F a power tool that delivers hot air to something

4 Place the words and phrases from the word bank under the correct heading.

word BANK

sander angle grinder
air ratchet impact wrench
pneumatic torque wrench

Used to smooth / remove surfaces

Used to tighten / loosen nuts or bolts

- 5 Listen and read the inventory checklist again. What is wrong with the air compressor?

Listening

- 6 Listen to a conversation between two mechanics. Choose the correct answers.

- What is the conversation mostly about?
 A a powerful impact wrench
 B a new power tool
 C a broken socket
 D a slow manual ratchet
- Why does the man like the air ratchet more than a manual ratchet?
 A it is newer C it is lighter
 B it is safer D it is faster

- 7 Listen again and complete the conversation.

- Mechanic 1: Hey, Laura. 1 _____.
 see our new air ratchet?
- Mechanic 2: Morning, Joe. I didn't. When did we get it?
- Mechanic 1: It came in yesterday while 2 _____.
 _____. It's great.
- Mechanic 2: I see. So you like it more than the 3 _____ ratchet?
- Mechanic 1: Definitely. It can loosen nuts and bolts much faster. It does the job in 4 _____.
- Mechanic 2: Nice. So it's like the 5 _____?
- Mechanic 1: Well, 6 _____. But an impact wrench creates more torque. In fact, it could shatter the air ratchet sockets.
- Mechanic 2: That's good to know.



Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

When did we get it?

So you like it more than the ...?

It can ... much faster.

Student A: You are a mechanic. Talk to Student B about:

- a new tool
- the tool's capabilities
- safety

Student B: You are a mechanic. Ask Student A about a new tool.

Writing

- 9 Use the conversation from Task 8 to fill out the product description.

New from
Trust-T-Tools

Check out our new _____!

Use it to _____
 and _____.

It can _____
 _____.

5 Bench and machine tools



drill press

bench grinder

lathe

lift

table saw

CARSON SHOP WORKS
MACHINE AND BENCH TOOLS

Where **BIG** names buy **BIG** tools

Drill Press - Variable Drill and Motor Speeds

Lathe - Rotates your work piece for expert carving, sanding, and knurling

Grinding Machine - Heavy duty grinding at a lightweight price

Bench Grinder - Dual **abrasive** grinding wheels, LED work lamp

Sanders - Hand sanders, bench sanders, and belt sanders. We've got them all

Bearing Press - Perfect for installation of gears, pulleys, and U-Joints

Automotive Lift - Making you a more comfortable mechanic

Table Saw - Precision cuts, optimum safety

Save **BIG** at Carson Shop Works!

Get ready!

① Before you read the passage, talk about these questions.

- 1 What machine tool is used to inspect the underside of a car?
- 2 What tool is used to cut wood?

Reading

② Read the website for a retailer's machine tool department. Then, mark the following statements as true (T) or false (F).

- 1 ☐ The lathe has two abrasive wheels.
- 2 ☐ The drill press has motor speed options.
- 3 ☐ The bearing press includes a work lamp.

Vocabulary

③ Match the words (1-6) with the definitions (A-F).

- | | |
|--|---|
| 1 <input type="checkbox"/> rotate | 4 <input type="checkbox"/> grinding machine |
| 2 <input type="checkbox"/> abrasive | 5 <input type="checkbox"/> table saw |
| 3 <input type="checkbox"/> drill press | 6 <input type="checkbox"/> sander |

- A a tool with one or more abrasive wheels for sharpening tools
- B to turn something about an axis
- C a machine for smoothing wood
- D a machine with a flat surface to cut wood
- E a heavy duty hole making machine
- F of a rough grainy texture

- 4 Read the sentence pair. Choose where the words best fit the blanks.

1 bearing press / lift

- A Let's put the truck up on the _____ to see the U-joints underneath.
B Use the _____ to install the gears.

2 lathe / bench grinder

- A Scott sharpened the bits with a _____.
B Sam used a _____ to carve the table legs.

- 5 Listen and read the website for a retailer's machine tool department again. Which tool features a light to help a mechanic see better?

Listening

- 6 Listen to a conversation between a tool salesman and a customer. Choose the correct answers.

- 1 What does the woman need a machine to do?
A repair tools C sharpen hand tools
B buff finishes D install attachments
- 2 What will the woman probably buy?
A a bench grinder C a table saw
B a sander D a lathe

- 7 Listen again and complete the conversation.

Salesman: Hello Ma'am. Is there anything I can help you with?

Customer: Yes. I need to 1 _____. I was looking at this sander.

Salesman: Well, that 2 _____ does have attachments for grinding. But a bench grinder will work better.

Customer: A 3 _____. Where are those?

Salesman: Right over here. See, this one has two wheels, one 4 _____ and one fine.

Customer: This is what I'm looking for.

Salesman: I agree. Those 5 _____ buffing finishes. But for sharpening tools you want a grinder.

Customer: 6 _____.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

I need to ...
See, this one has ...
Those sanders are great for ...

Student A: You are a tool salesman. Talk to Student B about:

- sanders
- bench grinders
- sharpening tools

Student B: You are a customer. Talk to Student A about something to sharpen your hand tools.

Writing

- 9 Use the conversation from Task 8 to fill out the grinder product description.

Carson _____ Grinder

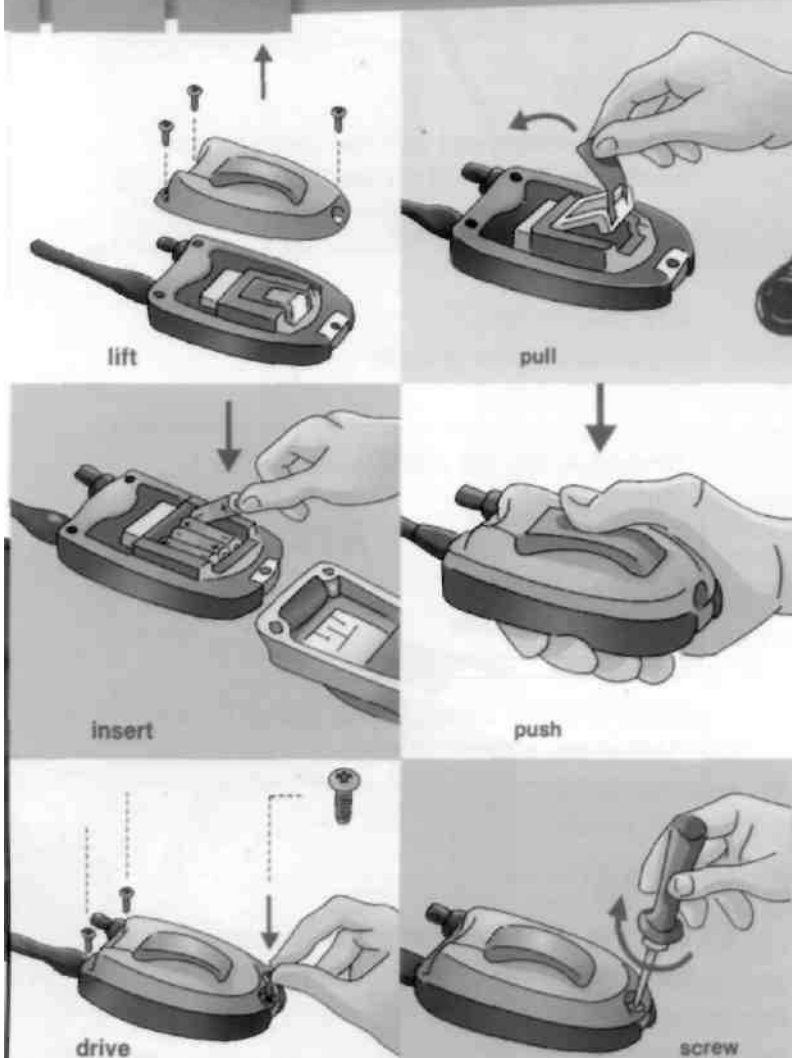
Product Specifications

- Two Abrasive Grinding Wheels (one _____ and one _____)
- Convenient LED Work Lamp
- Great for _____

On Sale Now for Only \$299!!!



6 Basic actions



Trucker's Transmit CB Radio Owner's Manual

Changing the batteries on your Trucker's Transmit CB Radio.

- 1 **Grip** radio firmly in one hand.
- 2 **Unscrew** the screws from battery cover with a flathead screwdriver.
- 3 **Lift** battery cover and **pull** green tab to **remove** old batteries.
- 4 **Flip** battery cover over to see battery diagram.
- 5 Remove old batteries and **insert** new ones as shown on diagram.
- 6 Replace battery cover. **Push** cover closed.
- 7 **Drive** screws back into battery cover.
- 8 **Screw** in with screwdriver and **twist** until tight.
- 9 To avoid **stripping** the screws, do not over tighten.

Turn on radio to test batteries.



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some basic actions mechanics use when working?
- 2 What are some actions that require tools to complete?

Reading

2 Read the instructions. Then, choose the correct answers.

- 1 What is the purpose of the manual page?
 - A to describe how the radio works
 - B to explain how to change the batteries
 - C to compare types of CB radios
 - D to provide radio repair instructions
- 2 What instruction is NOT given?
 - A flip the battery cover over
 - B drive screw into the battery cover
 - C twist screws until tight
 - D drive in the battery cover
- 3 Which item will NOT be removed from the radio?
 - A green tab
 - B battery cover
 - C dead batteries
 - D screws in cover

Vocabulary

3 Write a word that is similar in meaning to the underlined part.

- 1 The instructions are on the other side. Turn the paper over. _ _ _ p
- 2 Put the drill bit into the chuck. _ _ _ e _ t
- 3 Turn the light bulb clockwise until secure. s _ r _ _
- 4 Push upward on the table so I can put this mat underneath it. _ i _ _

- 4 Fill in the blanks with the correct words (and phrases) from the word bank.

Word BANK

twist push drive pull
unscrew remove strip grip

- 1 _____ the knob clockwise to close the valve.
- 2 _____ the handle toward yourself to open the door.
- 3 _____ the trunk down so it closes.
- 4 She used a hammer to _____ in the nail.
- 5 If the bolt is over tightened, you might _____ its threads.
- 6 To install a new bulb, you must _____ the old one.
- 7 _____ the handle firmly to avoid slippage.

- 5 Listen and read the instructions again. How does the owner know which way to put the batteries in?

Listening

- 6 Listen to a conversation between a mechanic and a customer. Check (✓) the actions that are required.

- 1 ☐ locate the light bulb holder
- 2 ☐ pull the metal tab
- 3 ☐ lift the hood
- 4 ☐ cut the three wires
- 5 ☐ unscrew the old bulb
- 6 ☐ remove the wire housing

- 7 Listen again and complete the conversation.

Mechanic: The bulbs for your headlights need to be replaced. I can show you 1 _____ do it.

Customer: That would be great.

Mechanic: First, 2 _____ and locate the light bulb holder with the three wires.

Customer: Okay. 3 _____?

Mechanic: 4 _____, push on this metal tab and gently unplug the wire housing.

Customer: That looks easy enough.

Mechanic: It's not too difficult. 5 _____, just unscrew the old bulb. Then, insert the new one.

Customer: Great. 6 _____.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

The bulbs for your headlights need ...

First ... / Next, just ...

Student A: You are a mechanic. Talk to Student B about:

- locating a light
- removing a light
- replacing a light

Student B: You are a customer.

Talk to Student A about replacing a light bulb.

Writing

- 9 Use the conversation from Task 8 to fill out the light bulb replacement instructions.

Larry's Auto Shop

Replacing your headlight bulbs

First, _____.

Then, _____.

Next, _____.

Finally, test the lights to make sure they work.

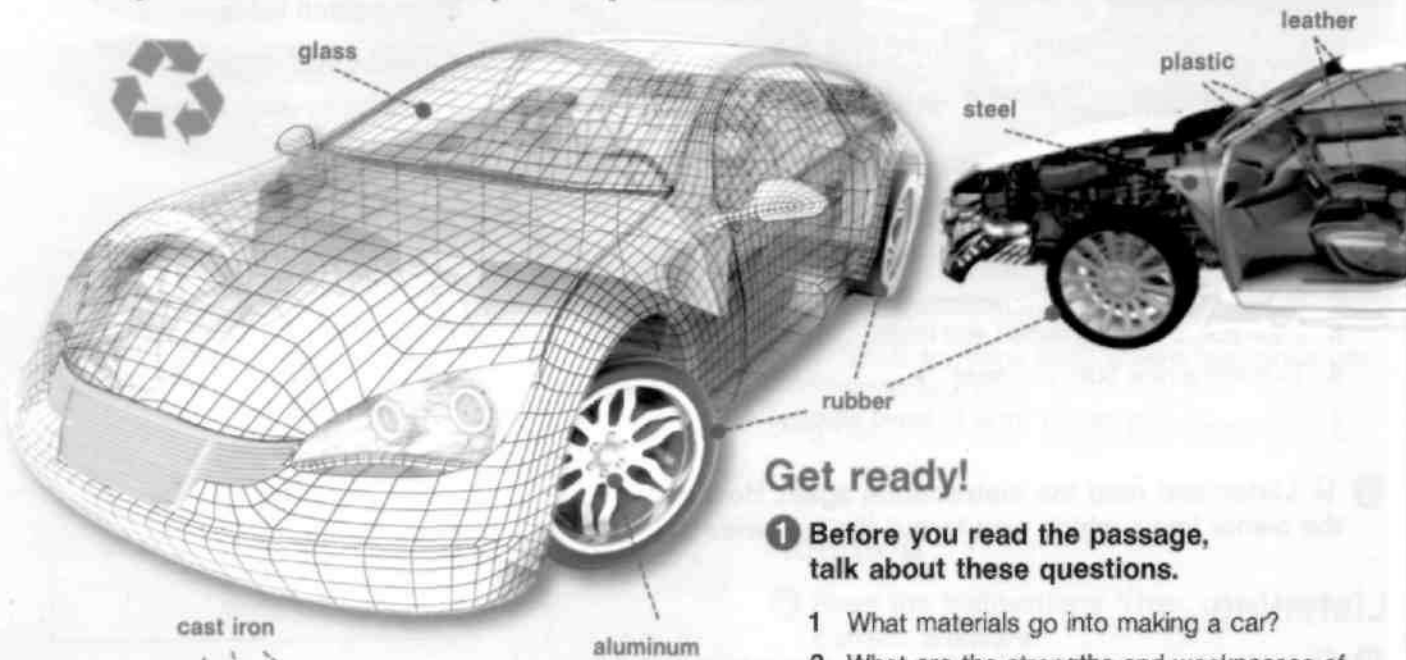


7 Materials

What's in a Car?

A quick look at what your speed racer is made of.

By Ashley Simms



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What materials go into making a car?
- 2 What are the strengths and weaknesses of different materials?

Reading

2 Read the magazine article. Then, complete the table using information from the article.

Material	Use in car manufacturing
rubber	_____
cast iron	_____
plastic	_____
glass	_____



When we think of cars, we think of metal. And it's true that car manufacturers use **steel** to build the frames of cars and trucks. They use **cast iron** for its durability to make engine blocks. And **lightweight aluminum** is perfect for wheel rims. But **plastic** and **fiberglass** makeup

much of car bodies these days. **Glass** is used to make windows and mirrors. And black **rubber** goes into almost every tire on the road. Of course, there are softer materials, too. **Leather** is commonly used to line the interior of the finest cars.

Vocabulary

3 Match the words (1-5) with the definitions (A-E).

- | | |
|---------------|-----------------|
| 1 — leather | 4 — lightweight |
| 2 — cast iron | 5 — fiberglass |
| 3 — glass | |

- A a brittle material used to make windows
- B a durable metal used to make engine blocks
- C low in mass relative to volume
- D material composed of fine filaments
- E a flexible material made from animal skin

- 4 Read the sentence pair. Choose when the words best fit the blanks.

1 rubber / plastic

A The body of this car is made of _____.

B Tire manufacturers use much of the world's _____.

2 steel / aluminum

A The frame of the truck is made of _____.

B The wheel rims are made of lightweight _____.

- 5 Listen and read the magazine article again. What material is often used inside expensive cars?

Listening

- 6 Listen to a conversation between two mechanics looking at a new car. Mark the following statements as true (T) or false (F).

1 _ The car body is made mostly of steel.

2 _ Plastic is less expensive than steel.

3 _ The safety cage is made of fiberglass.

- 7 Listen again and complete the conversation.

Mechanic 1: They sure don't make them like they used to, do they?

Mechanic 2: No, they don't. Most of this car's body is 1 _____.

Mechanic 1: No kidding? Plastic must be cheaper than 2 _____.

Mechanic 2: It's cheaper and 3 _____. Lightweight material improves fuel efficiency.

Mechanic 1: Yeah, but what does it do for 4 _____?

Mechanic 2: Well, there's a 5 _____ around the passenger area.

Mechanic 1: I see. And are these outer panels made of 6 _____?

Mechanic 2: Yeah. They're made of a combination of fiberglass and plastic.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Most of this car's body is ...

Plastic must be ...

These outer panels are ...

Student A: You are a mechanic. Talk to Student B about:

- a car body
- parts and materials
- reasons for using those materials

Student B: You are a mechanic. Talk to Student A about the makeup of a car.

Writing

- 9 Use the article and the conversation from Task 8 to fill out the car body makeup chart.



2005 Tolento Cyclone

Car body makeup chart

Side panels _____

Safety cage _____

Windows _____

Tires _____

8 Numbers

How do they say it?

Symbol	Interpretation	Example
=	is, equals, comes to	$\frac{1}{2} = 0.5$ One-half equals point five.
+	and, plus, add	$a + b = c$ A and B comes to C.
-	minus, less, subtract	$a - b = c$ A less B is C.
x	times, multiplied by	$a \times b = c$ A times B equals C.
$\frac{7}{8}$	seven eighths	a / b A Bths
1,200	one thousand two hundred or twelve hundred	The repair cost twelve hundred dollars.

Get ready!

- 1 Before you read the passage, talk about these questions.

- How do you say symbols like = and ÷?
- What endings should you add to fractions when saying them aloud?

Reading

- 2 Read the chart. Then, mark the following statements as true (T) or false (F).

- Eight less two means the same thing as eight minus two.
- Seven times six equals seven plus six.
- $\frac{3}{8}$ is pronounced three times eight.

Vocabulary

- 3 Fill in the blanks with the correct words and phrases from the word bank.

word BANK

add times less
plus comes to hundred

- Three _____ two is six.
- Four plus seven _____ eleven.
- Fifty _____ twenty equals thirty.
- One thousand plus four hundred is fourteen _____.
- To get ten, _____ three and seven.
- Fifteen _____ two is seventeen.

- 4 Read the sentence and choose the correct word.

- 1 Six **plus** / **divided by** three is nine.
- 2 Ten **and** / **less** eight equals two.
- 3 Start with eight, **subtract** / **add** two: this equals six.
- 4 Four **multiplied by** / **comes to** two is eight.
- 5 Five plus six **equals** / **less** eleven.

- 5 Listen and read the chart again. Which symbol do you use to multiply two numbers?

Listening

- 6 Listen to a conversation between two mechanics. Choose the correct answers.

- 1 What is the dialogue mostly about?
 - A buying new tools
 - B getting tools for a co-worker
 - C asking what size tools to use
 - D choosing the best tool for a task
- 2 What will the man most likely do next?
 - A Tighten a loose nut.
 - B Find some wrenches.
 - C Go to the hardware store.
 - D Suggest a different size tool.

- 7 Listen again and complete the conversation.

Mechanic 1: Joe, are you busy?
Mechanic 2: 1 _____.
 What do you need?
Mechanic 1: I have my hand on a loose nut. I don't want to let it go. 2 _____.
 _____ some tools for me?
Mechanic 2: 3 _____. What do you need?
Mechanic 1: Can I get a 4 _____ combination wrench?
Mechanic 2: Sure. Anything else?
Mechanic 1: Yeah. A three eighths wrench 5 _____. Thanks.
Mechanic 2: 6 _____. I'll grab them from the tool box now.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Are you busy?
Can you grab ...
Can I get a ...

Student A: You are a mechanic. Ask Student B about:

- getting tools
- sizes of tools

Student B: You are a mechanic. Answer Student A's questions.

Writing

- 9 Use the chart and the conversation from Task 8 to fill out the pronunciation chart.

Pronunciation Chart

3/16 _____

3/8 _____

7/8 _____

1/4 _____

9 Measurements



Do-It-Yourself MONTHLY

Know your measurements

Fasteners and tools use **imperial** measurements or **metric**, and knowing the difference is important. It prevents you from **rounding off** a fastener, damaging tools, or causing injury. If you don't know an item's size, use a **micrometer** or other **caliper** to measure it. Check **centimeters** or **millimeters** for metric tools. Look at **inches** for imperial tools.

Volume and weight are also very different in the two systems. Using **quarts** when a formula calls for **liters** is very dangerous. A **cubic inch** is totally different from a **cubic meter**. For weights, a **pound** cannot substitute for a **kilogram**. Always pay close attention to which system is required. If you must use tools from the other system, refer to a table of **conversion**.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are two systems used for measuring short distances?
- 2 What is measured in pounds?

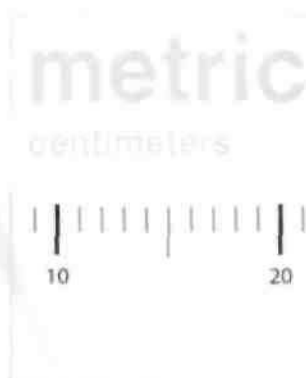
Reading

2 Read the magazine article. Then, fill in the blanks using words from the word bank.

Word BANK

measurements centimeters liters
pounds systems fasteners

There are two 1 _____ of measurement. Using the right one is important. It prevents damage to 2 _____. The metric system uses 3 _____ for distance, while the imperial system uses inches. Other types of 4 _____ are also different in the two systems. Volumes in quarts and 5 _____ are not interchangeable. Neither are weights in 6 _____ and kilograms.



Vocabulary

3 Match the words (1-8) with the definitions (A-H).

- | | |
|-------------------|--------------------|
| 1 _____ liter | 5 _____ conversion |
| 2 _____ pound | 6 _____ cubic inch |
| 3 _____ imperial | 7 _____ centimeter |
| 4 _____ round off | 8 _____ micrometer |

- A changing from one system into another
B a metric measure of length or distance
C an imperial measure of volume
D to damage a screw or bolt
E a tool that measures small distances
F the system that uses inches and quarts
G an imperial measure of weight
H a metric measure of volume

4 Write a word that is similar in meaning to the underlined part.

- The carpenter measured the bolt heads with a tool with adjustable legs. _ a l _ _ e r
- I have imperial wrenches, but I need one that is part of the system based on the meter. _ e _ _ i c
- This tank holds one unit equal to 1000 liters of liquid. _ u _ i _ m _ t _ _
- The size of the screw was eight units equal to 1/10 of a centimeter. _ _ l l _ m _ _ _ r s
- Add six units of imperial volume. _ u a _ _ s
- Steven accidentally recorded the weights in pounds instead of units of metric weight. k _ _ o _ r _ _ s
- How many units of imperial length is that rope? i _ _ _ e s

5 Listen and read the magazine article again. Why is it important to use the correct measurement system?

Listening

6 Listen to a conversation between two mechanics. Mark the following statements as true (T) or false (F).

- _ The man is using the wrong size wrench.
- _ The man injured his hand when a wrench slipped.
- _ The shop does not have imperial wrenches.

7 Listen again and complete the conversation.

- Mechanic 1: Joe, are you 1 _____ over there?
- Mechanic 2: Yeah. My wrench keeps 2 _____ this bolt.
- Mechanic 1: Let's see. Well, you're using the wrong wrench.
- Mechanic 2: Really? It seemed like the 3 _____.
- Mechanic 1: You can't use a metric wrench with an imperial bolt. You could 4 _____ the bolt or hurt your hand.
- Mechanic 2: I didn't realize I had 5 _____.
- Mechanic 1: Come with me. 6 _____ where we keep the imperial wrenches.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

My wrench keeps slipping ...
You're using the wrong ...
You can't use a ... with a ...

Student A: You are a mechanic. Talk to Student B about:

- a bolt
- using the correct wrench
- tool locations

Student B: You are a mechanic. Talk to Student A about using proper wrenches.

Writing

9 Use the conversation from Task 8 to fill out the mechanic's job notes.

JOB: 1779

What is being repaired?

Which tools are required?

What is the measurements system?

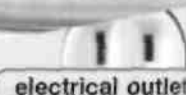
10 Around the shop



Rachel's AUTO REPAIR SHOP

Closing Checklist

- ☐ Clean out **sink** and make sure the **drain** is unclogged.
- ☐ Close the lid on the **solvent tank**.
- ☐ Unplug **fans** and **work lamps** from **electrical outlets**.
- ☐ Clean the floors in the **pit**. This includes the red and black **mats** as well.
- ☐ Make sure the **lift** is on the ground and turned off.
- ☐ Refill the **bead blaster**. Put it in **storage** for the next use.
- ☐ Place all **creepers** up against the wall.
- ☐ Turn off the **computer** and **printer**.
- ☐ Sign name at the end of this checklist. Put this checklist on the secretary's desk.
- ☐ Turn off lights and lock door.



Get ready!

- 1 Before you read the passage, talk about these questions.

- 1 What is used by mechanics to look under a car?
- 2 What accessory is found on the floor?

Reading

- 2 Read the auto shop checklist. Then, complete the chart.

Item	Action
Solvent Tank	1 _____
Lift	2 _____
3 _____	Refill and place in storage
Pit	4 _____

Vocabulary

- 3 Fill in the blanks with the correct words and phrases from the word bank.

Word BANK

lift fan solvent tank drain
creeper computer

- 1 The chemicals in the _____ will remove oil.
- 2 Joe raised the car with the _____.
- 3 Theo slid under the car on the _____.
- 4 There was something in the _____, so the water can't get through.
- 5 Look up the files on the _____.
- 6 Turn on the _____. It's getting hot.

4 Read the sentence and choose the correct word.

- 1 Enter the **pit / drain** to work on the car.
- 2 It's too dark to see. Get a **printer / work lamp**.
- 3 The computer is plugged into an **electrical outlet / sink**.
- 4 The **printer / lift** was out of paper.
- 5 The new parts were put in **creeper / storage** for later use.
- 6 Larry needs the **bead blaster / lift** so he can get the paint off the car.
- 7 Clean the **mats / fans** on the floor.
- 8 The **computer / sink** is full of water.

5 Listen and read the auto shop checklist again. Where should a mechanic put a completed checklist?

Listening

6 Listen to a conversation between a mechanic and a shop owner. Mark the following statements as true (T) or false (F).

- 1 — The woman closed the shop last night.
- 2 — An employee fell into the pit.
- 3 — The man repeated a previous mistake.

7 Listen again and complete the conversation.

- Owner:** Good morning, Derek. Can I talk to you?
- Mechanic:** Hi, Rachel. Sure, 1 _____?
- Owner:** The checklist shows that you closed last night. Is 2 _____?
- Mechanic:** Yes. Did I do something wrong?
- Owner:** You forgot to 3 _____ against the wall.
- Mechanic:** I'm sorry. I was in a hurry to get home.
- Owner:** Well, Juan tripped on them this morning. He 4 _____ the pit.
- Mechanic:** Oh, no! It's 5 _____ I'm so sorry.
- Owner:** He'll be okay. But that's why we have the checklist. Don't let it happen again
- Mechanic:** I won't, 6 _____.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Is that right?

Did I ...?

Don't let it ...

Student A: You are a shop owner. Talk to Student B about:

- the closing checklist
- an incomplete item
- consequences

Student B: You are a mechanic. Talk to Student A about closing the shop.

Writing

9 Use the checklist and the conversation from Task 8 to fill out the opening checklist.

Tom's Shop



✓ Opening Checklist

Lift: _____

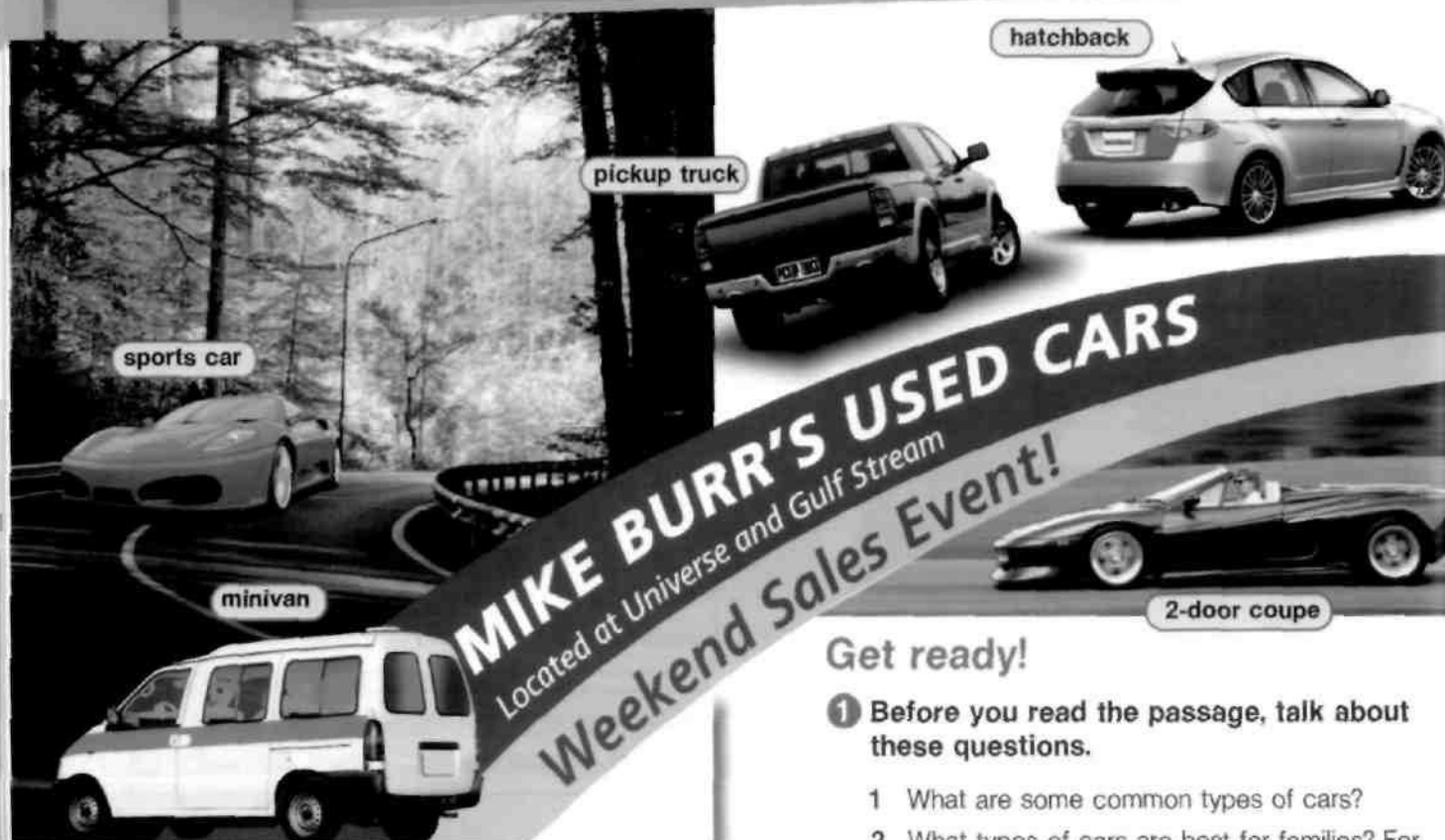
Fans: _____

Computer/Printer: _____

Sink/Drains: _____

Solvent Tank: _____

11 Types of cars



This weekend only, stop by for your new dream car!

Whether you want a **compact** or a **sports car**,

we have it!

We have used **4-door sedans** and **station wagons** starting at \$2,500!

Buy your first **convertible** for \$6,000!

Do you need four-wheel drive?

Get your **pickup truck** or **SUV** with a \$1999 deposit!

Trying to save money on gas?

Jump into one of our **2-door coupes** or **hatchbacks**, and start saving now!

Don't forget those big families!

We have a variety of **minivans** and full size passenger **vans** as well.

Hurry in this Saturday

and Sunday!

You won't find

better prices anywhere!



MIKE BURR'S USED CARS
Located at Universe and Gulf Stream
Weekend Sales Event!

Get ready!

① Before you read the passage, talk about these questions.

- 1 What are some common types of cars?
- 2 What types of cars are best for families? For single people in cities?

Reading

② Read the flyer for the car dealership. Then, mark the following statements as true (T) or false (F).

- 1 ☐ Convertibles cost less than 4-door sedans.
- 2 ☐ There are many types of minivans available.
- 3 ☐ The sales event lasts for a week.

Vocabulary

③ Match the words (1-7) with the definitions (A-G).

- | | |
|--|--|
| 1 <input type="checkbox"/> compact | 5 <input type="checkbox"/> 4-door sedan |
| 2 <input type="checkbox"/> minivan | 6 <input type="checkbox"/> pickup truck |
| 3 <input type="checkbox"/> convertible | 7 <input type="checkbox"/> station wagon |
| 4 <input type="checkbox"/> hatchback | |

- A a light truck with an open body
- B a smaller version of a van
- C a car with a removable roof
- D a small car
- E a car with a long body and lots of storage space
- F a car with a door in the back that opens upward
- G a car with four doors and trunk space

- 4 Read the sentence pair. Choose where the words best fit the blanks.

1 2-door coupe / van

- A The passenger _____ carries eight people.
B The _____ barely fits two people.

2 SUV / sports car

- A Alysa took her _____ on the four-wheel drive mountain trail.
B Only Sarah and Sue fit in the small _____.

- 5 Listen and read the flyer for the car dealership again. Which cars use a low amount of gas?

Listening

- 6 Listen to a conversation between a car salesman and a customer. Choose the correct answers.

- 1 What is the conversation mostly about?
A problems with a car
B recommending a car
C discussing a car's price
D comparing two cars
- 2 What type of car does the man suggest the woman buy?
A compact C sports car
B SUV D minivan

- 7 Listen again and complete the conversation.

Car Salesman: Hello there! 1 _____ help you?

Customer: Hi. I'm 2 _____ a new car, one that my entire family can ride in.

Car Salesman: Well, I'm sure 3 _____ for you. How big is your family?

Customer: It's me, my four kids, and my husband.

Car Salesman: Big family! Do you all travel in the car?

Customer: We do. My parents live 4 _____ from us, and we often visit them.

Car Salesman: Hmm, you 5 _____ some extra space for luggage, too.

Customer: We do. The kids pack a lot.

Car Salesman: Well, I think a 6 _____ is the choice for you. Let me show you one.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

I'm looking ...

I'm sure ...

I think a ...

Student A: You are a customer looking for a new car. Talk to Student B about:

- needing a car to fit the family in
- traveling frequently
- needing storage space in the car

Student B: You are a car salesman. Talk to Student A about choosing the right car.

Writing

- 9 Use the conversation from Task 8 to fill out the customer feedback form.

Mike Burr's USED CARS

Customer Feedback Form

Date: _____

Reason for visiting: _____

Name of employee that helped you: _____

Was our employee helpful? Y / N

How did he or she help? _____

12 Parts of a car: Exterior



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some important exterior parts of a car?
- 2 What is an accessory often seen on sports cars?

Reading

2 Read the checklist. Then, choose the correct answers.

- 1 What is the purpose of the checklist?
 - A to train employees on body repair
 - B to order replacement parts
 - C to determine the cost of repairs
 - D to assess damage to a vehicle
- 2 Which is NOT an instruction on the checklist?
 - A replace worn or bent wipers
 - B look for any signs of collision
 - C check the hood for dents or scratches
 - D test all bulbs in headlights and taillights
- 3 When should a car go to the maintenance garage?
 - A when the bumper is dented
 - B when the engine is not starting
 - C when the windshield is cracked
 - D when headlights are not functioning

Vehicle Inspection

Check **hood**, **bumpers**, and **fenders** for scratches or dents. Make a note of any signs of collision. Also check the **grill** for signs of frontal collision. All **doors** should open and close smoothly. If the car has a **spoiler**, check for paint scratches.

List damage: _____

Look for cracks in the **mirrors**. Also examine the **windshield** for damage. The **wipers** should move easily and should not be bent or worn out.

List damage: _____

Test **headlights**, **taillights**, and **brake lights** to ensure all bulbs are working. List bulbs that are not working: _____

Start engine and check fuel level. Record fuel level and any engine problems*:

Fuel: _____ Engine: _____

*Send all cars with engine trouble to the maintenance garage. All other damage is repaired in the parking lot.

Vocabulary

3 Place the words and phrases from the word bank under the correct headings.

word BANK

brake light grill taillight fender
spoiler headlight hood door

Front of car	
Rear of car	
Side of car	

4 Read the sentence and choose the correct word.

- 1 Herman could not see the road because of the dirt on his **hood / windshield**.
- 2 Sylvie checked her **mirrors / taillights** to see if any cars were behind her.
- 3 Fortunately, only the front **bumper / spoiler** was damaged in the crash.
- 4 Louis used the **grill / wipers** to clear the snow from the windshield.

5 Listen and read the checklist again. What should a mechanic do with a car's gas?

Listening

6 Listen to a conversation between two mechanics. Check (✓) the items that are damaged.

- | | |
|---------------------------------------|-----------------------------------|
| 1 <input type="checkbox"/> hood | 4 <input type="checkbox"/> door |
| 2 <input type="checkbox"/> fender | 5 <input type="checkbox"/> wipers |
| 3 <input type="checkbox"/> windshield | 6 <input type="checkbox"/> lights |

7 Listen again. Fill in the blanks.

- Mechanic 1:** Do you have the checklist ready?
- Mechanic 2:** Yes, go ahead.
- Mechanic 1:** Okay, the hood and fenders are fine, but 1 _____ in the windshield.
- Mechanic 2:** Cracked windshield. Got it. Are the 2 _____?
- Mechanic 1:** Yeah, they look fine.
- Mechanic 2:** Great. How are the lights?
- Mechanic 1:** They're all right, too. But I see a dent in the 3 _____.
- Mechanic 2:** Is there any damage to the paint?
- Mechanic 1:** Yes, 4 _____ some paint got scratched off.
- Mechanic 2:** Okay, scratched paint. Can you see 5 _____?
- Mechanic 1:** I think 6 _____.



Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

- Do you have the checklist?*
I see a crack in the ...
Is there any damage to the ...

Student A: You are a mechanic. Talk to Student B about:

- a checklist
- car parts
- areas of damage

Student B: You are a mechanic. Talk to Student A about areas of damage.

Writing

9 Use the checklist and the conversation from Task 8 to fill out the mechanic's checklist.

Returned vehicle inspection checklist

List damage, if any, to the following parts:

Fenders: _____

Windshield: _____

Doors: _____

Lights: _____



13 Parts of a car: Interior

MODEL RCB - INTERIOR

The new RCB is a must have! Let's look at its interior features. The car has front **bucket seats** and a rear **bench seat** covered in soft Italian leather. The RCB also has a custom-shaped **steering wheel**. It helps the driver's hands to relax while driving. The **door panels** on the RCB offer several controls. Each panel has an easy-to-use door **handle**, **window switch**, and door **lock**.

There are also convenient **knobs** on the **console** to adjust the radio, heat, and air conditioning. These controls are available on the steering wheel in certain models. The **seat belts** and **rearview mirror** adjust electronically. Finally, the car's **shifter** only requires a touch of the fingers. This car was definitely designed with ease and comfort in mind!



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What parts are included inside cars for comfort or entertainment?
- 2 What parts are included inside cars for safety?

Reading

2 Read the car manufacturer's website. Then, mark the following statements as true (T) or false (F).

- 1 ☐ The RCB can only seat two people.
- 2 ☐ The rearview mirror can be moved electronically.
- 3 ☐ Some RCB models have radio controls on the steering wheel.

Vocabulary

3 Read the sentence pair. Choose where the words best fit the blanks.

1 handle / bucket seat

- A Pull the _____ to open the door.
- B A _____ is deep, round, and comfortable.

2 door panel / bench seat

- A Three people can fit on a _____.
- B The window switch is on the _____.

3 knob / lock

- A The _____ is broken, so don't leave money in the car.
- B Turn the air conditioning on; it's the blue _____.

4 window switch / shifter

- A Push the _____; let's get some fresh air.
- B The _____ is usually behind the steering wheel.

- 4 Fill in the blanks with correct words and phrases from the word bank.

Word BANK

console rearview mirror
knob steering wheel seat belt

- 1 Turn the _____ to adjust the heat.
- 2 Check the _____ to see what is behind the car.
- 3 The _____ controls where the truck is going.
- 4 Wear your _____ at all times.
- 5 The controls for the radio are on the _____.

- 5 Listen and read the car manufacturer's website again. What is the car designed to be?

Listening

- 6 Listen to a conversation between a mechanic and a customer. Choose the correct answers.

- 1 What is the purpose of the phone call?
 - A to get advice on a repair
 - B to report a failed repair
 - C to change a drop off time
 - D to make an appointment
- 2 What is wrong with the car?
 - A the steering wheel is stuck
 - B the window switch is failing
 - C the rear view mirror is broken
 - D the handles and locks don't work

- 7 Listen again and complete the conversation.

Mechanic: Rodney's Repair Shop, this is Saul speaking. How can I help you?

Customer: Hi Saul, my name is Peggy. Can I 1 _____ for you to look at my car today?

Mechanic: Sure, Peggy. 2 _____ with it?

Customer: Well, the 3 _____ don't work.

Mechanic: 4 _____. But we can fix it.

Customer: Thanks. So, when can I 5 _____?

Mechanic: How about you 6 _____ at two this afternoon?

Customer: Great, I'll see you then.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

What's wrong with it?

The ... don't work.

How about you ...

Student A: You are a customer. Talk to Student B about:

- a car problem
- when to go to the shop

Student B: You are a mechanic. Talk to Student A about a problem and make an appointment.

Writing

- 9 Use the conversation from Task 8 to fill out the auto shop schedule.

JACK'S Auto Shop

Appointment book

Date: _____		
Time	Client	Problem

14 Gauges and meters



Measuring Savings, Gauging Safety

You see the **instrument cluster** on your **dashboard** every time you drive. Are you using it to stay safe and save money? Sure, you check your **fuel gauge** so you don't run out of gas. You probably eye the **speedometer** to avoid traffic tickets. Before you go on a trip, you might set the **odometer** to see how far you travel.

But checking the other gauges improves safety and saves money. Watch your **tachometer**. Running the engine fast wastes fuel and money. A glance at the **temperature gauge** prevents overheating. Monitor your tires with the **tire pressure gauge**. Correctly inflated tires add miles per gallon. Finally, watch out for the **battery light**. If it turns on, there's a problem with the charging system.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What gauges and dials are on the dashboard of a car?
- 2 When you are driving, which gauges do you check most often?

Reading

2 Read the column in an auto magazine. Then, mark the following statements as true (T) or false (F).

- 1 ☐ Setting the odometer can help avoid tickets.
- 2 ☐ Checking the tachometer can help save fuel.
- 3 ☐ Correctly inflated tires increase fuel efficiency.

Vocabulary

3 Match the words (1-5) with the definitions (A-E).

- | | |
|--|--------------------------------------|
| 1 <input type="checkbox"/> battery light | 4 <input type="checkbox"/> dashboard |
| 2 <input type="checkbox"/> tire pressure gauge | 5 <input type="checkbox"/> measure |
| 3 <input type="checkbox"/> tachometer | |

- A a gauge that shows engine rotation
- B a display that warns of electronic problems
- C an instrument panel with gauges and dials
- D to find out the amount, size or degree of something
- E a gauge that shows air pressure

4 Fill in the blanks with the words and phrases from the word bank.

word BANK

fuel gauge instrument cluster
odometer speedometer measures
temperature gauge

- 1 An ammeter _____ the flow of electric current.
- 2 Check the _____ to see if the engine is too hot.
- 3 To avoid running out of gas, check the _____.
- 4 The _____ shows how fast a car is moving.
- 5 The _____ holds dials and gauges and is located on the dashboard.
- 6 Harry set the _____ to see how far he will travel on his trip.

- 5 Listen and read the column in an auto magazine again. What is the purpose of the column?

Listening

- 6 Listen to a conversation between a mechanic and a customer. Then choose the correct answers.

- 1 What is wrong with the man's car?
A It will not start.
B It almost overheated.
C Its engine runs too quickly.
D Its temperature gauge is broken.
- 2 What will the woman likely do next?
A watch the tachometer
B check the car's engine
C replace the temperature gauge
D explain the cause of the problem

- 7 Listen again and complete the conversation.

Mechanic: What 1 _____ in today, Mr. Jackson?

Customer: Well, my car 2 _____ a few times this week.

Mechanic: I see. Does it happen on long drives?

Customer: No, my drive to work is only ten minutes long. But the temperature gauge gets 3 _____ in that time.

Mechanic: Okay. And do you 4 _____ hard?

Customer: Not at all. I'm trying to save gas. So I make sure 5 _____ stays below four thousand.

Mechanic: Okay, I'll take a look 6 _____ and see what I can find.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

My car almost ...

Does it happen ...

I'll take a look ...

Student A: You are a mechanic. Talk to Student B about:

- why he or she is at the shop
- the car's gauges
- what you will do next

Student B: You are a car owner. Talk to Student A about your car.

Writing

- 9 Complete the mechanic's check-in form.

Sunshine Garage

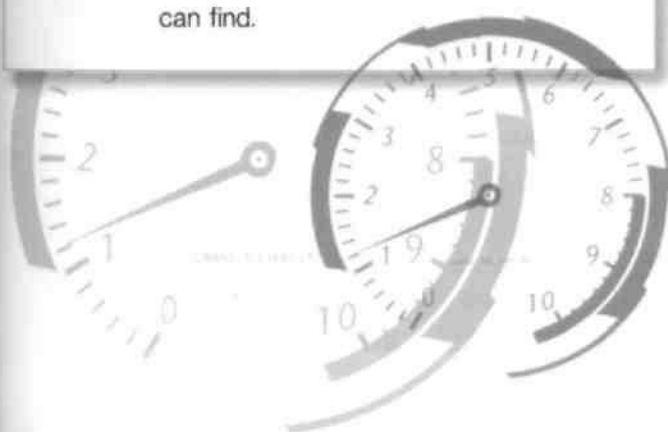
Date: _____

Customer: _____

Type of car: _____ Year: _____

Problem: _____

Meter Readings: _____



15 Tires

Almost every driver will get a flat someday



lug wrench



tire



flat tire



jack

Get ready!

- 1 Before you read the passage, talk about these questions.

- 1 What tools are needed to change a tire?
- 2 When is it necessary to change a tire?

Reading

- 2 Read the tire changing guide. Then, mark the following statements as true (T) or false (F).

- 1 ☐ A tire cannot be changed without a hubcap.
- 2 ☐ The wheel rests upon the lug bolts.
- 3 ☐ Lug nuts should be removed before a car is jacked up.

Vocabulary

- 3 Match the words (1-5) with the definitions (A-E).

- 1 ☐ lug nut
- 2 ☐ spare
- 3 ☐ lug bolt
- 4 ☐ lower
- 5 ☐ tighten

- A an extra tire kept for emergencies
- B to turn something so that it moves closer to another object
- C a metal cap used to attach a wheel to a car
- D a metal bar that a wheel sits on
- E to bring something down



That's why everyone should know how to change a **tire**. Just follow these simple steps.

- 1 Take out the **spare**, the **lug wrench**, and the **jack**.
- 2 Set the parking break and, if possible, **block** the other tires.
- 3 Remove the **hubcap**, if one is present.
- 4 **Loosen** the **lug nuts**. (Note: Do not remove them.)
- 5 **Crank** the jack to **jack up** the car enough to remove the tire.
- 6 Remove the lug nuts.
- 7 Pull the wheel off the **lug bolts**.
- 8 Put on the spare.
- 9 Replace the lug nuts on the lug bolts and **tighten** them slightly.
- 10 **Lower** the car.
- 11 Tighten the lug nuts completely.

- 4 Fill in the blanks with the correct words and phrases from the word bank.

word BANK

block lug wrench
tire crank loosen

- 1 John used the _____ to take off the hubcap.
- 2 To lift the car, _____ the jack.
- 3 A _____ is made of rubber.
- 4 _____ the lug nuts before you jack up the car.
- 5 _____ the tires so the car won't roll.

- 5 Listen and read the tire changing guide again. What is the final step in changing a tire?

Listening

- 6 Listen to a conversation between a driver and a passenger. Choose the correct answers.

- Why is the woman pleased the passenger is present?
 - She is missing needed equipment.
 - She cannot jack up the car alone.
 - She has not changed a tire before.
 - She needs help blocking the tires.
- What item is the woman missing?
 - a jack to lift the car
 - an item to block the tires
 - a spare tire to put on the car
 - a lug wrench to remove the nuts

- 7 Listen again and complete the conversation.

Driver: I'm glad you're here. I've 1 _____ a flat tire before.

Passenger: Don't worry. It's a 2 _____.

Driver: Great. How do we start?

Passenger: Well, let's 3 _____ we have everything we need first.

Driver: Okay. I've got a 4 _____ in the trunk. What else do we need?

Passenger: Just the jack and a 5 _____.

Driver: Those are in the trunk, too.

Passenger: Oh, do you have something to 6 _____?

Driver: I don't think so, sorry.



Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

What else do we need?

It's in the trunk.

Do you have something to ...

Student A: You are helping a friend change a tire. Talk to Student B about:

- difficulty
- items needed
- location of an item

Student B: You are a car owner. Talk to Student A about changing a tire.

Writing

- 9 Use the guide and the conversation from Task 8 to fill out the tire changing guide.



A-1 Auto Guide

Changing a Tire

Items needed	How each item is used

Glossary

- 2-door coupe** [N-COUNT-U11] A **2-door coupe** is an automobile with a fixed roof that has two side doors and a back door sloping downwards.
- 4-door sedan** [N-COUNT-U11] A **4-door sedan** is an enclosed automobile with four doors, back and front seats and a trunk. It carries four or more people.
- abrasive** [ADJ-U5] If something is **abrasive** it has a rough, grainy texture, such that it scratches surfaces it touches.
- add** [V-T-U8] To **add** numbers is to combine them.
- adjustable** [ADJ-U1] If an object is **adjustable**, it can change to be different sizes or take on different positions.
- air compressor** [N-COUNT-U4] An **air compressor** is a machine that takes in air at atmospheric air pressure and converts it to a higher pressure.
- air ratchet** [N-COUNT-U4] An **air ratchet** is a power tool powered by an air compressor and designed to loosen or tighten nuts and bolts quickly. An air ratchet is smaller than an impact wrench and designed more for speed than force and rotation.
- Allen key** [N-COUNT-U2] An **Allen key** or **Allen wrench** is an L or T-shaped wrench, the end of which fits into the hexagonal recess of Allen bolts and screws.
- aluminum** [N-UNCOUNT-U7] Aluminum is lightweight, silvery-white metal used in making automobile wheel rims.
- anchor** [N-COUNT-U3] An **anchor** is a type of fastener with a hook or other feature that offers more support for holding two things together than a regular bolt or screw.
- and** [CONJ-U8] And is used when combining or adding numbers. For example, one and one equals two.
- angle grinder** [N-COUNT-U4] An **angle grinder** is a handheld power tool used for cutting, grinding, or polishing something.
- ball pein hammer** [N-COUNT-U2] A **ball pein hammer** is a hand tool with a handle and a rounded metal head used in working metal.
- battery light** [N-COUNT-U14] A **battery light** is a display that lights up when a car's battery is not functioning properly.
- bead blaster** [N-COUNT-U10] A **bead blaster** is a machine that shoots out glass beads to scrape off paint.
- bearing press** [N-COUNT-U5] A **bearing press** is a stand mounted machine press for bending, bonding, and shaping metal, especially in the automotive industry.
- bench grinder** [N-COUNT-U5] A **bench grinder** is a grinding machine, usually with two abrasive grinding wheels, that is mounted on a work bench.
- bench seat** [N-COUNT-U13] A **bench seat** is a long, flat seat with space for three people.
- block** [V-T-U15] To **block** the wheels of a car is to put objects next to them to stop them from moving.
- bolt** [N-COUNT-U3] A **bolt** is a round, narrow piece of metal with a thread and a wide head at one end. It is usually used with a nut.
- brake light** [N-COUNT-U12] A **brake light** is a light on the back of a car to notify other drivers when the car is braking.
- bucket seat** [N-COUNT-U13] A **bucket seat** is a seat for one person that has a deep, round shape.
- bumper** [N-COUNT-U12] A **bumper** is a bar along the front or back of a car to protect the car from damage during collisions.
- caliper** [N-COUNT-U9] A **caliper** is a tool with adjustable legs for measuring the length or width of something.
- cast iron** [N-UNCOUNT-U7] Cast iron is an alloy of iron and carbon that is cast into shape.
- centimeter** [N-COUNT-U9] A **centimeter** is a metric unit that measures length or distance, equal to ten millimeters.
- clamp** [N-COUNT-U3] A **clamp** is a device that presses two things together tightly.
- claw hammer** [N-COUNT-U1] A **claw hammer** is a hand tool with a metal head on a handle that is used for striking, pounding, or driving nails into a surface. The opposite side of the metal head is split and curved for removing nails.
- combination wrench** [N-COUNT-U2] A **combination wrench** is a simple metal wrench with one open end and one ring-shaped end for turning nuts and bolts.

come to [V-PHRASE-U8] To **come to** a number is to equal that number.

compact [N-COUNT-U11] A **compact** is a small car.

computer [N-COUNT-U10] A **computer** is an electronic machine that can keep and work with information.

console [N-COUNT-U13] A **console** is the area in the car that faces passengers and contains a radio, temperature dials, gas meters, etc.

conversion [N-UNCOUNT-U9] **Conversion** is the process of changing from one state or mode into another.

convertible [N-COUNT-U11] A **convertible** is a car with a roof that can be folded or removed.

crank (V) [V-T-U15] To **crank** something is to turn a handle to make it move.

creeper [N-COUNT-U10] A **creeper** is a long board with wheels that a person lays on when working under a car.

cubic inch [N-COUNT-U9] A **cubic inch** is an imperial unit that measures the volume of a cube that is one inch long on each side.

cubic meter [N-COUNT-U9] A **cubic meter** is a metric unit that measures the volume of a cube that is one meter long on each side. It is equal to 1000 liters.

dashboard [N-COUNT-U14] A **dashboard** is the part of a car that has dials and gauges and is located below the windshield.

door [N-COUNT-U12] A **door** is the part of the car that opens to allow the driver and passengers to get in or out.

door panel [N-COUNT-U13] A **door panel** is the inside part of the door that usually contains the window and lock switches and is covered in an interior fabric.

drain [N-COUNT-U10] A **drain** is an opening in the floor through which water or other liquids can pass to keep the floor dry.

drill [N-COUNT-U4] A **drill** is a power tool used to bore holes into something.

drill bit [N-COUNT-U4] A **drill bit** is the cutting tool used in a drill. The drill rotates the drill bit, producing a hole in something.

drill press [N-COUNT-U5] A **drill press** is a motor driven drilling machine mounted on a stand, or fastened to the floor or work bench, used to make holes in materials.

drive [V-T-U6] To **drive** something is to cause it to move into or through something else by applying force.

electrical outlet [N-COUNT-U10] An **electrical outlet** is a socket that electrical devices plug into to receive electricity.

equal [V-T-U8] To **equal** a number is to be the correct answer to a mathematical problem.

fan [N-COUNT-U10] A **fan** is a machine that blows air, usually used to cool something or a person.

fastener [N-COUNT-U3] A **fastener** is a device that is used to hold two things together.

fender [N-COUNT-U12] A **fender** is the part of a car that covers and protects the wheels.

fiberglass [N-UNCOUNT-U7] **Fiberglass** is a material that is composed of resin and fine filaments of glass that is used to make the bodies of automobiles.

flat [N-COUNT-U15] A **flat** is a tire that has lost most or all of its air.

flathead screwdriver [N-COUNT-U1] A **flathead screwdriver** is a hand tool used to drive screws into a surface. A flathead screwdriver has a flat, wedge-shaped tip that fits into a slotted screw.

flip [V-T-U6] To **flip** something is to turn it over so that the topside is on the bottom, or the front side is in the back.

fuel gauge [N-COUNT-U14] A **fuel gauge** is an instrument that shows the quantity of gas or diesel fuel in the car.

glass [N-UNCOUNT-U7] **Glass** is a hard, brittle, often transparent material used to make windows and mirrors.

grade [N-COUNT-U3] A **grade** is a measurement of a fastener's strength, often determined by its manufacturing process and materials. A grade is often displayed on the head of a fastener.

grill [N-COUNT-U12] A **grill** is a device with crossing metal bars that is attached to the front of a car to protect it.

Glossary

- grinding machine** [N-COUNT-U5] A **grinding machine** is a machine that uses an abrasive wheel to grind, sharpen, or otherwise deform the object being worked on.
- grip** [V-T-U6] To **grip** something is to hold it firmly with a hand or a tool.
- hacksaw** [N-COUNT-U2] A **hacksaw** is a saw with a replaceable metal blade and very small teeth for cutting metal or plastic.
- hand tools** [N-COUNT-U1] **Hand tools** are manual devices operated by human hands and are commonly used in home improvement or automobile projects.
- handle** [N-COUNT-U13] A **handle** is the lever that a person must pull to get in and out of an automobile.
- hand saw** [N-COUNT-U2] A **hand saw** is a saw with a handle and a broad semi-flexible metal blade with small teeth for cutting wood.
- hatchback** [N-COUNT-U11] A **hatchback** is a car with a door on the back that opens from the bottom.
- headlight** [N-COUNT-U12] A **headlight** is a light on the front of the car that helps the driver see in the dark.
- heat gun** [N-COUNT-U4] A **heat gun** is a handheld power tool that delivers extremely hot air to something.
- hood** [N-COUNT-U12] A **hood** is a piece of metal that covers and protects the engine of a car.
- hubcap** [N-COUNT-U15] A **hubcap** is a metal cover that protects the center of the car wheel.
- hundred** [N-COUNT-U8] **Hundred** is combined with another number to abbreviate numbers in the thousands. For example, the number 2,300 could be stated twenty-three hundred.
- impact socket** [N-COUNT-U4] An **impact socket** is a durable socket used with an impact wrench.
- impact wrench** [N-COUNT-U4] An **impact wrench** is a power tool that is designed to utilize force and rotation to loosen or tighten nuts, bolts, and screws.
- imperial** [ADJ-U9] If something is **imperial**, it involves the system of measurement based on the inch and the pound.
- inch** [N-COUNT-U9] An **inch** is an imperial unit that measures length or distance.
- insert** [V-T-U6] To **insert** something is to put it into something else.
- instrument cluster** [N-COUNT-U14] An **instrument cluster** has several dials and instruments together on one panel on a dashboard.
- is** [V-T-U8] If the answer to a mathematical problem is a number, it equals that number.
- jack** [N-COUNT-U15] A **jack** is a device used to lift a car off the ground.
- jack up** [V-PHRASAL-U15] To **jack up** a car is to use a device to lift it up.
- kilogram** [N-COUNT-U9] A **kilogram** is a metric unit that measures weight.
- knob** [N-COUNT-U13] A **knob** is an object that is turned in order to change or adjust something.
- lathe** [N-COUNT-U5] A **lathe** is a machine that rotates an object to be worked on about an axis, so as to cut, sand, or shape the object with circular symmetry.
- leather** [N-UNCOUNT-U7] **Leather** is a flexible material made from the skin of an animal, often a cow.
- less** [PREP-U8] **Less** is used when taking a number away from another.
- lift** [N-COUNT-U5] A **lift** is a machine for raising an automobile in order to work easily on its underside.
- lift** [V-T-U6] To **lift** something is to move it upward by applying force.
- lightweight** [ADJ-U7] If something is **lightweight**, it is relatively low in mass for its volume, or not heavy.
- liter** [N-COUNT-U9] A **liter** is a metric unit that measures volume of gas or liquid.
- lock** [N-COUNT-U13] A **lock** is a device that does not allow an object to be opened.
- long-nose pliers** [N-COUNT-U1] **Long-nose pliers** are hand tools with parallel, needle-like pincers, often with serrated edges, used for gripping small objects.
- loosen** [V-T-U15] To **loosen** something is to make it less tight.

lower [V-T-U15] To **lower** a car is to bring it down, usually to the ground after it has been jacked up.

lug bolt [N-COUNT-U15] A **lug bolt** is a metal bar that helps to attach a wheel to a car. It is used with a lug nut.

lug nut [N-COUNT-U15] A **lug nut** is a metal cap that is put on the end of a lug bolt. It is used to attach a wheel to a car.

lug wrench [N-COUNT-U15] A **lug wrench** is a wrench designed to tighten or loosen lug nuts.

mat [N-COUNT-U10] A **mat** is a piece of thick material which covers part of a floor.

measure [V-T-U14] To **measure** is to find out the size, shape, or amount of something.

metric [ADJ-U9] If something is **metric**, it involves the system of measurement based on the meter and the kilogram.

metric thread [N-COUNT-U3] A **metric thread** is a thread that is measured in millimeters instead of inches.

micrometer [N-COUNT-U9] A **micrometer** is a type of caliper used to measure small distances.

millimeter [N-COUNT-U9] A **millimeter** is a metric unit of length, equal to 1/10 of a centimeter.

minivan [N-COUNT-U11] A **minivan** is a small passenger van that carries about eight people.

minus [PREP-U8] **Minus** is used when taking away a number from another.

mirror [N-COUNT-U12] A **mirror** is a piece of glass that reflects images.

multiplied by [V-PHRASE-U8] If a number is **multiplied by** another, it is added onto itself that number of times.

nail [N-COUNT-U3] A **nail** is a long, smooth piece of metal with a wide head at one end and a sharp point at the other end, usually used for holding pieces of wood together.

nut [N-COUNT-U3] A **nut** is a round piece of metal with a hole through the middle that goes around a bolt.

nut driver [N-COUNT-U2] A **nut driver** is a socket attached to a straight metal shaft and a handle, used for turning nuts and bolts. It is shaped like a screwdriver.

odometer [N-COUNT-U14] An **odometer** measures the number of miles or kilometers traveled.

Phillips screwdriver [N-COUNT-U1] A **Phillips screwdriver** is a hand tool used to drive screws into a surface. A Phillips screwdriver has a cross-shaped tip and is used specifically with Phillips screws.

pickup truck [N-COUNT-U11] A **pickup truck** is a light truck with an open body, low sides, and a tailboard.

pin [N-COUNT-U3] A **pin** is a long, narrow piece of metal or other material that is used to hold two things together.

pipe wrench [N-COUNT-U2] A **pipe wrench** is an adjustable wrench with an open ended jaw and angled teeth for turning pipes and round surfaced fittings.

pit [N-COUNT-U10] A **pit** is an area below ground level, where the mechanics stand and work on the bottom of an automobile.

plastic [N-UNCOUNT-U7] **Plastic** is any number of synthetic materials that are easily shaped and molded when soft, then become hard and durable.

plus [PREP-U8] **Plus** is used when adding numbers. For example two plus two equals four.

pneumatic torque wrench [N-COUNT-U4] A **pneumatic torque wrench** is a tool powered by an air compressor and designed to apply a pre-determined amount of torque to fasten or remove nuts or bolts.

pound [N-COUNT-U9] A **pound** is an imperial unit that measures weight.

printer [N-COUNT-U10] A **printer** is a machine that makes copies on paper of the information in the computer.

pull [V-T-U6] To **pull** something is to apply force upon it toward the body.

push [V-T-U6] To **push** something is to apply force upon it to move it.

quart [N-COUNT-U9] A **quart** is an imperial unit that measures volume of gas or liquid.

ratchet wrench [N-COUNT-U2] A **ratchet wrench** is a socket wrench with a ratcheting mechanism that tightens or loosens bolts by allowing the handle to turn as the bolt turns in one direction, without turning the bolt in the other.

Glossary

rearview mirror [N-COUNT-U13] A **rearview mirror** is the mirror in the center of the windshield that allows a person to see what's behind an automobile.

remove [V-T-U6] To **remove** something is to take it out of something else.

retractable [ADJ-U1] If something is **retractable**, it can shrink or pull back.

rotate [V-T-U5] To **rotate** something is to turn it about an axis.

round off [V-T-U9] To **round off** a screw or bolt is to damage it so that it cannot be moved properly with normal tools.

rubber [N-UNCOUNT-U7] **Rubber** is an elastic, water resistant, solid material, often black, made from the chemically treated substance of rubber trees, and used to make tires and hoses.

sander [N-COUNT-U4] A **sander** is a power tool used to smooth surfaces with sandpaper.

sander [N-COUNT-U5] A **sander** is a handheld or bench-mounted machine for making wood or other surfaces smooth by rubbing them with replaceable abrasive sand paper.

sawhorse [N-COUNT-U2] A **sawhorse** is a flat, narrow surface on four legs, on which to set a wooden board or other material while cutting, painting, or working with them in some way.

screw [N-COUNT-U3] A **screw** is a round, narrow piece of metal with a thread. It has a wide head at one end and a point at the other end.

screw [V-T-U6] To **screw** a threaded fastener, as in a bolt or screw, is to turn it, usually clockwise, so as to tighten it or bore it into something else.

seat belt [N-COUNT-U13] A **seat belt** is a strap that goes around the people in an automobile to protect them in case of a crash.

sheet metal screw [N-COUNT-U3] A **sheet metal screw** is a screw with deep threads along its entire rod. It is often used for holding together thin sheets of metal.

shifter [N-COUNT-U13] A **shifter** is a lever that controls what gear an automobile operates in.

shop vac [N-COUNT-U4] A **shop vac** is a vacuum device that has the ability to clean up wet substances.

sink [N-COUNT-U10] A **sink** is a container that fills with water and is used for washing.

slip-joint pliers [N-COUNT-U1] **Slip-joint pliers** are hand tools with parallel, flat pincers used for gripping small objects. Slip-joint pliers have an adjustable slot that increases the opening of the jaws.

socket [N-COUNT-U2] A **socket** is one of several interchangeable heads used with a socket wrench to turn various sizes of nuts and bolts.

socket extension [N-COUNT-U2] A **socket extension** is a metal fitting placed between a socket and a socket wrench in order to access bolts in locations that are difficult to reach.

solvent tank [N-COUNT-U10] A **solvent tank** is a container that holds solvent, which is used to clean auto parts.

spanner wrench [N-COUNT-U2] A **spanner wrench** is a wrench with one or more pins or hooks for adjusting spanner head screws, or retainer rings.

spare [N-COUNT-U15] A **spare** is an extra tire that is kept in the car in case a tire on the car goes flat.

speedometer [N-COUNT-U14] A **speedometer** measures how fast a car travels in miles or kilometers.

spoiler [N-COUNT-U12] A **spoiler** is a long piece of metal or plastic on the back of a car that can improve the movement of the car or can be decorative.

sports car [N-COUNT-U11] A **sports car** is a small, fast car that usually carries one or two people and often has a removable roof.

station wagon [N-COUNT-U11] A **station wagon** is a car with a long body, a third seat, and extra space behind the seats for storing things.

steel [N-UNCOUNT-U7] **Steel** is a hard, strong, metal, made by modifying iron.

steering wheel [N-COUNT-U13] A **steering wheel** is a wheel that is turned in order to steer an automobile.

storage [N-UNCOUNT-U10] **Storage** is an area where things are placed so they can be used later.

strip [V-T-U6] To **strip** a screw head, nut, or bolt is to deform its threads, recess, or general shape so that it becomes difficult to turn.

subtract [V-T-U8] To **subtract** a number is to take it away from another number.

SUV [N-COUNT-U11] An **SUV** (Sport Utility Vehicle) is a high-performance car that is built like a truck and has four-wheel drive.

table saw [N-COUNT-U5] A **table saw** is a machine that uses a circular saw blade protruding through a flat surface, or table, to cut wood.

tachometer [N-COUNT-U14] A **tachometer** measures the number of rotations an engine makes.

taillight [N-COUNT-U12] A **taillight** is a light on the back of a car that helps other drivers see the car in the dark.

temperature gauge [N-COUNT-U14] A **temperature gauge** measures how hot or cold a car engine is.

-th [N-COUNT-U8] **-th** is combined with the second number of a fraction when it is said aloud.

thread [N-COUNT-U3] A **thread** is a ridge that winds around a screw to hold it in place.

tighten [V-T-U15] To **tighten** a nut is to bring its edge closer to the item it is holding down.

times [PREP-U8] **Times** is used when multiplying numbers.

tire [N-COUNT-U15] A **tire** is an air-filled rubber cover that fits around a car wheel.

tire pressure gauge [N-COUNT-U14] A **tire pressure gauge** measures how much air is in a car tire.

tool kit [N-COUNT-U1] A **tool kit** is a set of tools.

twist [V-T-U6] To **twist** something is to cause it to turn by applying force.

unscrew [V-T-U6] To **unscrew** a threaded fastener is to turn it, usually counter clockwise, so as to loosen it or remove it from a hole.

utility knife [N-COUNT-U1] A **utility knife** is a cutting device that consists of a small, sharp blade that is retractable when not in use.

UTS thread [N-COUNT-U3] A **UTS thread** is a thread that is measured in inches instead of millimeters.

van [N-COUNT-U11] A **van** is vehicle, bigger than a car but smaller than a truck, used for transporting several people or goods.

washer [N-COUNT-U3] A **washer** is a flat, round piece of metal, plastic or rubber with a hole in the middle, which is used to make a bolt fit tightly.

window switch [N-COUNT-U13] A **window switch** is a button that causes the window to open or close.

windshield [N-COUNT-U12] A **windshield** is a glass window in the front of a car that protects the occupants.

wipers [N-COUNT-U12] **Wipers** are rubber blades that move across the windshield to remove moisture and debris.

wire cutter [N-COUNT-U2] A **wire cutter** is a pair of pliers with a sharp edge for cutting wire.

wood screw [N-COUNT-U3] A **wood screw** is a tapered screw with a flat head and threads along part of the rod. It is used for holding together pieces of wood.

work lamp [N-COUNT-U10] A **work lamp** is a moveable light that allows a person to see what they are working on.

wrench [N-COUNT-U1] A **wrench** is a hand tool that provides extra grip to loosen or tighten nuts, bolts, studs, and pipes.

**CAREER
PATHS**

Mechanics

Book
2

Jim D. Dearholt



Express Publishing

Table of contents

Engines

Unit 1 - Internal combustion engine	4
Unit 2 - Diesel vs. gasoline	6
Unit 3 - Two-stroke engine	8
Unit 4 - Four-stroke engine	10

Auto systems

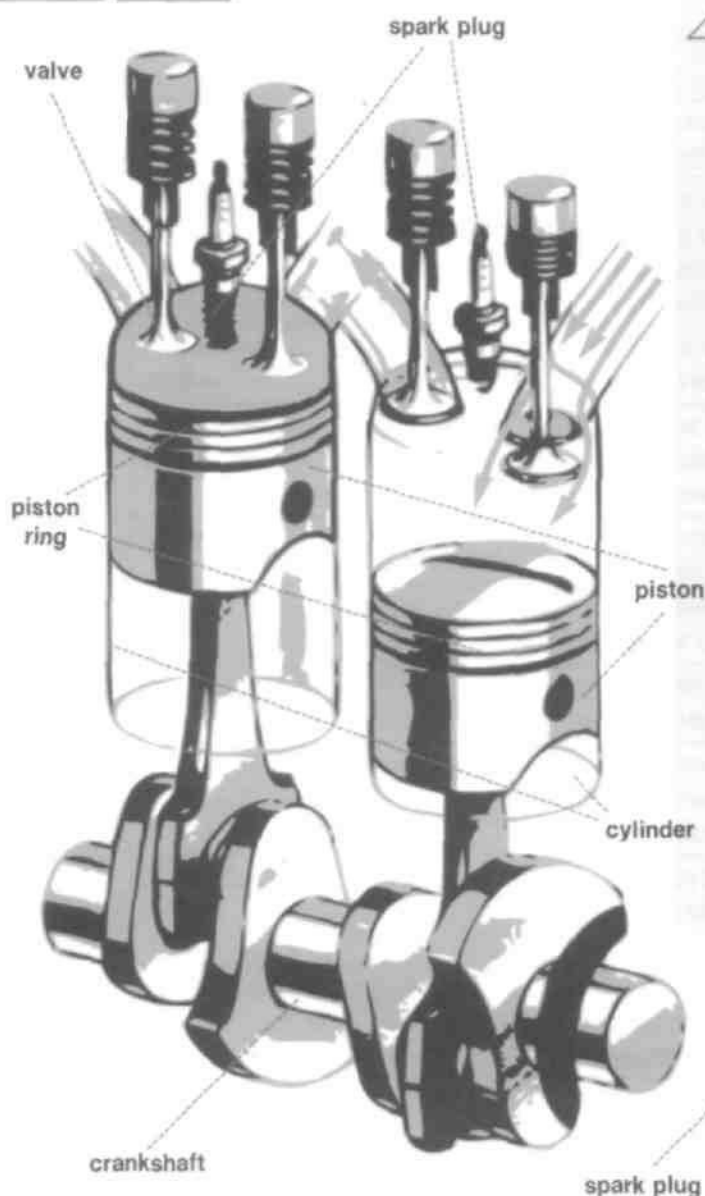
Unit 5 - Electrical system	12
Unit 6 - Ignition system	14
Unit 7 - Fuel system	16
Unit 8 - Lubrication system	18
Unit 9 - Exhaust system	20
Unit 10 - Cooling system	22
Unit 11 - Brake system	24
Unit 12 - Steering system	26
Unit 13 - Suspension system	28
Unit 14 - Transmission system	30
Unit 15 - Differentials and joints	32

Appendix

Glossary	34
----------------	----

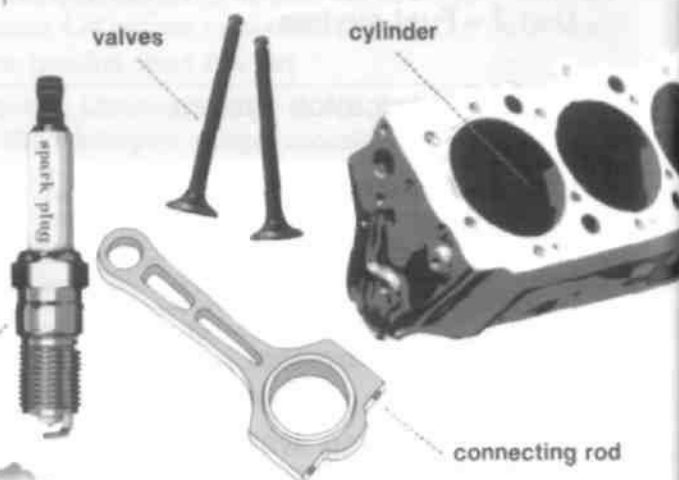
1 Internal combustion engine

Scholar's Encyclopedia: I-J 644



Internal Combustion Engine

An internal combustion engine operates in a cycle that compresses and ignites fuel and air to generate energy. The starting point is the **cylinder**. The cylinder runs through the **head** and down into the **engine block**. A **piston** within the cylinder moves up and down. At the start of the cycle, it pulls a mixture of fuel and air through **valves** and into the cylinder. It then moves upward compressing the fuel mixture. A **piston ring** forms a tight seal between the piston and the cylinder wall. This ensures that the fuel mixture cannot escape. It also keeps oil from the **sump** from entering the combustion chamber. Next, a **spark plug** fires and ignites the fuel mixture. The resulting explosion pushes the piston downward. This in turn moves a **connecting rod** attached to the piston. The connecting rod transfers the mechanical energy from the piston to a **crankshaft** contained within a **crankcase**.



Get ready!

- 1 Before you read the passage, talk about these questions.

- 1 Where are pistons located in a car's engine?
- 2 What are the main parts of a car's engine?

Reading

- 2 Read the encyclopedia entry. Then, mark the following statements as true (T) or false (F).

- 1 ☐ Air enters the cylinder through the valves.
- 2 ☐ Fuel is compressed by the piston.
- 3 ☐ The crankshaft connects to the sparkplug.

Vocabulary

- 3 Match the words (1-6) with the definitions (A-F).

- | | |
|---|--|
| 1 <input type="checkbox"/> engine block | 4 <input type="checkbox"/> piston ring |
| 2 <input type="checkbox"/> connecting rod | 5 <input type="checkbox"/> spark plug |
| 3 <input type="checkbox"/> crankcase | 6 <input type="checkbox"/> head |

- A body of engine
- B holds large shaft in engine
- C creates tight seal
- D top part of engine
- E transfers power from piston
- F causes explosion

- 4 Fill in the blanks with the correct words from the word bank.

Word Bank

piston cylinder sump crankshaft valve

- 1 A _____ controls the flow of air into an engine.
- 2 The _____ holds the engine's supply of oil.
- 3 The spark plug fires in the _____.
- 4 The _____ moves up and down in a cycle.
- 5 The connecting rod powers the _____.

- 5 Listen and read the encyclopedia entry again. How does an internal combustion engine supply energy to the rest of a vehicle?

Listening

- 6 Listen to a conversation between an experienced mechanic and a new mechanic working on an engine. Check (✓) the causes of the engine failure.

- | | |
|--|--|
| 1 <input type="checkbox"/> bad spark plugs | 4 <input type="checkbox"/> worn piston rings |
| 2 <input type="checkbox"/> oil leak | 5 <input type="checkbox"/> broken piston |
| 3 <input type="checkbox"/> cracked sump | |

- 7 Listen again and complete the conversation.

- Mechanic 1: I'm still 1 _____ what caused the engine to fail.
- Mechanic 2: I'm pretty certain that it was an 2 _____.
- Mechanic 1: Really? I was thinking 3 _____.
- Mechanic 2: It couldn't be that. The spark plugs are old, but they aren't 4 _____.
- Mechanic 1: So the sump is cracked?
- Mechanic 2: The sump 5 _____.
- Mechanic 1: It isn't? But then 6 _____ an oil leak?
- Mechanic 2: Look inside the cylinder and tell me what you see.
- Mechanic 1: The walls are discolored and damaged. It looks really dirty too.
- Mechanic 2: Exactly. Do you have any idea what caused that?
- Mechanic 1: My guess is that oil got in there. Ah, so it was the piston rings.
- Mechanic 2: Exactly. They wore out and oil leaked into the chamber.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Nothing is wrong with the ...

The ... is not the problem.

It has to be the ...

Student A: You are a new mechanic. Talk to Student B about:

- what you think caused the engine to fail
- what parts you checked
- why you think one is the cause

Student B: You are an experienced mechanic. Talk to Student A about why each part is not the problem and which one is.

Writing

- 9 Use the conversation from Task 8 to fill out the engine problem diagnosis form.

Frank's Garage

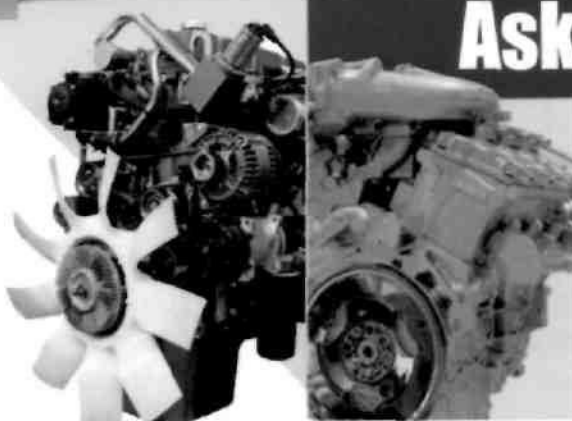
Engine Failure Diagnosis

Parts checked: _____

Cause determined: Y / N

Describe what you suspect caused the problem: _____

2 Diesel vs. gasoline



Diesel engine VS. Gasoline engine

Ask the Mechanic!

Dear Mechanic, I want to buy my first car. I noticed that some engines **run on gasoline** and others run on **diesel**. What's the difference?

- Todd in Yarmouth

Dear Todd, Both types of engines have **combustion chambers**. However, a diesel engine doesn't have a spark plug. Instead, it uses hot, compressed air to ignite the fuel. The air enters the chamber first. Then the **fuel injection pump** forces fuel into the chamber. Some have **precombustion chambers** or **glow plugs** that **heat up** the air to increase efficiency. In gasoline engines, on the other hand, fuel and air are mixed before entering the chamber, though most use a fuel injection pump as well. Diesel engines also have a higher **compression ratio**.

Diesel has a bad reputation because it doesn't burn as clean as gasoline. New **clean diesel** is much less polluting. And **biodiesel** offers a sustainable fuel option. It's more expensive than gasoline, but provides better fuel economy. Another thing to remember: diesel engines require less **maintenance** and are more **durable**.

Get ready!

1 Before you read the passage, talk about these questions.

- What are some different types of fuel for vehicles?
- In what part of an engine does fuel ignite?

Reading

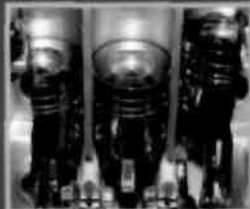
2 Read the advice column. Then, choose the correct answers.

- What is the purpose of the column?
 - to show ways to use less fuel
 - to state the benefits of diesel fuel
 - to explain the process of combustion
 - to compare different types of engines
- How is a gasoline engine different from a diesel engine?
 - A gas engine releases more pollutants.
 - A gas engine uses spark plugs for ignition.
 - A gas engine needs more time to warm up.
 - A gas engine has a smaller fuel injection pump.
- Which of the following is NOT a feature of a diesel engine?
 - Air and fuel mix before entering the chamber.
 - It is more durable than a gasoline engine.
 - It doesn't burn as clean a gasoline engine.
 - Gasoline cannot be used in it.

maintenance



combustion chamber



DIESEL injection pump



heat up



Vocabulary

3 Read the sentence pair. Choose where the words best fit the blanks.

1 **clean diesel / biodiesel**

- Plants are a main source for _____.
- _____ was created because regular diesel had too many pollutants.

2 **heat up / run on**

- When you start engines they _____.
- Most cars today _____ gasoline.

3 **durable/ maintenance**

- All vehicles require some _____.
- A _____ engine will last a long time.

4 **gasoline / diesel**

- _____ engines do not use spark plugs.
- _____ engines are the most common today.

- 4 Place the words and phrases from the word bank under the correct heading.

Word BANK

fuel injection pump compression ratio
glow plug combustion chamber
precombustion chamber

Gasoline and Diesel engines	Diesel engines only
_____	_____
_____	_____
_____	_____

- 5 Listen and read the advice column again. Which type of diesel is the most expensive?

Listening

- 6 Listen to a conversation between a car buyer and a salesperson. Mark the following statements as true (T) or false (F).

- ___ The man owned a diesel powered car before.
- ___ New diesel engines produce less pollution.
- ___ The man is worried that diesel engines are not durable.

- 7 Listen again and complete the conversation.

Buyer: I'm thinking about buying a car with a diesel engine, but I'm not sure if it's for me.

Salesperson: Well, what attracted you to diesel engines 1 _____?

Buyer: I've heard they're more 2 _____.

Salesperson: That's their main advantage. 3 _____ that fuel costs more.

Buyer: But the increased fuel efficiency 4 _____ that, right?

Salesperson: Absolutely. 5 _____ that diesel engines are more durable.

Buyer: That should save me money on maintenance 6 _____.

Salesperson: Exactly. You don't have to take them to the mechanic as often.

Buyer: That's good, though I am concerned about one thing. Aren't they dirty engines?

Salesperson: Not the newer ones. Some can even run on biodiesel.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

That's their main advantage.

A downside is ... / Another plus is ...

Student A: You are a salesperson. Talk to Student B about a diesel engine's:

- fuel efficiency
- durability
- pollution

Student B: You are a car buyer. Talk to Student A about your concerns about buying a diesel engine.

Writing

- 9 Use the conversation from Task 8 to fill out the buyer's notes on diesel engines.

Diesel vs. Gasoline

notes

Type of engine: _____

Pros: _____

Cons: _____

3 Two-stroke engine

HOME PAGE

ROGER'S BLOG

FUN WITH ENGINES Understanding Your Two-Stroke Engine



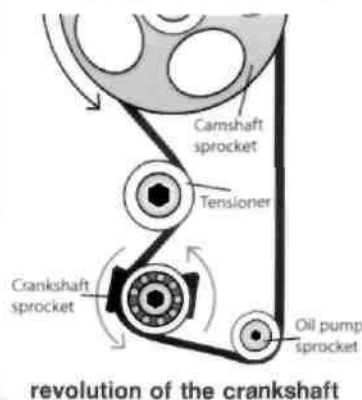
two-stroke engines



fuel

Look around your house and chances are you'll find **two-stroke engines**. They are in lawn mowers, chainsaws, leaf blowers, and many other small machines. Many owners, however, don't really understand how they work. They know they need to **mix two-stroke oil** with **fuel** in the correct **fuel-to-oil ratio**. But that's about it.

For such powerful little engines, they are actually quite simple. In the first part of the **cycle**, the piston goes down, creating a vacuum that sucks in the fuel, air, and oil mixture through the **inlet**. Then the piston goes up, **compressing** the mixture. Next, the spark plug **fires**, igniting the fuel mixture. The resulting explosion pushes the piston back down and forces **exhaust** out of the combustion chamber. In the down position, the piston has completed its cycle, which is equal to one **revolution** of the crankshaft.



Get ready!

1 Before you read the passage, talk about these questions.

- What are some small gasoline-powered machines?
- How do small gasoline-powered engines differ from large engines?

Reading

2 Read the blog post. Then, complete the table using information from the reading.

Two-stroke cycle	Resulting action
Piston goes down	1 _____
Piston goes up	2 _____
Spark plug fires	3 _____

Vocabulary

3 Check (✓) the sentence that uses the underlined part correctly.

- A Fuel is ignited in a combustion chamber.

— B An inlet compresses air out of the combustion chamber.
- A After the explosion, exhaust leaves the combustion chamber.

— B The fuel-to-oil ratio is the second step of the cycle.
- A Air leaves the chamber through the inlet.

— B You must mix fuel and oil in some engines.
- A A revolution is a complete rotation.

— B A two-stroke engine has no crankshaft.
- A Each time the piston moves up or down is one cycle.

— B When a spark plug fires there is an explosion.

4 Write a word that is similar in meaning to the underlined part.

- The chainsaw has an engine that completes a cycle in two movements.
_ _ _ _ _ t _ _ _ _ _ g _ _ e
- When a piston goes up it causes the air, oil, and fuel mixture to get smaller in volume.
_ _ _ p _ e _ _
- Use the correct proportion of fuel and oil in the lawnmower engine.
_ _ _ l _ _ _ _ _ l _ a _ _ _
- The hole is where a combination of air, fuel, and oil enters the engine. _ n _ _ _
- One set of down and up motions of the piston completely rotates the crankshaft. _ _ c _ _
- You must add a special type of lubrication to your chainsaw's fuel. _ _ o _ _ r _ _ _ l

- 5 Listen and read the blog post again. Where are two-stroke engines commonly found?

Listening

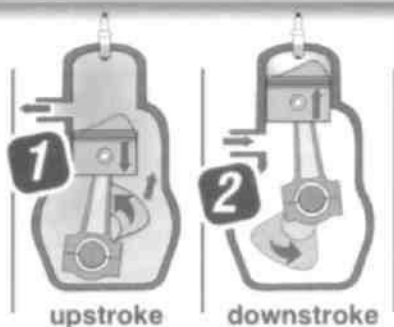
- 6 Listen to a conversation between two mechanics. Choose the correct answers.

- What is the conversation mainly about?
 - the result of overusing a chainsaw
 - the types of two-stroke engine oil
 - the repairs completed on an engine
 - the cause of an engine problem
- What mostly likely damaged the pistons?
 - overuse of the engine
 - an insufficient fuel-to-oil ratio
 - lack of regular maintenance
 - using the wrong type of oil

- 7 Listen again and complete the conversation.

Mechanic 2: I just did. My guess is that he pretty much ruined the engine.
 Mechanic 1: Really? How did you figure that out?
 Mechanic 2: It looks like the pistons are damaged.
 Mechanic 1: 1 _____?
 Mechanic 2: I think so. But I'll have to test them 2 _____.
 Mechanic 1: What do you think caused that to happen? Do you think he was 3 _____?
 Mechanic 2: 4 _____ that he didn't add enough oil to the fuel.
 Mechanic 1: That's a 5 _____. I wouldn't be surprised if that's it.
 Mechanic 2: Yeah. A lot of people forget to use the right 6 _____ - _____ - _____.

Two-Stroke Cycle



Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

It looks like ... / My guess is ...
I need to ... to be sure

Student A: You are a mechanic working on a two-stroke engine. Talk to Student B about:

- the engine's problem
- the cause of the problem
- the solution to the problem

Student B: You are a mechanic. Ask Student A about the problems with the engine.

Writing

- 9 Use the conversation from Task 8 to fill out the repair ticket.

Fred's Small Engine Repair

Repair Ticket

Engine type:

lawnmower ☐

chainsaw ☐

other: _____

Problem reported by owner:

strange noise ☐

not working ☐

other: _____

Possible cause: _____

Repairs needed: _____

4 Four-stroke engine

Scholar's Encyclopedia: F-H 634

Four-Stroke Engine

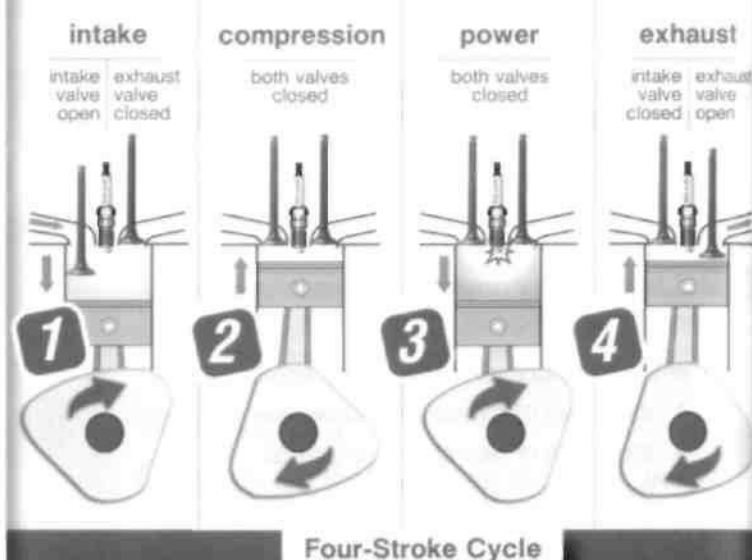
A **four-stroke engine** is a common engine that cycles through four stages. The process works by heating a mixture of fuel and air in a cylinder.

In the first stage, or **intake stroke**, fuel and air enter the cylinder through the **intake valve**. The piston inside the cylinder moves down to make room for the mixture.

Then the valve is closed and the piston moves up again. This is the next stage, or **compression stroke**. The upward-moving piston compresses the fuel and air. The **head gasket** and valves on the **cylinder head** contain the combustion **pressure** during this stage.

The cycle then enters the **power stroke**. In this stage, heat or a spark **ignites** the mixture. The result is a massive force that pushes the piston down again. This force is what powers the engine.

When the fuel is spent, the **exhaust valve** opens to release the remaining gases. This is called the **exhaust stroke**.



Vocabulary

3 Match the words (1-5) with the definitions (A-E).

- | | |
|-------------------|------------------------|
| 1 — ignite | 4 — exhaust stroke |
| 2 — pressure | 5 — compression stroke |
| 3 — exhaust valve | |

- A the process of compressing fuel and air
 B a force caused by pushing against something
 C an opening where spent fuel is released
 D to make something burn or catch fire
 E the process of releasing spent fuel

Get ready!

1 Before you read the passage, talk about these questions.

- What is a four-stroke engine?
- What are the four stages in a four stroke cycle?

Reading

2 Read the encyclopedia entry. Then, fill in the blanks with the correct words from the word bank.

Word Bank

compression exhaust ignites
 intake cylinder releases

The four-stroke engine works by heating fuel and air in a 1 _____. During the first stroke, the 2 _____ valve lets fuel and air into the cylinder. Then the valve closes during the 3 _____ stroke. A piston moves up to condense the air and fuel. Then the mixture 4 _____ during the power stroke. The final stroke 5 _____ gas. This is the 6 _____ stroke.

4 Read the sentence pair. Choose where the words best fit the blanks.

1 intake valve / intake stroke

- A The engine failed because too much air entered the cylinder during the _____.
 B The _____ was loose so the mechanic replaced it.

2 head gasket / four-stroke engine

- A The _____ is the most common type of car engine.
 B The damaged _____ caused a fuel leak in the cylinder.

3 power stroke / cylinder head

- A The car did not start because the spark failed during the _____.
 B Alison added coolant to the _____ to reduce excess heat during ignition.

- 5 Listen and read the encyclopedia entry again. How is used fuel removed from an engine?

Listening

- 6 Listen to a conversation between a mechanic and a customer. Choose the correct answers.

- What is the purpose of the conversation?
 - to describe damage to the engine
 - to explain why repair costs are high
 - to show the customer how to fix the car
 - to get more information about the problem
- What will the mechanic likely do next?
 - find the problem with the engine
 - give the customer an estimate
 - repair the existing gasket
 - order a replacement part

- 7 Listen again and complete the conversation.

Mechanic: Well, Ms. Wheaton, 1 _____ your car has a damaged head gasket.

Customer: I don't know much about cars. What does that mean?

Mechanic: The engine has to be sealed during compression to 2 _____.

Customer: Okay. So what does the gasket have to do with it?

Mechanic: The gasket 3 _____ so that no air can escape. That keeps the pressure steady inside.

Customer: 4 _____ that air is leaking from my engine?

Mechanic: That's right. Without the 5 _____ of air and fuel, your car doesn't have enough power.

Customer: Oh, I see. Is this a really serious problem?

Mechanic: It definitely has to be fixed. But I have to 6 _____.

Customer: If that's what it takes, okay. Do you know how much it will be?

Mechanic: Yeah. Just let me grab the cost estimate.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

It looks like your ... is ...

What does the ... have to do with it?

Is this a serious problem?

Student A: You are a mechanic. Talk to Student B about:

- a damaged engine
- repairs
- an estimate

Student B: You are a customer. Talk to Student A about your car's engine.

Writing

- 9 Use the conversation from Task 8 to fill out the mechanic's description of services.

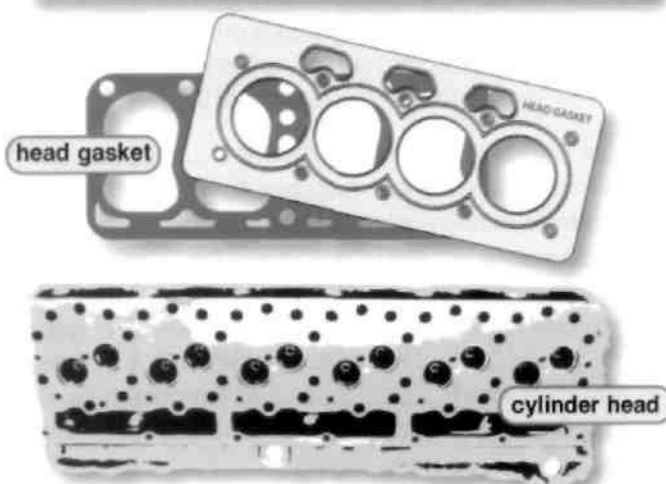
Jackson Automotive Repair

Description of Services

Cause of problem: _____

Functions affected: _____

Repairs needed: _____



5 Electrical system

HOME

ELECTRICAL

AUTO PARTS

CONTACT

negative terminal

positive terminal

Car Genius Auto Parts

Car Genius carries all the products you need to keep your electrical system working.



blade fuse



tubular fuse

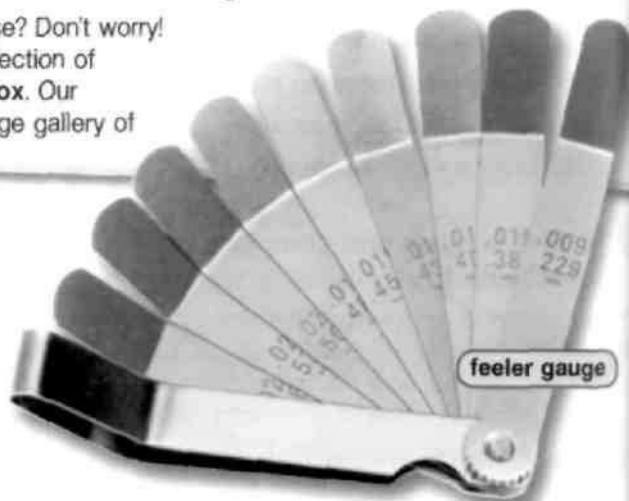
For older cars, Car Genius recommends replacing **distributor caps** with every tune-up. This should keep your car starting smoothly. Check out our vehicle chart to find the right one.

For cars with **distributorless ignition systems**, you will need to **gap** your spark plugs before installation. Car Genius's **feeler gauges** are perfect for setting the right gap.

Did your engine **blow** a fuse? Don't worry! Car Genius has a great selection of products to fill your **fuse box**. Our website has a detailed image gallery of

blade fuses and **tubular fuses**. Just compare your **burned-out** fuse to our pictures to find the right replacement.

If you have trouble with your **battery**, Car Genius can help. We have various products for testing and maintaining your battery's **charge**. When you just need a jumpstart, check out our guides for identifying **positive terminals** and **negative terminals**.



feeler gauge

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What two terminals does a battery have?
- 2 What are two types of fuses used in a car's electrical system?

Reading

2 Read the webpage for an electrical system supplier. Then, fill in the blanks with the correct words and phrases from the word bank.

word BANK

distributors customers
systems charges spark plugs
products terminals

Car Genius carries many different 1 _____ to maintain electrical systems. A vehicle chart is available to help customers select 2 _____. Products are also available for cars with distributorless ignition 3 _____. Feeler gauges measure the right distance to gap 4 _____. For fuse replacements, a picture gallery guides 5 _____ to the correct type. Car Genius also offers resources to check batteries' 6 _____ and identify 7 _____.

Vocabulary

3 Write a word that is similar in meaning to the underlined part.

- 1 Barbara needed a fuse housed in a glass tube to fix her engine. _ u b _ _ _ r _ u _ _
- 2 Paolo attached the cable to the part of the battery that receives an electrical current. _ _ s i _ _ v _ t _ _ _ _ n a _
- 3 The mechanic needed a device that measures distance between electrodes to gap the spark plugs. _ e e _ _ r _ g _ _ g _
- 4 Dahlia just discovered that her device that provides electricity is dead. _ a t _ _ _ y
- 5 Locate the housing that holds fuses. _ u s _ _ o _
- 6 Ed could tell the car was old because it had a part that sends electricity to the engine. d _ _ t r _ _ _ t o _ _ _ _

- 4 Fill in the blanks with the correct words and phrases from the word bank.

Word Bank

charge gap negative terminals blade fuse
blow burned-out distributorless ignition systems

- 1 _____ require less maintenance than those with distributors.
- 2 If an engine will not start, it might help to _____ the spark plugs.
- 3 The problem was a _____ fuse.
- 4 If the battery does not have a _____, the ignition will not work.
- 5 If you _____ a fuse, some electric devices won't work.
- 6 Identify the positive and _____.
- 7 Return this glass tube and get a _____.

- 5 Listen and read the webpage for an electrical system supplier again. What are Car Genius guides used for?

Listening

- 6 Listen to a conversation between a customer and a company representative. Mark the following statements as true (T) or false (F).

- 1 ___ The man got the model number from the old fuse.
- 2 ___ The man purchased the wrong type of fuse.
- 3 ___ The woman explains how to install the fuse.

- 7 Listen again and complete the conversation.

Representative: Thanks for calling Car Genius. Can I help you?

Customer: Yes, I _____ to order a new fuse for my vehicle on your website, but I can't find the right one.

Representative: I can certainly help you find the right fuse. Do you have your 2 _____ - _____ with you?

Customer: Yes, I do. It says it's a 15A, but none of the pictures look 3 _____.

Representative: You might be looking at the 4 _____.

Customer: Yes, but all the fuses in these pictures are 5 _____ glass.

Representative: You're on the page for 6 _____. You need to click on the link for blade fuses.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

But I can't find ...
Is your fuse ...
You need to ...

Student A: You are a representative for an electrical system supply company. Talk to Student B about:

- the customer's fuse type
- the website

Student B: You are a customer. Talk to Student A about fuse types.

Writing

- 9 Use the conversation from Task 8 to fill out the representative's notes about a service call.

Call Report

4256

Customer's problem: _____

Cause of problem: _____

Was the problem resolved? Y/N

If yes how was the problem resolved? _____

6 Ignition system

Auto Monthly

January Edition



You try to **start** your car and nothing happens. Compare your car's symptoms to our troubleshooting list to see what's wrong. When you turn the **key**:

Symptom: The lights don't work and the engine is silent.

Diagnosis: The battery could be dead. Check the cables and **ground** connections.

Symptom: The lights work. The engine makes a clicking noise but it doesn't **turn over**.

Diagnosis: There could be a loose connection involving the **starter** or **starter relay**.

Symptom: The lights work but the engine is silent.

Diagnosis: The starter could be bad, or you have a failing **ignition switch**.

A mechanic can replace your ignition switch, battery cables, or starter. If your battery is dead, you can replace or charge it yourself after a **jump start**. Your car should start normally once it's charged. However, if the battery doesn't hold the **charge**, there could be problems in the charging system. Have a mechanic check the **alternator**, **voltage regulator**, and battery.



Get ready!

- 1 Before you read the passage, talk about these questions.

- How do you start a car?
- How can you start a car that has a dead battery?



Reading

- 2 Read the troubleshooting guide. Mark the following statements as true (T) or false (F).

- ___ If an ignition switch is bad, a car's lights won't work.
- ___ The article recommends that professionals handle all work with batteries.
- ___ A malfunctioning alternator could lead to a dead battery.

Vocabulary

- 3 Read the sentence pair. Then, choose where the words best fit the blanks.

- turn over / charge**
A Because of a bad starter, the engine won't _____.
B A dead battery has no _____.
- charging system / key**
A Every car has a unique _____.
B If the battery is dead, check the _____.

- 4 Fill in the blanks with the correct words and phrases from the word bank.

word BANK

alternator turn over
jump start ground
starter relay clicking

- Attach these cables to your battery before the _____.
- When I turned the key, I heard a(n) _____ sound.
- Electric current is sent by the _____.
- A bad _____ can lead to a dead battery.
- When the engine doesn't _____, the car doesn't start.
- A(n) _____ is attached to a battery's negative terminal and completes the circuit.

- 5 Listen and read the troubleshooting guide again. How can you tell that a car battery is dead?

Listening

- 6 Listen to a conversation between a customer and mechanic. Choose the correct answers.

- What is likely the problem?
 - The battery is dead.
 - The car is out of gasoline.
 - The spark plugs are not firing.
 - The ignition switch isn't working.
- What does the woman tell the man to do?
 - Replace the battery.
 - Turn off all electronic devices.
 - Have the car towed to the shop.
 - Get someone to jump start the car.

- 7 Listen again and complete the conversation.

Mechanic: Let's see if we can find out what's wrong.

Customer: Oh, great. Thank you.

Mechanic: First, I know this sounds silly, 1 _____ gas in the tank?

Customer: Yes, I filled the tank last night.

Mechanic: Okay. When the key is turned, can you switch the radio on?

Customer: Yes, the radio works, 2 _____ the lights.

Mechanic: Good, that means the battery has some charge. What happens when you 3 _____?

Customer: Nothing.

Mechanic: Does the engine 4 _____?

Customer: No, not at all.

Mechanic: Does the engine make a 5 _____?

Customer: No, there's no sound 6 _____.

Mechanic: 7 _____ the ignition switch or the starter. You'd better have the car towed in so we can have it properly checked.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Let's see if we can find out ...
What happens when you ...
It's probably the ...

Student A: You are a mechanic. Talk to Student B about:

- a car that won't start
- what works in the car
- what the problem may be

Student B: You are a car owner. Talk to Student A about your car not starting.

Writing

- 9 Use the conversation from Task 8 to fill out the check-in sheet.



Charlie's Garage

Check-in Sheet

Customer: _____

Problem with car: _____

Describe symptoms: _____

Likely cause of problem: _____

7 Fuel system

Harris & Sons Auto

Date: April 18 Customer: Charles Warner
Make: Tolento Model: Racer Year: 2006

Area of inspection:

fuel system (Type: **gasoline direct injection**).

Customer notes: Customer suspects the **fuel injection** system is malfunctioning.

REPORT

Fuel lines: Visually checked steel and rubber **fuel lines**. Removed hoses and clamps and checked for damage. Two hoses were replaced.

Filters: Removed and replaced the **fuel filter**.
Removed and replaced the **air filter**.

Pumps: Checked **fuel pump** operating pressure.

Lines: Checked condition of fuel lines going to **fuel tank**. Checked hoses carrying fuel to injectors.

Injectors: Checked and cleaned **fuel injectors**.

Air intake: Cleaned **cold air collection box**.

Carburetor: No carburetor on this model.

Inspection summary: The fuel system had not been serviced since purchase. Two rubber hoses had signs of wear and small cracks. The fuel injectors were slightly clogged. Mr. Warner is advised not to drive with little fuel in his tank to reduce the amount of sediment in fuel injectors.



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some parts of an automobile fuel system?
- 2 Which part of the fuel system screens out dirt or rust from the fuel?



Reading

2 Read the mechanic's inspection report. Then, mark the following statements as true (T) or false (F).

- 1 ☐ The steel fuel lines were damaged.
- 2 ☐ The fuel system had not been serviced before.
- 3 ☐ This model of car does not use a carburetor.

Vocabulary

3 Match the words (1-5) with the definitions (A-E).

- | | |
|---------------------------------------|--|
| 1 <input type="checkbox"/> fuel line | 4 <input type="checkbox"/> fuel filter |
| 2 <input type="checkbox"/> carburetor | 5 <input type="checkbox"/> fuel injector |
| 3 <input type="checkbox"/> fuel tank | |

- A a part that mixes fuel and air
- B a device that screens out dirt in the fuel
- C a storage container for fuel
- D a tube that delivers fuel to the engine
- E a pump that delivers fuel to the combustion chamber of the engine

- 4 Fill in the blanks with the correct words and phrases from the word bank.

Word Bank

fuel system
cold air collection box
fuel filter air filter
gasoline direct injection

- The function of a(n) _____ is to remove impurities from fuel.
- A(n) _____ is used to remove dirt from air that mixes with fuel.
- The _____ contains the air filter.
- The _____ uses a pump to deliver fuel to the engine.
- With _____, fuel is sent directly into the cylinder.

- 5 Listen and read the mechanics inspection report again. Why wasn't the problem discovered earlier?

Listening

- 6 Listen to a conversation between a mechanic and a car owner. Choose the correct answers.

- Why does the man apologize?
 - He cannot fix the damage.
 - He has to delay the repairs.
 - He thinks the work will be expensive.
 - He accidentally damaged the fuel system.
- Why must the fuel tank be replaced?
 - It was punctured.
 - It has too much rust.
 - It has damaged hoses.
 - It was installed incorrectly.

- 7 Listen again and complete the conversation.

Customer: Oh, good. So, how does it look?
Mechanic: Not good. Your car needs a lot of work. 1 _____, but the estimate looks pretty expensive.
Customer: Wow, 2 _____? What's wrong with my car?
Mechanic: Well, the fuel system has big problems. There's a fuel leak. Some of the fuel lines need to be replaced.
Customer: Still, a few hoses can't 3 _____ money, can they?
Mechanic: The hoses are 4 _____.
Customer: There are more problems?
Mechanic: 5 _____. The fuel tank has some serious 6 _____. I think it's dangerous to leave it in.
Customer: Are new tanks expensive?
Mechanic: They're not cheap. And the time for the repairs will cost money too.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

So, how does ...? / What's wrong with ...?
The hoses are ...

Student A: You are a mechanic. Talk to Student B about:

- a damaged fuel line
- parts to be replaced

Student B: You are a car owner. Talk to Student A about the cost of repairs.

Writing

- 9 Use the conversation from Task 8 to fill out the following mechanic's report.

Murphy's Garage

Inspection Report

Parts checked: _____

Problems: _____

Recommended repairs: _____

8

Lubrication system



You depend
on your car. That's why
getting regular maintenance
from the experts at Express
Oil is so important.

Here at Express Oil, we care about you and your car. As professionals, we offer more than just **oil changes**. We watch over your **lubrication system**. Our selection of **oils** offer the right **viscosity** and **detergent** properties to prevent **sludge** buildup. We can change your **oil filter**, monitor the **oil pressure** and test the **oil pump**.

And we know: it's tempting to change your oil at home. But a mistake could allow **heat** and **friction** to damage your car. Our professional **grease guns** and **Zerks** will **reduce** wear and tear and **lubricate** the suspension better than any home grease gun can.

Come experience
Express Oil's speed and
convenience today!

Express Oil

Get ready!

- 1 Before you read the passage, talk about these questions.

- 1 How do drivers ensure the oil in their engine is up to standard?
- 2 What is used to grease car parts?

Reading

- 2 Read the advertisement for an oil change shop. Then, mark the following statements as true (T) or false (F).

- 1 — An oil change at Express Oil removes detergent buildup.
- 2 — Express Oil changes oil pumps with each oil change.
- 3 — A poorly lubricated suspension will experience friction.

Vocabulary

- 3 Match the words (1-5) with the definitions (A-E).

- 1 — viscosity
- 2 — detergent
- 3 — sludge
- 4 — oil
- 5 — Zerk

- A a part that works with a grease gun
- B the thickness of a fluid
- C a slippery substance used to keep parts moving
- D a chemical used to clean things
- E a thick substance produced by burning oil

- 4 Fill in the blanks with the correct words and phrases from the word bank.

word BANK

lubricate oil pressure
reduce oil filter grease gun heat

- 1 The oil pump creates _____.
- 2 A _____ is used to pump grease.
- 3 The _____ screens out dirt.
- 4 Grease is used to _____ engine parts.
- 5 Lubrication systems _____ damage caused by heat.
- 6 Parts rubbing together cause _____.

- 5 Listen and read the advertisement for an oil change shop again. How could changing an engine's oil at home damage it?

Listening

- 6 Listen to a conversation between a customer and a mechanic. Choose the correct answers.

- What is the conversation mainly about?
 - extra charges on the bill
 - reasons to replace the oil pump
 - tasks completed during an oil change
 - damages caused by a dirty oil filter
- What will the man most likely do next?
 - drain the oil
 - change the oil filter
 - check the lubrication system
 - update the woman's account

- 7 Listen again and complete the conversation.

Customer: Yes, hello. I'm Karen Hanson. You're already done? That was quick.

Mechanic: Thanks, we 1 _____. Let me just review what we did and we can send you on your way.

Customer: Okay, 2 _____.

Mechanic: First, we drained the oil and replaced it. Then, I changed the 3 _____ and lubricated the steering and suspension system.

Customer: Hmm. My oil filter was 4 _____ at my last oil change. Was it really necessary to do it again?

Mechanic: Oh, absolutely. It was pretty dirty. If it gets too full of dirt, oil won't 5 _____. And that can destroy an engine. Really, the oil filter should be replaced at every oil change.

Customer: 6 _____.

Mechanic: Of course, I can put a note on your account if you want us to check with you next time.

Customer: I'd appreciate that, thanks.

Mechanic: No problem. I'll update it right now.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Let me just review ...
First, we ...
Was it really necessary to ...

Student A: You are a mechanic. Talk to Student B about:

- an oil change
- why a part was replaced
- his or her account

Student B: You are a customer. Talk to Student A about the oil change.

Writing

- 9 Use the conversation from Task 8 to fill out the oil change receipt.

Express Oil

Receipt for Services

Tasks completed: _____

Items replaced: _____

Reason for replacement: _____

Other notes: _____



9 Exhaust system

exhaust manifold

tailpipe

muffler

JJ's Muffler and Automotive

Do you have **muffler** trouble? Did you fail an **emissions** test? Come into JJ's Muffler and Automotive. We are a family-owned shop that provides the best customer service at unbeatable prices. We offer vehicle emission inspections and diagnostics and repairs, as well as high quality **emission controls** and installations. We honor our promise to provide free visual inspections upon request and will perform engine scans when necessary. Our services include:

Exhaust services and repairs to:

- Catalytic converters
- Exhaust manifolds
- Exhaust manifold gaskets
- Exhaust pipes
- PCV valves
- Heat shields

Custom and performance installations of:

- True dual **exhaust systems**
- Diesel exhaust systems
- Mid-range and high performance mufflers
- Custom-made **tailpipes**

Come in for your exhaust system needs today!

Get ready!

1 Before you read the passage, talk about these questions.

- 1 How do gases leave a car?
- 2 What are some parts of a car exhaust system?

Reading

2 Read the advertisement. Then, mark the following statements as true (T) or false (F).

- 1 ☐ The shop performs emission inspections.
- 2 ☐ The shop installs custom heat shields.
- 3 ☐ The shop can install multiple types of exhaust systems.

Vocabulary

3 Match the words (1-5) with the definitions (A-E).

- | | |
|--|---|
| 1 <input type="checkbox"/> pollution | 4 <input type="checkbox"/> exhaust system |
| 2 <input type="checkbox"/> PCV valve | 5 <input type="checkbox"/> exhaust manifold |
| 3 <input type="checkbox"/> heat shield | |

- A a vehicle's waste-disposal system
 B an emissions control device
 C substances harmful to the air
 D a device used as protection from heat
 E a structure that carries gases to the exhaust pipe

4 Read the sentence pair. Choose where the words best fit the blanks.

1 exhaust pipe / catalytic converter

- A The _____ carries gases to the muffler.
 B A(n) _____ reduces the harmful gases in exhaust.

2 muffler / tailpipe

- A The purpose of a _____ is to limit sound.
 B The last part of the exhaust system is the _____.

- 5 Listen and read the advertisement again. What will the company do without charge?

Listening

- 6 Listen to a conversation between a mechanic and a customer. Choose the correct answers.

- 1 Why is the woman at the shop?
A to report a problem with her emissions
B to sign up for an emissions test
C to purchase a new muffler
D to take her car home
- 2 What caused the woman's problem?
A a broken muffler
B a clogged PCV valve
C a cracked exhaust pipe
D a failed catalytic converter

- 7 Listen again and complete the conversation.

Customer: So you found out why I was failing my emissions test?

Mechanic: We 1 _____. It turned out to be your 2 _____.

Customer: Sorry, what's that?

Mechanic: It controls the amount of gases returning to the cylinder to be burned. 3 _____, it's a device used to lower your emissions.

Customer: Oh, okay. So did you just have to 4 _____?

Mechanic: Well, we unclogged it and ran the diagnostics again, but there wasn't much improvement.

Customer: Oh that's not good.

Mechanic: It's okay. We just installed a new valve. They're 5 _____ one more time.

Customer: Ok. I hope the new valve 6 _____ I really need my car to pass the emissions test.

Mechanic: Don't worry. I'm sure the new valve will improve your emissions significantly.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

So you found out what ...

It turned out to be ...

I hope the new ...

Student A: You are a mechanic. Talk to Student B about:

- the cause of an emissions problem
- fixing the problem
- passing an emissions test

Student B: You are a car owner. Talk to Student A about repairs to your emission system.

Writing

- 9 Use the conversation from Task 8 to fill out the bill.

JJ's Muffler and Automotive Bill for Services

Customer: _____

Problem: _____

Description of services: _____

Parts required: _____



10 Cooling system



Do-it-Yourself

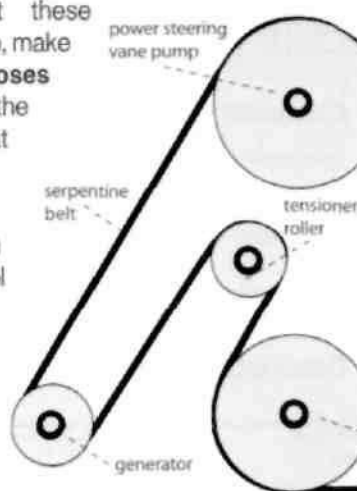
Auto Cooling Systems

Any driver can keep a car's **cooling system** healthy. Professionals only need to be consulted when something has to be replaced or fixed.

First, the easiest way to maintain your engine's cooling system is to keep adequate **antifreeze** levels. Also known as **coolant**, antifreeze works to keep the fluid in the cooling system from **boiling** or **freezing**. A **coolant recovery system** provides a reservoir for the **radiator**. It collects overflowing coolant that can be returned to the radiator after cooling.

Next, check the radiator. The **upper radiator hose** should be delivering liquid to the radiator, and the **lower radiator hose** should be releasing liquid from the radiator by the force of the **water pump**. A **serpentine belt** and **pulleys** may power the water pump, so inspect these pieces carefully. Also, make sure the **heater hoses** are connected to the heater core and that the **thermostat** is operating.

Finally, the **fan** should be pulling cool air through the radiator fins while the car is idling.



Reading

2 Read the chapter on auto repair. Then, choose the correct answers.

- 1 What is the main idea of the article?
 - A maintaining the cooling system
 - B comparing types of cooling systems
 - C replacing parts of the cooling system
 - D identifying problems in the cooling system
- 2 According to the passage, what is the easiest way to keep a cooling system functioning?
 - A by keeping fans functioning
 - B by testing the thermostat monthly
 - C by replacing the water pump annually
 - D by keeping the right amount of coolant
- 3 Which of the following does NOT cool a radiator?
 - A fan
 - B water pump
 - C heater hose
 - D coolant recovery system

Vocabulary

3 Match the words (1-7) with the definitions (A-G).

- | | |
|----------------|---------------------|
| 1 — fan | 5 — heater hose |
| 2 — pulley | 6 — cooling system |
| 3 — radiator | 7 — serpentine belt |
| 4 — antifreeze | |

- A the system that keeps the engine cool
- B a rubber tube that connects to the heater core
- C an electric device that blows air
- D a device with a wheel and a grooved rim
- E the device used to cool liquid in a cooling system
- F a type of coolant used to prevent water from freezing
- G a rubber belt that winds through pulleys

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What parts keep an engine cool?
- 2 What belt apparatus powers the water pump?

- 4 Read the sentence pair.
Choose where the words best fit the blanks.

1 upper radiator hose / lower radiator hose

- A The _____ carries liquid out of the radiator.
B The _____ delivers liquid to the radiator.

2 boil / freeze

- A Heating liquid to extreme temperatures makes it _____.
B Without antifreeze, liquids may _____ when it's cold.

3 coolant / thermostat

- A A _____ is a liquid that helps keep the engine cool.
B A _____ helps maintain an ideal temperature.

4 water pump / coolant recovery system

- A The _____ catches liquid from the radiator.
B The _____ circulates liquid through the cooling system.

- 5 Listen and read the chapter on auto repair again. Which cooling system does not need liquid?

Listening

- 6 Listen to a conversation between a mechanic and a customer. Mark the following statements as true (T) or false (F).

- 1 _____ The car overheated because of a broken hose.
2 _____ The radiator must be replaced.
3 _____ The man recommends a new water pump.

- 7 Listen again and complete the conversation.

Mechanic: Oh, Ms. Billings. Well, I've 1 _____ for you. Your car overheated because the cooling system failed.
Customer: Oh no. What happened?
Mechanic: Well, there are two problems. The 2 _____ is that the radiator is cracked.
Customer: Really? That's bad, isn't it?
Mechanic: Unfortunately, yeah. We'll need to 3 _____.
Customer: I see. I guess if that's what has to happen, okay. Now, you said there were two problems?
Mechanic: That's right. Actually, it's this other problem that caused the damage to the radiator. It's your 4 _____.
Customer: It's broken, too?
Mechanic: 5 _____. It's just got a very 6 _____.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

*Your car overheated because ... /
Well, there are two problems. / It's got a very bad leak.*

Student A: You are a mechanic. Talk to Student B about:

- why his or her car overheated
- problems in the cooling system
- repairs that are needed

Student B: You are a car owner. Talk to Student A about your car's cooling system.

Writing

- 9 Use the conversation from Task 8 to fill out the work order.

Harrison Auto

Work Order

Customer: _____

Reason for bringing in car: _____

Problem: _____

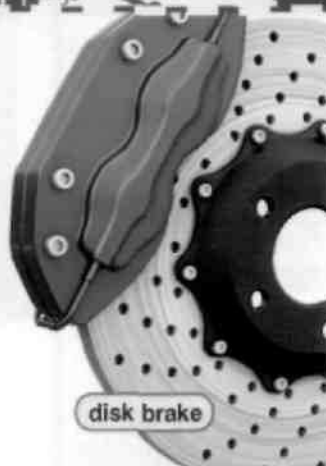
Repairs needed: _____

11 Brake system



QUICK STOP BRAKE SHOP

Thank you for choosing
Quick Stop Brakes as your
automotive care center!



disk brake



drum brake

Whether you need new **brake pads** or a completely new **brake system**, we have what you want!

Our services include:

- Brake system inspection*
- Brake fluid changes**
- Brake line repairs
- Brake shoe replacements
- Brake master cylinder inspection / repair
- Caliper inspection / replacements
- Power brake booster repair / replacements
- Detailed inspection and diagnostics for anti-lock braking systems (ABS)

We know brakes like no one else does. Whether you are driving with **hydraulic brakes**, **disc brakes**, **power brakes**, or **drum brakes**, we know what to do.

Remember, you need to see a brake specialist immediately if you are experiencing:

- A brake warning light that stays on
- Squealing or grinding brakes
- A hard **brake pedal**
- A spongy or low brake pedal
- A **parking brake** locked in place

* recommended twice a year
** recommended every two years



brake pad

brake shoe



brake pedal

Get ready!

- 1 Before you read the passage, talk about these questions.

- 1 What types of brakes are used in cars today?
- 2 How does a driver activate the brakes?

Reading

- 2 Read the poster from a brake shop. Then, mark the following statements as true (T) or false (F).

- 1 ___ Quick Stop Brakes can replace entire brake systems.
- 2 ___ The poster recommends changing brake fluid two times a year.
- 3 ___ The poster recommends seeing a brake specialist if a brake pedal is too low.

Vocabulary

- 3 Match the words (1-9) with the definitions (A-I).

- | | |
|-----------------------|---------------------|
| 1 ___ brake pedal | 6 ___ power brakes |
| 2 ___ disc brake | 7 ___ brake pad |
| 3 ___ drum brake | 8 ___ parking brake |
| 4 ___ brake shoe | 9 ___ caliper |
| 5 ___ master cylinder | |

- A a thin block used to apply friction to a disc
- B a lever drivers press to slow a car
- C a piece of metal forced against a brake drum
- D a brake system using a brake booster
- E a brake that uses pads and discs to stop a car
- F a brake that is separate from the main system
- G a brake that uses brake shoes to stop a car
- H a container for brake fluid
- I a device that holds brake pads

4 Read the sentence pair. Choose where the words best fit the blanks.

1 brake booster / brake line

A A power brakes system relies on a _____.

B A _____ connects a master cylinder and a brake.

2 brake system / brake fluid

A Without _____, a hydraulic brake wouldn't work.

B The _____ should be inspected regularly.

3 hydraulic brake / anti-lock braking system

A A(n) _____ prevents cars from slipping while braking.

B A(n) _____ transmits power to brake pads with pressurized fluids.

5 Listen and read the poster from a brake shop again. What services does the company offer for ABS?

Listening

6 Listen to a conversation between a mechanic and manager in a brake shop. Mark the following statements as true (T) or false (F).

- 1 _ The mechanics will repair a car's ABS.
- 2 _ The mechanics will install new brake shoes.
- 3 _ The shop has no afternoon appointments.

7 Listen again and complete the conversation.

Manager: Good morning, Tim. What 1 _____ today?

Mechanic: Morning, Terry. It 2 _____ a busy morning, but the afternoon will be slow.

Manager: When's the 3 _____?

Mechanic: It's at nine.

Manager: Okay, and what are we doing for them?

Mechanic: That one's an 4 _____ replacement.

Manager: That's not too bad. 5 _____ that?

Mechanic: At ten, a 6 _____ is being towed in. We're replacing the whole thing.

QUICK STOP
BRAKE SHOP

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

What are we ...

When's the first ...

What's after ...?

Student A: You are a brake shop manager. Talk to Student B about:

- the time of appointments
- the work to be done

Student B: You are a brake shop mechanic. Talk to Student A about the day's appointments.

Writing

9 Use the conversation from Task 8 to fill out the morning schedule.

QUICK STOP BRAKE SHOP

Schedule

Date: _____

Time Repairs/Work

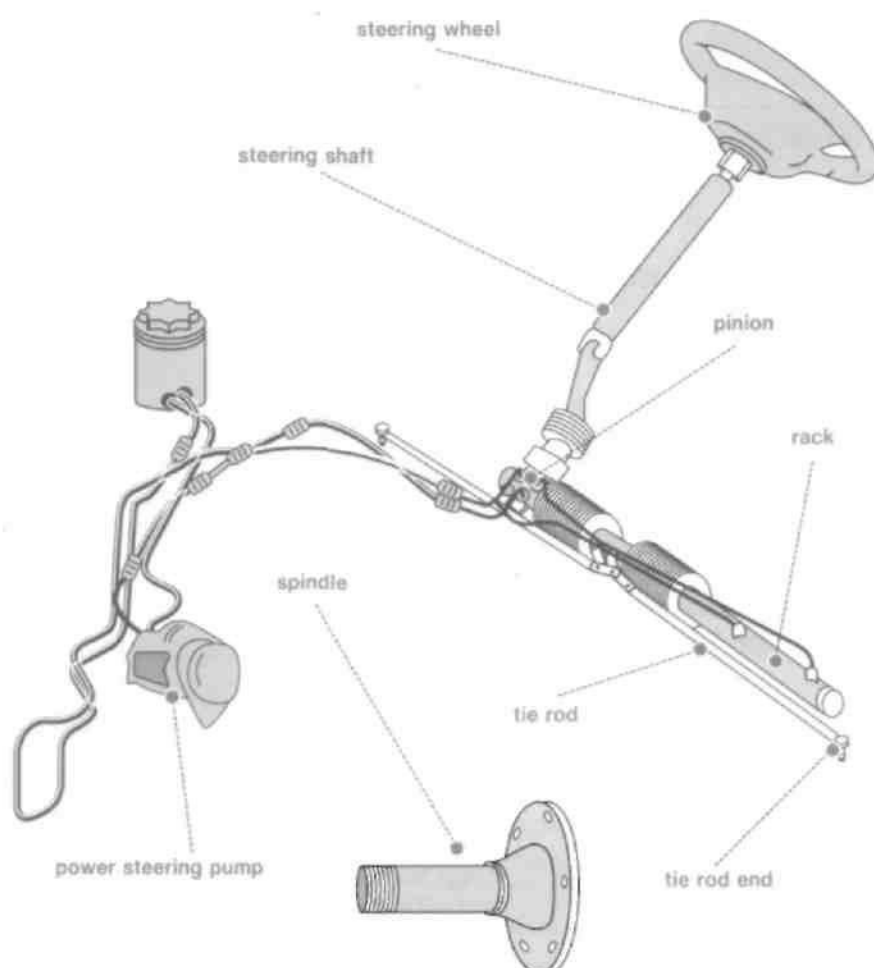
9:00 _____

10:00 _____

12 Steering system

Understanding your Steering System

CHAPTER 8



Rack and pinion steering is one of the most common **steering systems** used today. But few people actually know how it works.

It all starts with the **steering wheel**. It turns a **steering shaft**, which is attached to the **pinion**. The pinion, a gear, locks with the **rack**, another gear. So when you **rotate** the wheel, the steering shaft turns the pinion. The pinion then turns the rack.

Attached to each side of the rack are inner and outer **tie rods**. These rods connect to the **spindles**. As the rack pulls and pushes the rods, they move the spindles. And it is the spindles that hold the wheels. By turning the spindle, the rods turn the wheel.

Most modern cars also have **power steering**. In these systems, the rack has a cylinder with a piston in the middle. The **power steering pump** supplies high pressure fluid to move the piston. This reduces the amount of force needed to turn the pinion gear and rack.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 How do drivers direct a car?
- 2 What connects the steering wheel to the rest of the steering system?

Reading

2 Read the chapter on auto repair. Then, mark the following statements as true (T) or false (F).

- 1 ☐ The tie rods connect to the control arms and pinion.
- 2 ☐ The tie rods turn the spindles.
- 3 ☐ Power steering removes gears from a steering system.

Vocabulary

3 Match the words (1-5) with the definitions (A-E).

- | | |
|---|---|
| 1 <input type="checkbox"/> spindle | 4 <input type="checkbox"/> power steering |
| 2 <input type="checkbox"/> rotate | 5 <input type="checkbox"/> rack |
| 3 <input type="checkbox"/> steering shaft | |

- A a system that makes turning easier
- B a gear that moves the tie rods
- C to turn something in a circular motion
- D a piece that connects the steering wheel to the pinion
- E a part that holds wheels in place

- 4 Fill in the blanks with the correct words and phrases from the word bank.

Word BANK

power steering pump pinion tie rod
steering system steering wheel

- The _____ is connected to the rack and spindle.
- High pressure fluid is moved by the _____.
- The rack is turned by the _____.
- Every turn starts by moving the _____.
- The _____ is a combination of several parts, including wheels, rods, and gears.

- 5 Listen and read the chapter on auto repair again. Why are power steering systems helpful?

Listening

- 6 Listen to a conversation between a mechanic and a customer. Choose the correct answers.

- What is the conversation mainly about?
A describing a repair C investigating a problem
B estimating repair costs D listing broken components
- What does the man suggest?
A There may be a leak.
B The pump may be broken.
C The steering wheel may be broken.
D The rack and pinion may be disconnected.

- 7 Listen again and complete the conversation.

Customer: When I try to turn it, the 1 _____ is really stiff.
Mechanic: So it takes a lot of work to turn it?
Customer: Oh, yes. I have to use 2 _____.
Mechanic: Have you noticed any stains under the car?
Customer: You know, I 3 _____ on the garage floor this morning.
Mechanic: Well, you could be 4 _____. When there's no fluid, it's really hard to turn the steering wheel.
5 _____ a leak.
Customer: Is that hard to fix?
Mechanic: It's usually 6 _____. But let's get your car on the lift and have a look.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

When I try to ...
Have you noticed any ...
Is that hard ...?

Student A: You are a mechanic. Talk to Student B about:

- problems with steering
- signs of the problem
- possible causes

Student B: You are a car owner. Talk to Student A about the problems you are having steering your car.

Writing

- 9 Use the conversation from Task 8 to fill out the mechanic's notes.

Client: _____

Problem: _____

Symptoms/Signs: _____

Likely cause: _____

13 Suspension system

HOME

ABOUT US

AUTO PARTS

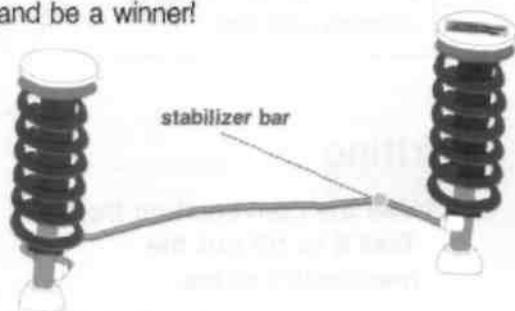
CONTACT



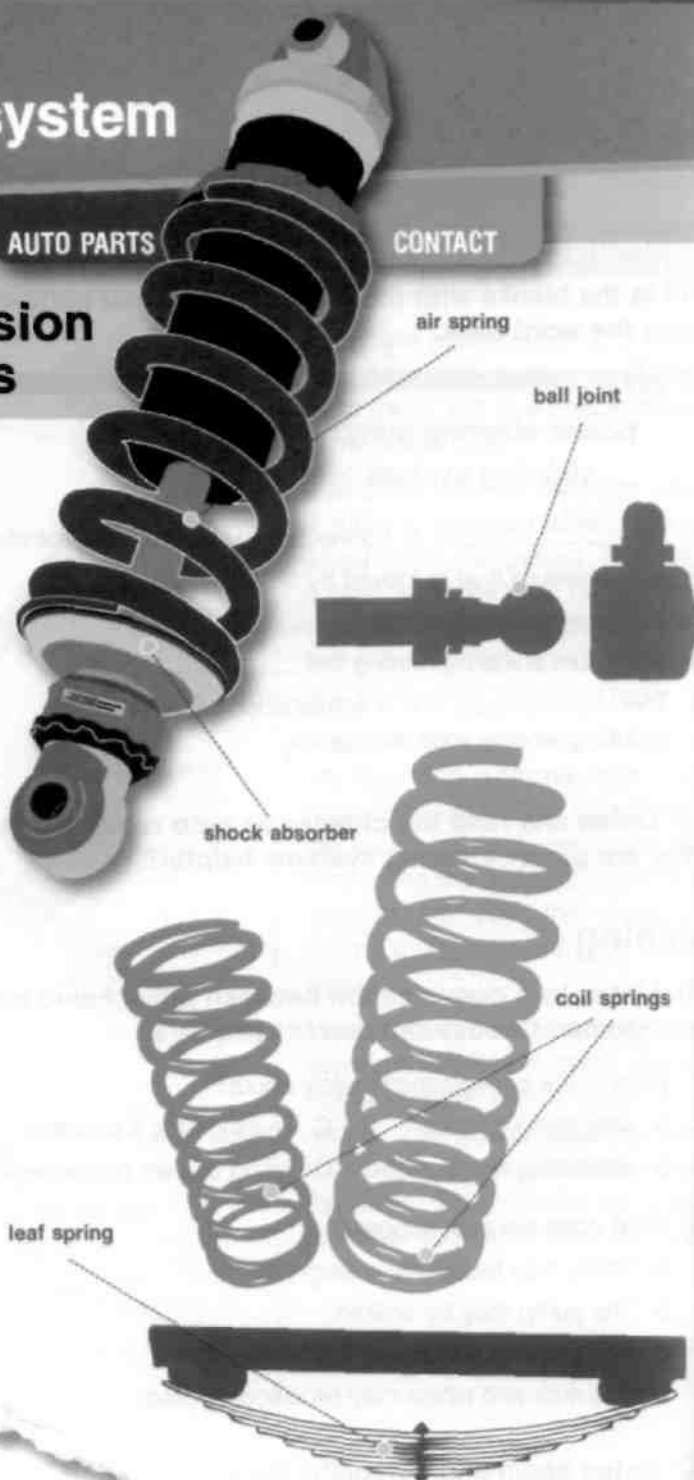
For over 30 years, Acme has been a leading manufacturer of car **suspension systems**. Our products are known for quality, durability and safety.

We offer **double-wishbone**, **multilink** and **strut suspension systems** at attractive prices. Our **MacPherson strut systems** are constructed with high quality **shock absorbers** and **coil springs**. We are a reliable source for **air springs**, **torsion bars**, **stabilizer bars**, **ball joints**, and **leaf springs**.

Acme is also proud to congratulate the Top Speed professional racing team. Top Speed won the 2011 International Racing Invitational Race, and the team uses only Acme strut suspension systems in each and every car. Isn't it time to drive like a pro? Choose Acme and be a winner!



stabilizer bar



air spring

ball joint

shock absorber

coil springs

leaf spring

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What is the function of a car's suspension system?
- 2 What are some parts of a suspension system?

Reading

2 Read the suspension manufacturer's website. Then, mark the following statements as true (T) or false (F).

- 1 ☐ Acme Suspension has developed thirty suspension models.
- 2 ☐ MacPherson strut systems have leaf springs.
- 3 ☐ Acme Suspensions' products are used in professional races.

Vocabulary

3 Match the words (1-5) with the definitions (A-E).

- | | |
|--|---|
| 1 <input type="checkbox"/> coil spring | 4 <input type="checkbox"/> stabilizer bar |
| 2 <input type="checkbox"/> torsion bar | 5 <input type="checkbox"/> multilink suspension |
| 3 <input type="checkbox"/> ball joint | |

- A a bar that connects the suspension system
 B a device that contracts and expands to absorb shock
 C a ball that connects to a cup shaped socket
 D an auto frame with four arms and no struts
 E a bar that twists when the wheels turn

- 4 Fill in the blanks with the correct words and phrases from the word bank.

Word Bank

Macpherson strut air spring
double-wishbone suspension leaf spring

- If there is a sudden change in weight in the car, the _____ helps absorb it.
- The _____'s metal strips bend and flex to absorb road shock.
- A(n) _____ has a coil spring and shock absorber attached to it.
- There are two arms on a(n) _____.

- 5 Listen and read the suspension manufacturer's website again. Who won a sporting event using Acme Suspension?

Listening

- 6 Listen to a conversation between a new mechanic and an experienced mechanic. Choose the correct answers.

- What is the conversation mainly about?
A repairing a suspension system
B replacing shock absorbers
C listing suspension parts to check
D explaining different suspension types
- What will the woman most likely do next?
A test the ball joints C look at the torsion bar
B check the coil springs D examine the shock absorbers

- 7 Listen again and complete the conversation.

Mechanic 1: Dave, 1 _____. I'm not sure what's wrong with the car. I think it's 2 _____.

Mechanic 2: Well, what's wrong with it?

Mechanic 1: The customer said it 3 _____ on bumpy roads.

Mechanic 2: Okay, I'd agree that it's a suspension problem. So let's go 4 _____. What kind of suspension does it have?

Mechanic 1: It's a 5 _____ system.

Mechanic 2: All right, then you need to start by checking the 6 _____ and shock absorbers.

Mechanic 1: I can do that. What else should I check?

Mechanic 2: Next, you should take a look at the ball joints.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

I'm not sure what's wrong with this car.

What kind of suspension does it have?

Next, you should look at the ...

Student A: You are a new mechanic. Talk to Student B about:

- a problem with a car
- the type of suspension system
- parts to examine

Student B: You are an experienced mechanic. Talk to Student A about a car's suspension.

Writing

- 9 Use the conversation from Task 8 to fill out the mechanic's checklist.

Suspension Check

Problem with car: _____

Type of suspension: _____

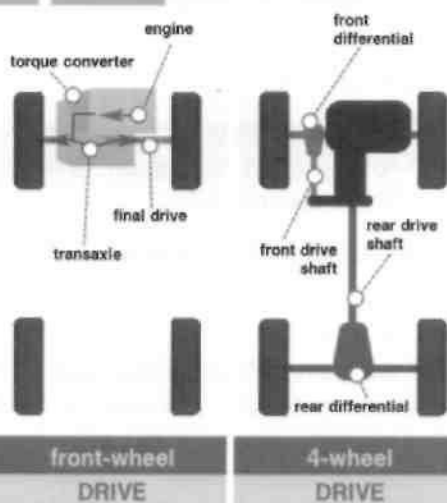
Order of items checked:

1. _____

2. _____

3. _____

14 Transmission system



Transmission Trouble?

Problems with the **drive train** can ruin a car. That's why it's so important to catch signs of it early. Here's a list of common **transmission system** problems. If you find any of these, you'd better get to a mechanic.

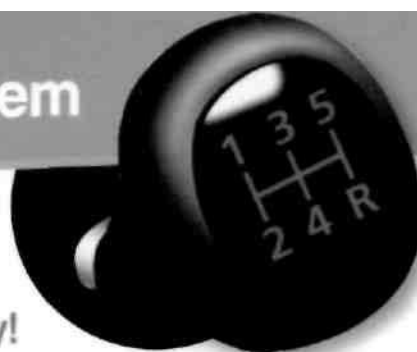
Problem 1 Fluid is leaking. **Transmission fluid** is a red, sticky fluid. If you see this substance under your car, there's a problem. The transmission system is closed, so fluid will never leak in a properly functioning system.

Problem 2 Your manual transmission grinds when the **clutch** is engaged. This suggests that the synchronizers are worn out or damaged. Listen for grinding when you depress the **clutch pedal**, but before you move the **gear shift**.

Problem 3 Your automatic transmission lags or jars when changing gears. An automatic transmission should change gears smoothly. Anything else points to transmission trouble.

Problem 4 The transmission whines or clunks. These sounds may come from different parts of the car, depending on whether you have **front-, rear-, or four-wheel drive**, as most have different transmission placements. But no matter where the sound comes from, see a mechanic before it gets worse.

gear shift



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are two different types of transmission system?
- 2 How does a driver change gear?

Reading

2 Read the auto repair webpage. Then, mark the following statements as true (T) or false (F).

- 1 ☐ All transmissions lose fluid over time.
- 2 ☐ Grinding sounds indicate problems in automatic transmissions.
- 3 ☐ Most rear- and front-wheel drive cars have transmissions in different areas.

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | |
|---|---|
| 1 <input type="checkbox"/> rear-wheel drive | 4 <input type="checkbox"/> drive train |
| 2 <input type="checkbox"/> automatic transmission | 5 <input type="checkbox"/> clutch pedal |
| 3 <input type="checkbox"/> manual transmission | 6 <input type="checkbox"/> engage |

- A a system that powers a car from the back wheels
 B a transmission controlled by the driver
 C a lever that allows drivers to change gears
 D a transmission controlled by the car
 E the system that delivers power to the wheels
 F to use

4 Fill in the blanks with the correct words and phrases from the word bank.

word BANK

transmission system clutch
 gear shift four-wheel drive
 front-wheel drive transmission fluid

- 1 Move the _____ to the far left position to put the car in reverse.
- 2 This car has a manual transmission. Can you use a _____?
- 3 Cars with _____ can drive in snow and wet weather without losing traction.
- 4 A car with _____ is powered from the front tires, not the rear tires.
- 5 The _____ in an automatic car functions on its own.
- 6 _____ is a red, sweet smelling liquid.

- 5 Listen and read the auto repair webpage again. What is the likely cause of grinding when a clutch is used?

Listening

- 6 Listen to a conversation between a car owner and a mechanic. Choose the correct answers.

- Why does the man call the mechanic?
 - His car whines at high speeds.
 - His car grinds when changing gears.
 - His car is leaking transmission fluid.
 - His car jerks suddenly when changing gears.
- What does the woman suspect is wrong?
 - The synchronizers are worn down.
 - The gear shift is too loose.
 - The transmission fluid is gone.
 - The clutch pedal needs replacing.

- 7 Listen again and complete the conversation.

Mechanic: Sure. Can you tell me what's happening?

Owner: Well, whenever I shift gears, I hear a loud grinding noise.

Mechanic: Hmm, sounds like a transmission system problem. Is it a 1 _____ transmission?

Owner: It's a manual transmission.

Mechanic: 2 _____ is your car?

Owner: It's about 7 years old.

Mechanic: Well, it's possible for the synchronizers to get 3 _____ in that time. I suspect that's the problem.

Owner: I was afraid of that. So, can I 4 _____ this weekend?

Mechanic: Actually, I'd recommend that you bring it in 5 _____. These things can get worse 6 _____.

Owner: Got it. What's a good time?

Mechanic: How about two this afternoon?

Owner: Sure, see you then.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Can you tell me what's happening?
Do you have a ... or a ...?
And how ...?

Student A: You are a mechanic. Talk to Student B about:

- the problem
- type of transmission
- your recommendation

Student B: You are a car owner. Talk to Student A about a problem with your car.

Writing

- 9 Use the conversation from Task 8 to fill out the appointment sheet.

Tom's Transmission Shop

appointment sheet

Customer name: _____

Appointment time: _____

Type of transmission: _____

Explain problems: _____

Possible repairs: _____



rear-wheel drive

front-wheel drive



15 Differentials and joints

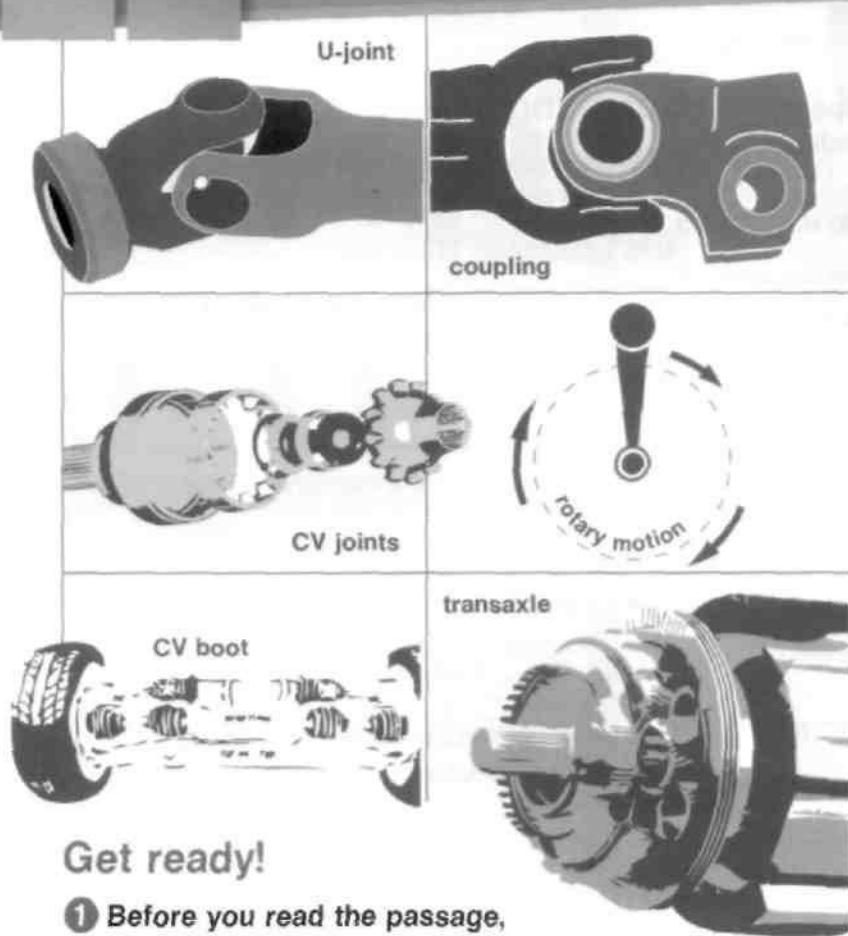
St. Petersburg Herald

Ask the Doctor

Dear Car Doctor,
I hear a loud **clunk** when I put my car in gear,
and it vibrates when I speed up or slow down.
What's going on?

- Roger

Dear Roger,
It sounds like you have a problem with your **joints**, which **transmit** the **rotary motion** of **transaxle** to the wheels. If you have a rear-wheel drive vehicle, you likely have **U-joints**. A U-joint is essentially two connected **hinges**. When the connection is loose, they spin and make a "clunk" upon meeting. On the other hand, if you have a front-wheel drive car, you probably have **CV joints**. Like U-joints, CV joints produce a **knocking** sound when loose. However, the problem usually begins with the **CV boot**. A cracked CV boot lets grease escape and dirt enter. The result is that the **coupling** experiences too much **friction**, wears down, and loosens. But no matter what joints you have, you need to get to a mechanic before the joints completely fail and you lose control of your vehicle.



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What joint is two connected hinges?
- 2 What type of joint does a CV boot protect?

Reading

2 Read the auto advice column. Then, choose the correct answers.

- 1 What is the purpose of the passage?
 - A to show the steps of joint replacement
 - B to recommend switching to CV joints
 - C to explain symptoms of U and CV joint damage
 - D to describe the differences between U and CV joints
- 2 Where does damage to a CV joint usually start?
 - A a worn down hinge
 - B a cracked CV boot
 - C a loose coupling
 - D a snapped transaxle
- 3 What is probably true of a car with a damaged CV boot?
 - A It needs a new U-joint.
 - B It has front-wheel drive.
 - C It cannot transmit rotary motion.
 - D Its CV joint has completely failed.

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- 1 — CV boot
- 2 — joint
- 3 — friction
- 4 — knocking
- 5 — rotary motion
- 6 — transaxle

- A a point at which two things are joined
- B a circular turn
- C protective rubber sleeve
- D the resistance created when two bodies rub together
- E a short, hard and repetitive sound
- F a device that transfers energy from the transmission

- 4 Fill in the blanks with the correct words and phrases from the word bank.

Word Bank

U joints clunk transmits
couplings CV joints hinges

- 1 The engine _____ energy to the rest of the car.
- 2 _____ are usually found on front-wheel drive cars.
- 3 The car made a _____ when it shifted gears.
- 4 Cars with rear-wheel drive often have _____.
- 5 Doors turn on _____.
- 6 All car joints are types of _____.

- 5 Listen and read the auto advice column again. What would happen if a car's joints fail?

Listening

- 6 Listen to a conversation between a mechanic and a car owner. Mark the following statements as true (T) or false (F).

- 1 _ The problem was caused by a damaged U-joint.
- 2 _ The man recommends fixing the joint.
- 3 _ The woman approves replacing the joint and shaft.

- 7 Listen again and complete the conversation.

Mechanic: Oh, hi. Yes, well, I've figured out what was causing that 1 _____ sound.

Customer: Oh, good. What was it?

Mechanic: It's 2 _____.
It's the 3 _____.

Customer: I see. Did I cause the damage somehow?

Mechanic: 2 _____. The CV boot was cracked, but that can happen after a lot of driving.

Customer: Okay. So 5 _____ it?
Or will you have to replace it?

Mechanic: It's 6 _____, so we'll have to replace it.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

*I figured out what ... / The ... was cracked.
It's better if we ...*

Student A: You are a mechanic. Talk to Student B about:

- the car's joint problems
- how damage occurred
- what repairs are needed

Student B: You are a car owner. Talk to Student A about your car's joint problems.

Writing

- 9 Use the conversation from Task 8 to fill out the repair shop's work report.



Mechanic Labor Report

Mechanic name: _____

Problem reported: _____

Cause: _____

Repairs needed: _____

Glossary

- air filter** [N-COUNT-U7] An **air filter** is a screen that removes dirt and other particles from the air that goes into an engine.
- air spring** [N-COUNT-U13] An **air spring** is a device that uses air to absorb shock or sudden changes in weight.
- alternator** [N-COUNT-U6] An **alternator** is a device in a car that provides a flowing electric current that changes directions.
- antifreeze** [N-UNCOUNT-U10] **Antifreeze** is a coolant that is used to lower the freezing point of water circulating through the cooling system.
- anti-lock braking system** [N-COUNT-U11] An **anti-lock braking system** (ABS) is a system that provides better traction in slippery circumstances and allows a driver to keep steering control of a vehicle.
- automatic transmission** [N-COUNT-U14] An **automatic transmission** is a type of transmission that is controlled by the car, not the driver.
- ball joint** [N-COUNT-U13] The **ball joint** is a flexible type of connection in the suspension system where a ball shaped piece of metal connects to a cup shaped socket.
- battery** [N-COUNT-U5] A **battery** is a device that provides electricity for a machine.
- biodiesel** [N-UNCOUNT-U2] **Biodiesel** is a form of liquid fuel made from vegetable oils and/or animal fats.
- blade fuse** [N-COUNT-U5] A **blade fuse** is a type of fuse with a plastic body that fits into a socket with two metal blades.
- blow** [V-T-U5] To **blow** a fuse is to run an excessive electrical current through a fuse, which causes the fuse to break or melt and stop the current.
- boil** [V-T or I-U10] To **boil** is to change from liquid to gas by application of heat.
- brake booster** [N-COUNT-U11] A **brake booster**, or a **power booster**, is a device in a power brakes system that is used to amplify force applied to the pistons and the master cylinder, making it easier to slow the vehicle down.
- brake fluid** [N-UNCOUNT-U11] **Brake fluid** is the fluid in a hydraulic brake system that is used to stop the car.
- brake line** [N-COUNT-U11] A **brake line** is a pipe or hose in a hydraulic brake system that connects the master cylinder to a brake. The brake line is where the brake fluid flows through.
- brake pad** [N-COUNT-U11] A **brake pad** is a thin block that is used to apply friction to a brake disc in order to slow a vehicle down.
- brake pedal** [N-COUNT-U11] A **brake pedal** is a foot pedal on the floor of the car that the driver uses to operate the brakes.
- brake shoe** [N-COUNT-U11] A **brake shoe** is a long, curved piece of metal that is forced against the brake drum to slow or stop a vehicle.
- brake system** [N-COUNT-U11] A **brake system** is the combination of interacting parts that slow a vehicle down.
- burned-out** [ADJ-U5] If a fuse is **burned-out**, it has broken or melted from an excessive electrical current.
- caliper** [N-COUNT-U11] A **caliper** is a device on a disc brake that holds the brake pads. A caliper uses hydraulic force to squeeze the pads against the disc to slow down the car.
- carburetor** [N-COUNT-U7] A **carburetor** mixes fuel and air and supplies it to the engine. Fuel injection systems have replaced most carburetors.
- catalytic converter** [N-COUNT-U9] A **catalytic converter** is an emissions control device that uses a catalyst to reduce poisonous substances such as carbon monoxide and hydrocarbon pollutants.
- charge** [N-COUNT-U5] A **charge** is an amount of electricity that a battery has.
- charge** [V-T-U6] To **charge** a battery is to fill it with energy by passing an electric current through it.
- clean diesel** [N-UNCOUNT-U2] **Clean diesel** is a more refined form of diesel that emits fewer pollutants than regular diesel.
- clunk** [N-COUNT-U15] A **clunk** is a heavy, short, metallic sound.
- clutch** [N-COUNT-U14] A **clutch** is a tool that enables two revolving shafts to be joined or detach as required during shifting.
- clutch pedal** [N-COUNT-U14] A **clutch pedal** is the lever that is pressed to allow the driver of a manual transmission to change gears.

coil spring [N-COUNT-U13] A **coil spring** is a spiral shaped piece of metal which expands and contracts to absorb shock on bumpy roads.

cold air collection box [N-COUNT-U7] A **cold air collection box** is the container for the air filter.

combustion chamber [N-COUNT-U2] A **combustion chamber** is a place within an engine where fuel is compressed and ignited.

compress [N-UNCOUNT-U3] To **compress** is to make the volume of something smaller.

compression ratio [N-UNCOUNT-U2] A **compression ratio** is the ratio of a combustion chamber's largest and smallest volume as measured by the piston in the lowest and highest positions.

compression stroke [N-COUNT-U4] A **compression stroke** is the stage in the four-stroke cycle in which a piston moves to the top of the cylinder to compress the mixture of fuel and air.

connecting rod [N-COUNT-U1] A **connecting rod** is a piece that connects the piston to the crankshaft.

coolant [N-COUNT-U10] A **coolant** is a liquid substance used to prevent overheating, rust and corrosion, and it lubricates the water pump.

coolant recovery system [N-COUNT-U10] A **coolant recovery system** is a bottle or tank with two hoses coming out of the cap that acts as a reservoir for liquid coming from the cooling system and then returns the liquid once it cools down.

cooling system [N-COUNT-U10] A **cooling system** is a system in a motor vehicle that keeps the engine cool.

coupling [N-COUNT-U15] A **coupling** is an instrument that joins two rotating shafts at their ends so as to transmit torque from one to the other.

crankcase [N-COUNT-U1] A **crankcase** is the bottom part of the engine surrounding the crankshaft.

crankshaft [N-COUNT-U1] A **crankshaft** is the main shaft in the engine that is moved by the connecting rods.

CV (constant velocity) joint [N-COUNT-U15] A **CV joint** is a device that transfers the power from the engine while also allowing full steering and suspension movement in front-wheel drive cars.

CV boot [N-COUNT-U15] A **CV boot** is a protective rubber sleeve that goes around a CV joint.

cycle [N-UNCOUNT-U3] A **cycle** is the motion of the piston from one position to the other and back to the initial position.

cylinder [N-COUNT-U1] A **cylinder** is a round hole in the cylinder block that contains a piston.

cylinder head [N-COUNT-U4] A **cylinder head** is the part of a four-stroke engine that houses the valves and often contains passages for transferring excess heat away from the engine.

detergent [N-COUNT-U8] A **detergent** is a chemical that is used to clean things.

diesel [N-UNCOUNT-U2] **Diesel** is a liquid fuel made from petroleum that is heavier, cheaper, and less refined than gasoline.

disc brake [N-COUNT-U11] A **disc brake** is a type of brake that uses friction between brake pads and brake discs, or rotors, to stop the car.

distributor cap [N-COUNT-U5] A **distributor cap** is the part of an ignition system that sends electricity into an engine to start a vehicle.

distributorless ignition system [N-COUNT-U5] A **distributorless ignition system** is an ignition system without a distributor that typically requires less maintenance than one with a distributor.

double-wishbone suspension [N-COUNT-U13] A **double-wishbone suspension** is a system where the wheels are held by two wishbone (or y shaped) arms.

drive train [N-COUNT-U14] A **drive train** is the system that transfers power from the engine to the driving wheels.

drum brake [N-COUNT-U11] A **drum brake** is a type of brake that uses hydraulic pressure to force brake shoes against the inside of the drum attached to a wheel.

durable [ADJ-U2] If something is **durable**, it can withstand a lot of use and stress.

emissions [N-COUNT-U9] **Emissions** are the gases that are released into the air.

emissions control [N-COUNT-U9] An **emissions control** is a device implemented in the exhaust system to remove or recycle some of the harmful gases before being released into the air.

engage [V-T-U14] To **engage** something is to use it.

Glossary

- engine block** [N-COUNT-U1] An **engine block** is the main part of the engine to which other parts are attached.
- exhaust** [N-UNCOUNT-U3] **Exhaust** is the gas that is given off when fuel is burned.
- exhaust manifold** [N-COUNT-U9] An **exhaust manifold** is a structure of branched pipes that carries exhaust gases from the cylinders to the exhaust pipe.
- exhaust pipe** [N-COUNT-U9] An **exhaust pipe** is a pipe in the exhaust system that carries gases from the exhaust manifold to the muffler.
- exhaust stroke** [N-COUNT-U4] An **exhaust stroke** is the stage in the four-stroke cycle in which the piston returns to the top of the cylinder to force the mixture of fuel and air out through the open exhaust valve.
- exhaust system** [N-COUNT-U9] An **exhaust system** is a vehicle's waste-disposal system that carries exhausts from the engine and releases them into the air.
- exhaust valve** [N-COUNT-U4] An **exhaust valve** is the part of a four-stroke engine where the spent mixture of fuel and air is released from the cylinder.
- fan** [N-COUNT-U10] A **fan** is an electrically driven device mounted in front of the radiator that blows air to cool the liquid that flows through the cooling system.
- feeler gauge** [N-COUNT-U5] A **feeler gauge** is a device that measures the distance between a spark plug's electrodes.
- fire** [V-I-U3] To **fire** is to create a spark which ignites the fuel mixture in an engine.
- four-stroke engine** [N-COUNT-U4] A **four-stroke engine** is a type of engine commonly used in cars, aircraft and other machinery. It cycles through four stages, or strokes, called intake, compression, power and exhaust.
- four-wheel drive** [N-UNCOUNT-U14] **Four-wheel drive** is a system in which power from the engine is transmitted to all of the wheels.
- freeze** [V-T or I-U10] To **freeze** is to change from liquid to solid by application of extreme cold.
- friction** [N-UNCOUNT-U15] **Friction** is the resistance created when one body rubs against another.
- front-wheel drive** [N-UNCOUNT-U14] **Front-wheel drive** is a system in which the power from the engine is transmitted to the front wheels only.
- fuel** [N-UNCOUNT-U3] **Fuel** is the liquid substance that an engine burns to create mechanical energy.
- fuel filter** [N-COUNT-U7] A **fuel filter** is a screen that removes dirt and rust from the fuel system.
- fuel injection** [N-UNCOUNT-U7] **Fuel injection** is the measured delivery of fuel to an engine.
- fuel injection pump** [N-COUNT-U2] A **fuel injection pump** is a device that forces fuel into the combustion chamber.
- fuel injector** [N-COUNT-U7] A **fuel injector** is a pump that delivers fuel at high pressure to the combustion chambers of a car engine.
- fuel line** [N-COUNT-U7] A **fuel line** is a tube that is used to deliver fuel from the fuel tank to the engine.
- fuel pump** [N-COUNT-U7] A **fuel pump** is a device that moves fuel from the tank to the engine.
- fuel system** [N-COUNT-U7] The **fuel system** is the set of devices that store and bring fuel to the car engine.
- fuel tank** [N-COUNT-U7] A **fuel tank** is a storage container for the fuel the engine needs to run.
- fuel-to-oil ratio** [N-COUNT-U3] The **fuel-to-oil ratio** is proportion of oil to fuel used in a two-stroke engine.
- fuse box** [N-COUNT-U5] A **fuse box** is the housing that contains fuses.
- gap** [V-T-U5] To **gap** a spark plug is to adjust the space between a spark plug's electrodes so it produces a spark that is an appropriate strength to start an engine.
- gasoline** [N-UNCOUNT-U2] **Gasoline** is a liquid fuel made from petroleum that is used in most cars.
- gasoline direct injection** [N-UNCOUNT-U7] **Gasoline direct injection** is a system where gasoline is pumped directly into the combustion chamber of the engine.
- gear shift** [N-COUNT-U14] A **gear shift** is an instrument that allows the driver to select and engage or disengage the gears in a transmission.
- glow plug** [N-COUNT-U2] A **glow plug** is a wire in some diesel engines that heats the air in the combustion chamber when the engine is cold.
- grease gun** [N-COUNT-U8] A **grease gun** is a high pressure tool that pumps grease onto engine parts.

ground [N-COUNT-U6] A **ground** is a connection between the earth and an electric circuit.

head [N-COUNT-U1] A **head** is the part attached to the top of the engine that covers the tops of the cylinders, holds the spark plugs, and often contains valves.

head gasket [N-COUNT-U4] A **head gasket** is a ring that seals the cylinder head to maintain the proper pressure inside the cylinder and prevent substances from leaking in or out.

heat [N-UNCOUNT-U8] *Heat is how warm an item is.*

heat shield [N-COUNT-U9] A **heat shield** is a device used as protection from high temperatures.

heat up [V-T-U2] To **heat** something up is to make it get hotter.

heater hose [N-COUNT-U10] A **heater hose** is a rubber hose that leads from the engine block to the heater core.

hinge [N-COUNT-U15] A **hinge** is a bearing that connects two solid objects.

hydraulic brake [N-COUNT-U11] A **hydraulic brake** is a brake that uses brake fluid to transmit force or power to the brake pads.

ignite [V-T-U4] To **ignite** something is to cause it to burn or catch fire.

ignition switch [N-COUNT-U6] The **ignition switch** is the device that starts the electrical systems in the car.

inlet [N-COUNT-U3] An **inlet** is where air, fuel, and oil enter the combustion chamber.

intake stroke [N-COUNT-U4] An **intake stroke** is the stage in the four-stroke cycle in which a piston moves to the bottom of the cylinder and makes room for fuel and air to enter the cylinder. Fuel and air are forced in through the intake valve.

intake valve [N-COUNT-U4] An **intake valve** is the part of a four-stroke engine where fuel and air enter the cylinder before being compressed.

joint [N-COUNT-U15] A **joint** is the place where two things, or separate parts of one thing, are joined.

jump start [N-COUNT-U6] A **jump start** is the process of starting a car by connecting its battery to another car's battery in order to provide electric power.

key [N-COUNT-U6] A **key** is a piece of metal that is cut into a shape that is used to open or close a lock.

knocking [N-COUNT-U15] A **knocking** is a hard, short and repetitive sound.

leaf spring [N-COUNT-U13] A **leaf spring** is one of a series of metal strips placed one on top of the other that help to absorb road shocks by bending flexibly.

lower radiator hose [N-COUNT-U10] A **lower radiator hose** is a rubber hose connecting the radiator to the cylinder block where the cooled liquid leaves the radiator.

lubricate [V-T-U8] To **lubricate** is to put oil on something to make it move easily.

lubrication system [N-COUNT-U8] A **lubrication system** is a group of devices that deliver oil to moving parts of an engine to avoid damage.

MacPherson strut [N-COUNT-U13] A **MacPherson strut** is a metal rod that has a coil spring and shock absorber attached to it. It helps absorb shocks from rough roads.

maintenance [N-UNCOUNT-U2] **Maintenance** is the act of making regular adjustments and repairs to keep an engine working properly.

manual transmission [N-COUNT-U14] A **manual transmission** is a type of transmission that is operated by the driver of a car.

master cylinder [N-COUNT-U11] A **master cylinder** is the container that stores the brake fluid in a hydraulic brake system. The master cylinder hydraulically forces brake fluid through brake lines when the brake pedal is stepped on.

mix [V-T or I-U3] To **mix** is to combine two or more things.

muffler [N-COUNT-U9] A **muffler** is a piece of equipment attached to a car used to quiet the sounds of the gases released from the engine.

multilink suspension [N-COUNT-U13] A **multilink suspension** is a type of rear suspension system that uses at least four arms and no struts. It allows flexible adjustment of ride and handling.

Glossary

negative terminal [N-COUNT-U5] A **negative terminal** is the part of a battery that sends an electrical current to the positive terminal.

oil [N-COUNT-U8] **Oil** is a slippery substance that is used to keep things moving easily.

oil change [N-COUNT-U8] An **oil change** is the removal of old oil and replacement with new oil in an engine.

oil filter [N-COUNT-U8] An **oil filter** is a screen that removes dirt from the oil.

oil pressure [N-COUNT-U8] **Oil pressure** is the amount of force created by the oil pump that keeps oil on the engine parts.

oil pump [N-COUNT-U8] An **oil pump** is a device that moves oil around an engine.

parking brake [N-COUNT-U11] A **parking brake**, or emergency brake, is a separate brake system that is used as a backup brake system in case the regular brakes fail, and it keeps the vehicle from moving accidentally.

PCV valve [N-COUNT-U9] A **PCV (Positive Crankcase Ventilation) valve** is an emissions control device located on the cylinder head cover that allows a certain amount of crankcase blow-by gases back into the cylinders to be burned again.

pinion [N-COUNT-U12] The **pinion** is the round gear with teeth that fit into the rack part of the rack and pinion steering system.

piston [N-COUNT-U1] A **piston** is a cylindrical plug that moves up and down in the cylinder during combustion.

piston ring [N-COUNT-U1] A **piston ring** is a metal ring that fills the space between a piston and the cylinder wall.

positive terminal [N-COUNT-U5] A **positive terminal** is the part of a battery that receives an electrical current from the negative terminal.

power brakes [N-PL-U11] **Power brakes** are brakes that use a brake booster, or power booster, to increase power and make braking easier.

power steering [N-UNCOUNT-U12] **Power steering** is a system where the engine provides power to help the driver turn the steering wheel.

power steering pump [N-COUNT-U12] The **power steering pump** is a device that moves steering fluid to apply pressure to the steering system.

power stroke [N-COUNT-U4] A **power stroke** is the stage in the four-stroke cycle in which heat ignites the compressed mixture of fuel and air, causing tremendous pressure that forces the piston to the bottom of the cylinder. This stage is the primary source of a machine's power.

precombustion chamber [N-COUNT-U2] A **precombustion chamber** is a small contained space where air is warmed before entering the main combustion chamber.

pressure [N-UNCOUNT-U4] **Pressure** is force that is caused by something pushing against something else.

pulley [N-COUNT-U10] A **pulley** is a device with a wheel that has a grooved rim in which a rope or belt can wind through. It is used to change the direction of applied force and to control the tension and slack in a belt drive.

rack [N-COUNT-U12] The **rack** is the gear in rack and pinion steering that the pinion gear works with to turn the wheels.

radiator [N-COUNT-U10] A **radiator** is a device used to cool the liquid in the cooling system by channeling the water through a series of air ducts.

rear-wheel drive [N-UNCOUNT-U14] **Rear-wheel drive** is a system in which the power from the engine is transmitted to the back wheels only.

reduce [V-T-U8] To **reduce** something is to make it less strong.

revolution [N-COUNT-U3] A **revolution** is one complete turn of the crankshaft.

rotary motion [N-UNCOUNT-U15] **Rotary motion** is the act of rotating as if on an axis.

rotate [V-T or I-U12] To **rotate** is to turn around a center point or axis.

run on [V-PHRASAL-U2] To **run on** something is to be powered by that source of fuel.

serpentine belt [N-COUNT-U10] A **serpentine belt**, or accessory belt, is a flat rubber belt that winds through pulleys and turns accessories on the front of the engine.

shock absorber [N-COUNT-U13] A **shock absorber** is a device near each wheel that reduces the effect of sudden shocks from rough roads and cuts down on bouncing.

sludge [N-UNCOUNT-U8] **Sludge** is a thick, oily substance that is produced when the engine burns oil.

spark plug [N-COUNT-U1] A **spark plug** is a device that uses electricity to create a spark to ignite the fuel.

spindle [N-COUNT-U12] The **spindle** is the metal part on which the hub and wheel bearings are mounted.

stabilizer bar [N-COUNT-U13] The **stabilizer bar** is a metal rod that connects the suspension system and helps prevent swaying on curves and turns.

start [V-T-U6] To **start** a car is to make the engine begin to work.

starter [N-COUNT-U6] The **starter** is the device that makes the engine begin to work.

starter relay [N-COUNT-U6] The **starter relay** sends electric current to the starter, which makes the engine begin to work.

steering shaft [N-COUNT-U12] The **steering shaft** is a piece of metal that connects the steering box to the steering column.

steering system [N-COUNT-U12] The **steering system** is the collection of devices used to guide the movement of a car.

steering wheel [N-COUNT-U12] The **steering wheel** is the round device turned by a driver to control the direction of the wheels of an automobile.

strut suspension [N-COUNT-U13] A **strut suspension** is a system that uses a metal bar with a coil spring and a shock absorber to absorb shock and provide a smooth ride.

sump [N-COUNT-U1] A **sump** is a reservoir that stores oil in the engine.

suspension system [N-COUNT-U13] The **suspension system** is a series of devices that support the car frame and help absorb shock from uneven roads.

tailpipe [N-COUNT-U9] A **tailpipe** is the pipe at the back of the vehicle that releases the gases into the air.

thermostat [N-COUNT-U10] A **thermostat** is a device used to help the liquid in the cooling system warm up the engine.

tie rod [N-COUNT-U12] The **tie rod** is a steel rod that links the spindle and rack.

torsion bar [N-COUNT-U13] A **torsion bar** is a metal rod that twists when the wheels turn to keep the car stable.

transaxle [N-COUNT-U15] A **transaxle** is a device that combines the transmission and differential of a motor vehicle and is connected to the axles of the wheels.

transmission fluid [N-UNCOUNT-U14] **Transmission fluid** is the red, sweet-smelling liquid that provides hydraulic pressure in automatic transmissions.

transmission system [N-COUNT-U14] A **transmission system** is a system of gears that allows cars to move at different speeds.

transmit [V-T or I-U15] To **transmit** something is to pass it from one object to another.

tubular fuse [N-COUNT-U5] A **tubular fuse** is a type of fuse that is housed in a glass tube.

turn over [V-PHRASAL-U6] To **turn over** is to start running (an engine).

two-stroke engine [N-COUNT-U3] A **two-stroke engine** is a type of internal combustion engine that completes its cycle when the crankshaft makes one revolution.

two-stroke oil [N-UNCOUNT-U3] **Two-stroke oil** is a special oil added to the fuel of a two-stroke engine to lubricate it.

U-joint [N-COUNT-U15] A **U-joint** is a coupling that transfers the power from the engine and allows for rotation in three planes in rear-wheel drive cars.

upper radiator hose [N-COUNT-U10] An **upper radiator hose** is a rubber hose connecting the radiator to the cylinder block where the liquid enters the radiator.

valve [N-COUNT-U1] A **valve** is a device that control the flow of fluid by opening and closing.

viscosity [N-UNCOUNT-U8] **Viscosity** is how thick or thin a fluid is.

voltage regulator [N-COUNT-U6] A **voltage regulator** is a device that controls the amount of electric current needed for the battery.

water pump [N-COUNT-U10] A **water pump** is a device that circulates water through the cooling system.

Zerk [N-COUNT-U8] A **Zerk** is a fitting that allows grease to be injected into an engine with a grease gun.

**CAREER
PATHS**

Mechanics

Book
3

Jim D. Dearholt



Express Publishing

Table of contents

Electricity

Unit 1 - Basic electricity	4
Unit 2 - Electrical tools and equipment	6

Motorcycles

Unit 3 - Parts of a motorcycle	8
Unit 4 - Common problems	10

HVAC

Unit 5 - Heating	12
Unit 6 - Ventilation	14
Unit 7 - Air conditioning and refrigeration	16

Heavy machinery

Unit 8 - Farm machines	18
Unit 9 - Construction and demolition machines	20

Collision repair

Unit 10 - Welding	22
Unit 11 - Frame repair	24
Unit 12 - Refinishing	26

Auto

Unit 13 - Hybrids	28
Unit 14 - Electric cars	30
Unit 15 - Troubleshooting problems	32

Appendix

Glossary	34
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1 Basic electricity



Course Bem - 10259

Basic Electricity for Mechanics

Course Description

This course is required for all maintenance technicians and mechanics. It covers the fundamentals and basic laws of **electricity**. The course also focuses on proper safety techniques for mechanical and electrical jobs. It is a prerequisite for the Basic Electricity II course. The course is divided into three main sections:

Section 1: We cover basic electrical theory and terminology. Students learn about **currents** and the laws of **AC** and **DC**, as well as the basics of **circuits** and **circuitries**.

Section 2: This section addresses **conductivity**. Students learn the basics about **insulators**, **conductors**, and **electric resistance**. Students also get an introduction to **magnetism** and **capacitance** during this section.

Section 3: The final section discusses measurements of electricity. Students learn terminology and uses for measurements such as **voltage**, **ohm**, and **amp**. Students are expected to understand the differences between the various measurements. The end of this section focuses on applying this knowledge to the workplace environment. We also focus on providing safety tips, regulations, and emergency actions suitable for the workplace.

Students are required to demonstrate their knowledge in a practical exam upon completion of the course. A Certificate of Completion is awarded, which is a requirement for many positions.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 Why are copper wires used in electrical wiring?
- 2 What is one type of electrical current?

Reading

2 Read the course description. Then, mark the following statements as true (T) or false (F).

- 1 ☐ The first section covers electrical measurements.
- 2 ☐ Safety techniques are taught in Basic Electricity II.
- 3 ☐ Completion of the course is required for some jobs.

Vocabulary

3 Match the words (1-8) with the definitions (A-H).

- | | |
|--------------------------------------|---|
| 1 <input type="checkbox"/> current | 5 <input type="checkbox"/> electricity |
| 2 <input type="checkbox"/> circuit | 6 <input type="checkbox"/> magnetism |
| 3 <input type="checkbox"/> circuitry | 7 <input type="checkbox"/> capacitance |
| 4 <input type="checkbox"/> conductor | 8 <input type="checkbox"/> conductivity |

- A a system of circuits
- B a form of energy
- C an object that allows energy to flow
- D the amount of electric charge a device can hold
- E a force that attracts or repulses objects
- F the degree to which a substance allows the flow of electricity
- G a complete path a current flows around
- H a flow of electrical charge

4 Place the words from the word bank under the correct heading.

Word BANK

AC voltage insulator
resistance ohm amp DC

Currents	Inhibitors	Measurements

- 5 Listen and read the course description again. How do students demonstrate what they have learned during the course?

Listening

- 6 Listen to a conversation between a teacher and a student in an electricity course. Choose the correct answers.

- 1 What is the exam mostly about?
 - A defining electrical terms
 - B listing the parts of a circuit
 - C describing types of insulators and conductors
 - D explaining the difference between AC and DC
- 2 What concepts does the man confuse?
 - A AC and DC
 - B ohms and amps
 - C insulators and conductors
 - D conductivity and resistance

- 7 Listen again and complete the conversation.

Teacher: All right. We'll start with terminology. List three types of electrical measurements.

Student: Okay. Three types are voltage, ohm, and amp.

Teacher: Good. Now, 1 _____ an ohm and an amp.

Student: Hmm, well, an ohm 2 _____ in something, while an amp measures the strength of an electrical flow.

Teacher: That's correct. So what's 3 _____ then?

Student: Voltage. Voltage 4 _____ in a current, right?

Teacher: Correct. Very good. Now, tell me how an insulator 5 _____ a conductor.

Student: Okay. A conductor 6 _____, and an insulator stops electricity from flowing.

Teacher: Good. So what property does an insulator exhibit?

Student: I know this, it's 7 _____. Oh! It's resistance.

Teacher: Exactly. Insulators are forms of electrical resistance. Now, which type of current only flows 8 _____?

Student: That's AC.

Teacher: Actually, that's incorrect.

Student: Oh, it's DC. I always mix that up!

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

List three types of electrical measurements.

Explain the difference between ...

Tell me how ...

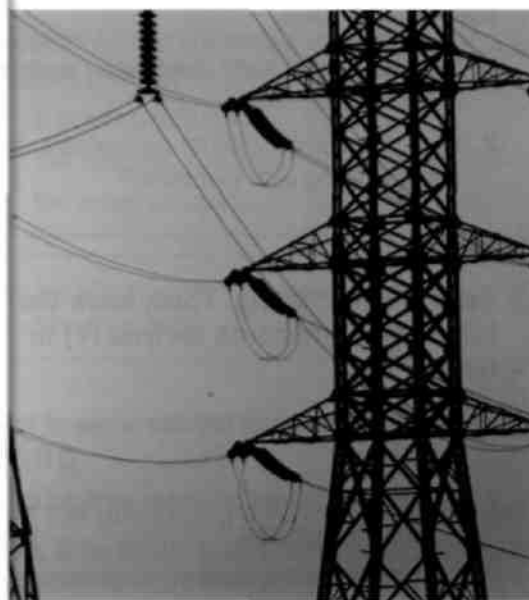
Student A: You are a teacher. Ask Student B about:

- electrical measurements
- conductors and insulators
- types of current

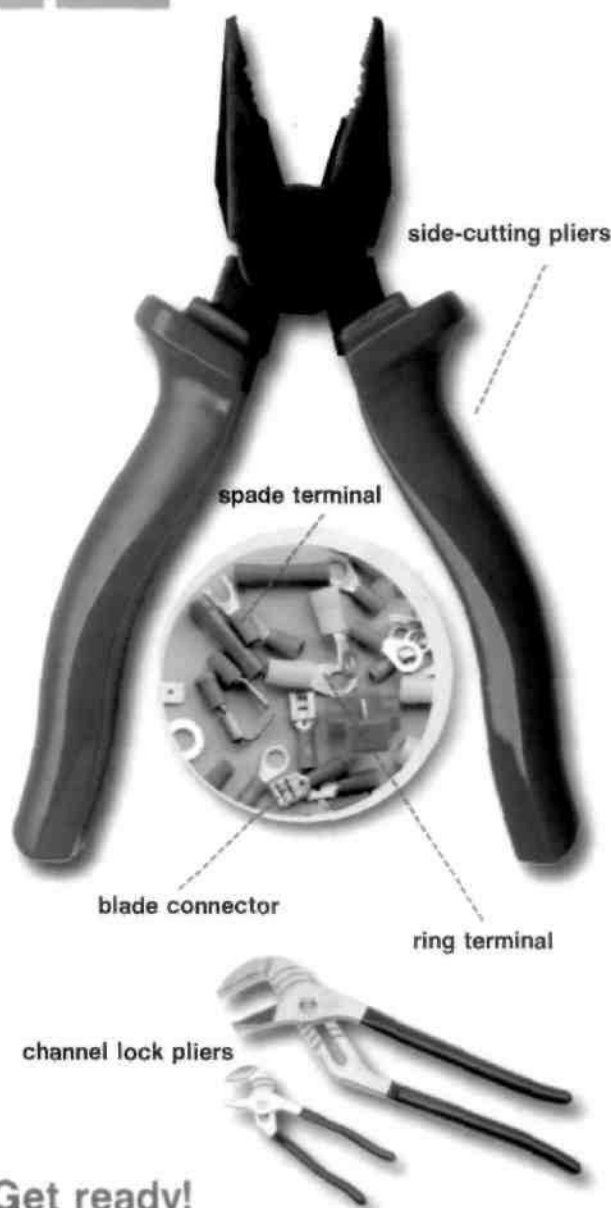
Student B: You are a student in an electricity course. Answer Student A's questions.

Writing

- 9 Use the course description and the conversation from Task 8 to write a summary of basic electrical terms. Include: measurements, currents, and conductors and insulators.



2 Electrical tools and equipment



Get ready!

- 1 Before you read the passage, talk about these questions.

- 1 What are some tools used when working with electricity?
- 2 What are some types of connectors used when working with electricity?

Reading

- 2 Read the job listing. Then, mark the following statements as true (T) or false (F).

- 1 ☐ Applicants must provide some of their own tools.
- 2 ☐ Applicant need not have worked in this specific industry.
- 3 ☐ Applicants are required to possess a degree.

Welcome to

J O B L I S T E R

Job Title: Electronic equipment mechanic

Date of Opening: March 11

Employer: Rochester Industries, Haslet, NY

Job Description: Monitor and repair electrical systems throughout Rochester Industries' Haslet semi-conductor manufacturing plant. Inspect and repair plant controls, heating and cooling systems, electrical wiring, and electrical equipment used in the semi-conductor manufacturing process. Use **multimeter** and **continuity detectors** to diagnose problems and make repairs. Keep maintenance and repair logs.

Qualifications: Three years' experience diagnosing and repairing industrial electrical systems and equipment. Experience working with sensitive electrical equipment in the semi-conductor industry preferred. Experience using different lengths of **fish tape** to install **wires** in difficult to reach spaces. Ability to work for long periods of time on ladders, in small, unheated spaces with only a **flashlight** for lighting, and under machinery. Must be capable of installing a wide variety of connectors including but not limited to low- and **high-voltage connectors**, **blade connectors**, **ring terminals**, **spade terminals**, and **coaxial connectors**. Must be familiar with and possess the following tools: **crimpers**, **wire strippers**, **side-cutting** and **channel lock pliers**, **soldering irons**, and **anti-static wristbands**. Good communication skills a must. Must possess a driver's license.

[CLICK HERE TO APPLY](#)

Applicants must pass a skills and safety examination before interviewing.

Vocabulary

- 3 Match the words (1-8) with the definitions (A-H).

- | | |
|--|--|
| 1 <input type="checkbox"/> multimeter | 5 <input type="checkbox"/> voltage connector |
| 2 <input type="checkbox"/> wire | 6 <input type="checkbox"/> blade connector |
| 3 <input type="checkbox"/> flashlight | 7 <input type="checkbox"/> side-cutting pliers |
| 4 <input type="checkbox"/> ring terminal | 8 <input type="checkbox"/> channel lock pliers |

- A a device that provides lighting
- B a device used to carry electricity
- C a device that connects a wire into a terminal
- D a tool that measures voltage and more
- E a device that connects with a screw
- F a tool used to slice through wires
- G an adjustable gripping tool
- H a device that joins two wires together

- 4 Fill in the blanks with the correct words and phrases from the word bank.

Word Bank

spade terminal anti-static wristband
wire stripper continuity detector
soldering iron fish tape crimper

- 1 A screw is needed to connect the _____.
- 2 Use a(n) _____ to protect the equipment.
- 3 Use the _____ to remove the covering.
- 4 A(n) _____ is needed to melt the tip of the wire.
- 5 Bend the end of wire with the _____.
- 6 A(n) _____ will tell you if the wire has current.
- 7 Guide the wire through the wall using _____.

- 5 Listen and read the job listing again. What must an applicant pass to have an interview?

Listening

- 6 Listen to a conversation between a salesperson and a mechanic. Choose the correct answers.

- 1 What is the conversation mostly about?
 - A the features of a multimeter
 - B a comparison of two multimeters
 - C a project that requires a multimeter
 - D the difference between voltmeters and multimeters
- 2 Why does the man hesitate to purchase the item?
 - A It has no continuity detector.
 - B Its screen is too small.
 - C It cannot store data.
 - D It is too expensive.

- 7 Listen again and complete the conversation.

Mechanic: I just need something simple.
Salesperson: How about this one? It's the KT-59, one of our best-selling models.
Mechanic: I like the 1 _____, but how does it perform?
Salesperson: Few multimeters are 2 _____.
Mechanic: It has a 3 _____.
Salesperson: Did you know that it is backlit to make it easier to read in low light situations? It also can store data.
Mechanic: Wow, those are great features. So, what am I looking at 4 _____ price?
Salesperson: This one 5 _____ at \$165.99.
Mechanic: That's a bit more than I was 6 _____.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

I need something ...
Did you know ...?
That's a bit more ...

Student A: You are a mechanic. Talk to Student B about:

- a product you want
- the features you want
- the price you prefer

Student B: You are a salesperson. Answer Student A's questions about a product.

Writing

- 9 Use the job listing and conversation from Task 8 to write a product description. Include: features, uses, and price.

3 Parts of a motorcycle

**GRINNEL
X43**

Coming in at 1,000 pounds with a full tank, the Grinnel X43 is our entry-level touring motorcycle and among our best selling!



With state-of-the-art, computer-adjusted front and rear suspension systems and comfortable seating it offers an amazingly smooth riding experience for those just entering the world of motorcycles.

The X43's **handlebars** are designed to reduce strain and put the driver in full control. Convenient placement of the **throttle**, the **clutch lever**, and the **shift lever** make this bike simple and easy to operate for a first-time driver. Unlike **chain** or **belt drives**, the X43's **shaft drive** is extremely durable and requires little maintenance. It's just one example of the X43's reliability. Our aim is to ensure that you get the smoothest ride with minimal maintenance.

And how do we accomplish that goal? We start with a high-strength steel **frame**. The **fork tubes** and durable **triple trees** provide the front suspension, while the **swingarm** with computer-controlled **shock absorbers** creates the rear suspension. A six-gallon **fuel tank** ensures you can take a long ride without refueling. And not only is the X43 supported by a standard steel **side stand**, it is supported by Grinnel's three-year, unlimited mileage warranty. Check out the Grinnel X43 today, and get into the world of riding motorcycles.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some of the parts of a motorcycle?
- 2 What keeps a motorcycle standing when it is not being driven?

Reading

2 Read the advertisement for a motorcycle. Then, choose the correct answers.

- 1 What is the advertisement mostly about?
 - A different types of options for a motorcycle
 - B types of products from a motorcycle company
 - C a motorcycle designed for touring
 - D available parts for a motorcycle
- 2 What is true of the X43 model?
 - A It is built for racing.
 - B It has an optional side stand.
 - C It is recommended for first-time drivers.
 - D It weighs less than 900 pounds with fuel.
- 3 Which is NOT a feature of the X43?

A side stand	C steel frame
B belt drive	D shock absorbers

Vocabulary

3 Read the sentence pair. Choose where the words best fit the blanks.

1 motorcycle / frame

- A A _____ is similar to a bicycle with an engine.
- B The wheels, seat, and other parts attach to the _____.

2 side stand / handlebars

- A The _____ allow drivers to park a motorcycle.
- B _____ are used to make turns.

3 chain drive / shaft drive

- A A _____ has a long rod in the drive train.
- B Gears are an important part of a _____.

4 fuel tank / belt drive

- A Gasoline or diesel is stored in the _____.
- B A _____ connects the engine and rear wheel.

- 4 Place the words and phrases from the word bank under the correct heading.

Word BANK

clutch lever swingarm fork tube
shift lever throttle triple tree
shock absorber

Front suspension	Rear suspension	Controls

- 5 Listen and read the advertisement for a motorcycle again. What type of rider is the X43 aimed at?

Listening

- 6 Listen to a conversation between two mechanics. Mark the following statements as true (T) or false (F).

- ___ The motorcycle was in an accident.
- ___ The mechanic wants to replace the fork.
- ___ The frame is the most damaged part.

- 7 Listen again and complete the conversation.

Mechanic 2: That depends. The 1 _____ are beyond repair.

Mechanic 1: No doubt about that.

Mechanic 2: I think I could find a reasonably priced replacement.

Mechanic 1: OK. How about the 2 _____?

Mechanic 2: I went over it with a 3 _____ and didn't find a single crack.

Mechanic 1: That's incredible!

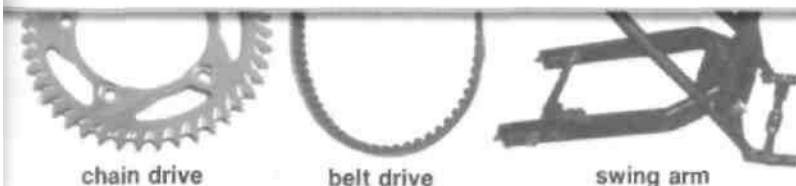
Mechanic 2: There was some damage, but it's 4 _____.

Mechanic 1: So do you think it's still 5 _____?

Mechanic 2: Sure, but 6 _____ a lot of work. We'll also need to replace both wheels, the brakes, and the swingarm.

Mechanic 1: 7 _____?

Mechanic 2: That's all I could find.



Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

How about the ...?
So do you think it ...?
We'll also need to ...

Student A: You are a mechanic. Talk to Student B about:

- the damage to a motorcycle
- what needs to be repaired
- if the motorcycle can be ridden

Student B: You are a mechanic. Talk to Student A about the damage to a motorcycle.

Writing

- 9 Use the advertisement and conversation from Task 8 to fill out an assessment of a damaged motorcycle. Include: damaged parts, repairs required, and parts that are safe.

Damage Assessment

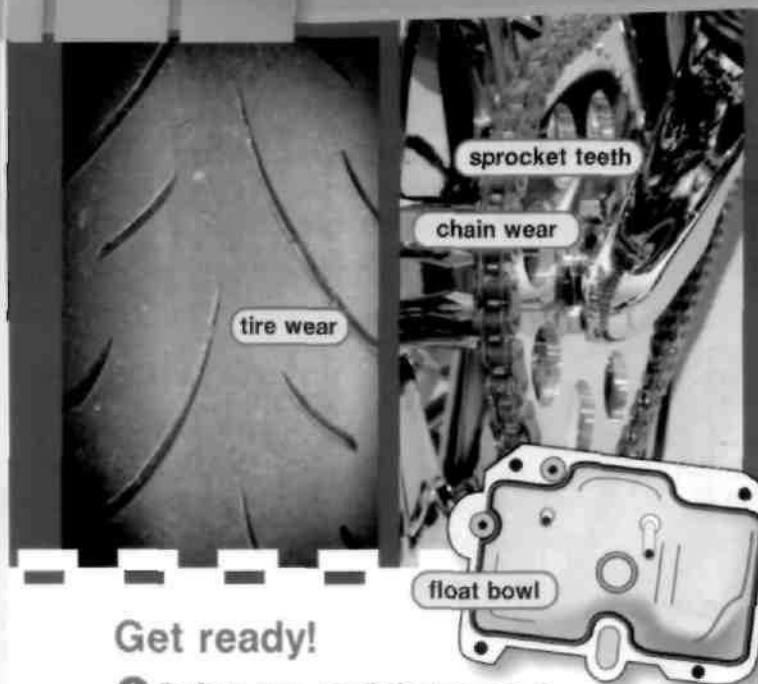
Customer name: _____

Damaged parts: _____

New parts required: _____

Safe parts: _____

4 Common problems



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What type of problems can affect motorcycles?
- 2 What type of wear affects how a motorcycle reacts with the ground?

Reading

2 Read the magazine article. Then, mark the following statements as true (T) or false (F).

- 1 ☐ Fuel stabilizers prevent gasoline from becoming varnish.
- 2 ☐ Excessive wear is caused by having too much air in tires.
- 3 ☐ A loose chain will damage sprocket teeth.

Vocabulary

3 Match the words (1-7) with the definitions (A-G).

- | | |
|-------------------------------------|---|
| 1 <input type="checkbox"/> deposit | 5 <input type="checkbox"/> excessive |
| 2 <input type="checkbox"/> varnish | 6 <input type="checkbox"/> chain tension |
| 3 <input type="checkbox"/> inflate | 7 <input type="checkbox"/> battery tender |
| 4 <input type="checkbox"/> give out | |

- A more than usual
 B a device that maintains an electrical charge
 C a solid substance that forms in a liquid
 D to break or become unusable
 E how tight or loose a chain is
 F to force air into a tire
 G a substance created when gasoline evaporates

MOTORCYCLE MONTHLY

JULY
ISSUE

Motorcycles need a lot of maintenance – it's an unfortunate fact. But some of the most common motorcycle problems are actually quite easy to avoid.

If you only ride your motorcycle a few times a year, you're vulnerable to issues caused by inactivity. First and foremost is **fuel contamination**. If fuel sits exposed to air for too long, the gasoline evaporates and turns to **varnish**. When this happens, the **float bowl** of your carburetor is clogged with **deposits**. You can avoid these **stale gas** issues by adding **fuel stabilizers** before putting your motorcycle in storage.

Another common problem caused by inactivity is a dead battery. Maintain your charge by getting a **battery tender**. It's less expensive than purchasing new batteries, and your motorcycle will be ready at any time.

Of course, riding causes problems, too. That's why maintaining proper tire pressure is important. Low tire pressure leads to **excessive wear**, which forces you to purchase new tires early. **Inflating** tires properly eliminates unnecessary **tire wear**.

Even more important than tire pressure is **chain tension**. Chains that are too tight can bend **sprocket teeth**, while chains that are too loose grind against the **chain guide**. Either condition leads to **chain wear** and the likelihood your chain will **give out** while you're riding. Correct tensioning prevents avoidable maintenance as well as potential accidents.

...

4 Read the sentence pair. Choose where the words best fit the blanks.

1 **fuel stabilizer / fuel contamination**

- A _____ can start in just a few weeks.
 B Add _____ to your tank before storing your bike.

2 **stale gas / float bowl**

- A The carburetor failed because it was filled with _____.
 B Once varnish forms, a carburetor's _____ must be cleaned thoroughly.

3 **tire wear / chain wear**

- A _____ can be avoided with proper tensioning.
 B Low pressure can increase _____.

4 **sprocket teeth / chain guides**

- A _____ catch the chain to transfer power to the sprocket.
 B _____ lead chains onto sprockets.

- 5 Listen and read the magazine article again. Which problem is probably the most dangerous?

Listening

- 6 Listen to a conversation between two mechanics. Choose the correct answers.

- 1 Why is the motorcycle at the repair shop?
A It has a broken carburetor.
B It is showing signs of chain wear.
C It was not maintained while in storage.
D It needs the chain tension adjusted.
- 2 What part does the man want to replace?
A the front tire C the carburetor
B the float bowl D the chain guide

- 7 Listen again and complete the conversation.

Mechanic 2: Oh, no, nothing major like that. He just hasn't ridden it for months and never really took care of it in that time.

Mechanic 1: I see. So, 1 _____.
The float bowl is full of varnish.

Mechanic 2: Yeah, the whole carburetor is 2 _____.

Mechanic 1: 3 _____ he was using a battery tender, either.

Mechanic 2: Nope, he wasn't.

Mechanic 1: So besides 4 _____ the carburetor and installing a battery, what do we have to do?

Mechanic 2: Well, I'm glad you asked. I want a 5 _____ something.

Mechanic 1: Of course.

Mechanic 2: Look at the front tire. It's got a fair amount of wear, 6 _____?

Mechanic 1: Yeah, that's pretty bad.

Mechanic 2: Okay, I'm glad you agree. The customer didn't want to spend a lot of money. But I'm going to change this tire anyway.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Let me ...

The carburetor is ...

I'm glad you asked.

Student A: You are a mechanic. Talk to Student B about:

- what is wrong with a motorcycle
- what repairs are needed

Student B: You are a mechanic. Talk to Student A about a motorcycle in your shop.

Writing

- 9 Use the article and conversation from Task 8 to write an article on motorcycle maintenance. Include tips on: storage, tires, and chains.

motorcycle maintenance



TIPS INCLUDED

MOTORCYCLE
MONTHLY



5 Heating



furnace



thermostat



boiler



radiator

HENSON'S Heating & Air Conditioning

Rely on Henson's Heating and Air Conditioning to keep you warm this winter! Henson's **maintains** all types of **heating systems**. Whatever type of heater you use, we recommend an annual inspection.

Henson's will examine your **furnace** and test your heat **pumps** for free. Then we'll give you a cost estimate, and we're confident you won't find lower rates anywhere. We also offer free air duct cleaning when you pay for any service to your **central heat** system. Call us to **repair** or replace any malfunctioning heating components, including **thermostats**.

If you use an **oil-fired** system or **gas heater**, Henson's will check for leaks and other hazards. Don't take chances with old, rattling **boilers** or leaking **radiators**; leave it to the experts. Our services are backed by a one-year guarantee, so you can always feel safe with Henson's.

Does your home or building need a new heater? Henson's has you covered. We will **install** your new system at the best rate in town.

Henson's also keeps hot water flowing from your faucets. Is your **water heater** busted or leaking? We will send a technician right away to fix it. We know how important hot water is during winter, so we won't keep you waiting.

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some different ways to heat a building?
- 2 What instrument decides the temperature of a building or room?

Reading

2 Read the HVAC company's webpage. Then, choose the correct answers.

- 1 What is the purpose of the web page?
 - A to give instructions for repairing heaters
 - B to explain the importance of proper heating
 - C to describe a company's heating services
 - D to sell different types of heaters
- 2 Which is NOT a service offered on the web page?
 - A pump inspection
 - B duct cleaning
 - C heater installation
 - D thermostat reprogramming
- 3 What does the company offer for free?
 - A central heat service
 - B thermostat repair
 - C furnace inspection
 - D pump replacement

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | |
|--------------|--------------------|
| 1 — pump | 4 — maintain |
| 2 — furnace | 5 — water heater |
| 3 — radiator | 6 — heating system |

- A a container that produces heat
- B to keep something working properly
- C a container for storing and heating water
- D a utility for keeping a building warm
- E a device that moves heat to another area
- F a room heater that contains hot water

- 4 Fill in the blanks with the correct words and phrases from the word bank.

Word Bank

thermostat repair install
central heat boiler oil-fired

- If you can't _____ the broken heater, we'll get a new one.
- A(n) _____ system distributes warmth equally throughout a house.
- The _____ burst and flooded the room.
- Remove the new water heater from the box and read all instructions before you _____ it.
- The _____ controls the temperature in the house.
- The office replaced the radiator with a(n) _____ heater instead.

- 5 Listen and read the HVAC company's webpage again. What things do Henson's repair and maintain?

Listening

- 6 Listen to a conversation between a mechanic and a customer. Mark the following statements as true (T) or false (F).

- ___ The furnace is not producing heat.
- ___ The pump will have to be replaced.
- ___ The man has not finished his inspection.

- 7 Listen again and complete the conversation.

Mechanic: Well, Ms. Davis, your furnace is still 1 _____, but there's definitely a problem with the furnace.

Customer: I thought so. It made such a strange noise when I 2 _____. What's wrong with it?

Mechanic: I'm not quite sure what's causing that noise. 3 _____ a couple of things.

Customer: Really? What do you think it might be?

Mechanic: The pump might be faulty, or the boiler might just be 4 _____.

Customer: Could it be serious?

Mechanic: If we're lucky, I'll just need to repair the pump.

Customer: Well, that doesn't 5 _____. What if it's the boiler?

Mechanic: If 6 _____, you might have to replace the whole unit.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

I'm not sure what is ...

It could be the ...

You might have to ...

Student A: You are a mechanic. Talk to Student B about:

- a problem with a furnace
- possible causes
- possible repairs

Student B: You are a customer. Talk to Student A about possible repairs to a furnace.

Writing

- 9 Use the conversation from Task 8 to complete the mechanic's job notes. Include: a description of the problem and likely causes.

Notes

Description of problem:

.....

.....

.....

.....

Likely causes:

.....

.....

.....

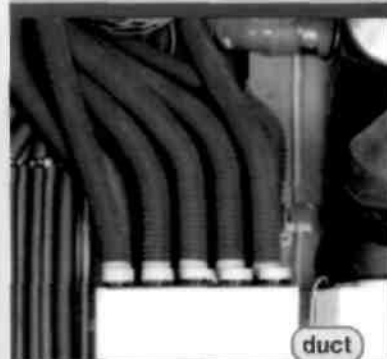
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6 Ventilation

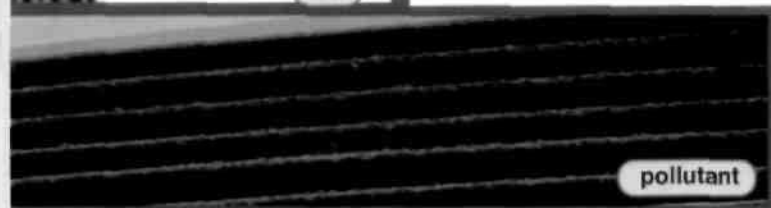
A+ HEATING and COOLING A-Plus



unit ventilator



duct



pollutant

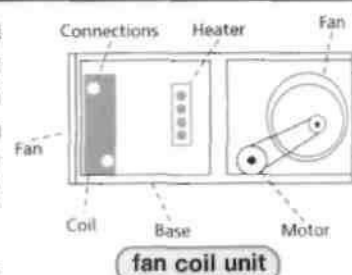
Why Ventilate?

Ventilation is vital to the safety of your home or business. Without adequate airflow, you risk exposure to mold, dust particles and odor-producing agents. Breathing in these **pollutants** can be unpleasant and is often dangerous to your health. A-Plus can help you install the right system to maintain ideal air quality.

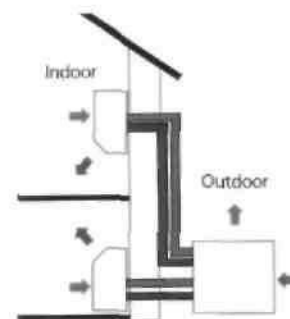
Small spaces are especially at risk for accumulating pollutants. **Fan coil units** are perfect for maintaining airflow, and they also function as heaters. You can also install a **unit ventilator** to bring fresh air in from outside. For areas with high **humidity**, you probably need a **mechanical exhaust** to reduce mold and odors.

A-Plus has a great lineup of air conditioners to clean and cool your air. For industrial spaces, check out our easy-to-install **package units**. If you need an air conditioner for home, we recommend a **split system**. Since the loud condensing unit is stored outdoors, you'll enjoy clean air and a quiet home.

For ventilation systems that are not working properly, A-Plus offers inspection and repair services. If you have a central ventilation system, we'll examine your **air handler** to make sure your **blower** and **dampers** are functioning. We recommend replacing **filters** and having **air ducts** cleaned regularly to avoid dust buildup.



fan coil unit



split system

Vocabulary

3 Write a word that is similar in meaning to the underlined text.

1 Open the box that conditions and blows air to see what is wrong with the heater.

_ _ r _ a n _ _ _

2 Gregory installed a ductless system with a fan for distributing air.

f _ _ _ o i _ _ u _ _ t

3 Irene did not want the air conditioner built into a single unit because it was too loud.

p _ _ k _ _ e _ n _ t

4 The hotel updated its air conditioners to improve the flow of fresh air in each room.

_ e n _ _ _ a t _ _ n

5 The amount of moisture in the air was much higher than normal.

_ u m _ _ i t _

6 Air conditioners with one outdoor part and one indoor part are popular with homeowners.

s _ l i _ _ y _ _ e m

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What is the danger with poor ventilation?
- 2 What type of ventilation system has both indoor and outdoor components?

Reading

2 Read the webpage. Then, mark the following statements as true (T) or false (F).

- 1 ☐ Unit ventilators can also provide heat.
- 2 ☐ Package units are not recommended for use in homes.
- 3 ☐ A-Plus checks dampers during central ventilation inspections.

- 4 Read the sentence pair. Choose where the words best fit the blanks.

1 air ducts / dampers

- A Dust gathered in the _____ after Louis stopped using his heater.
B Some of the _____ are not opening enough to allow air through.

2 air quality / pollutants

- A The heating company is selling a new heater that reduces _____ indoors.
B The parents' association announced that the school should improve classroom _____.

3 blower / filter

- A When Darius forgot to change the _____, dirt blew out of his heater.
B The new _____ circulates air more effectively than the old one.

4 unit ventilator / mechanical exhaust

- A Install a(n) _____ to bring in fresh air.
B The _____ pulls air out of the bathroom.

- 5 Listen and read the webpage again. What do the company recommend for areas with lots of water in the air?

Listening

- 6 Listen to a conversation between the owner of a heating and cooling company and a secretary. Choose the correct answers.

- 1 What is the conversation mainly about?
A correcting a scheduling error
B changing a mechanic's schedule
C explaining why a project is delayed
D changing the secretary's schedule
- 2 What will the owner likely do later in the day?
A clean a set of ducts
B install an air conditioner
C order a new unit ventilator
D inspect a mechanical exhaust system

- 7 Listen again and complete the conversation.

Owner: An emergency call has come in, and I've got to find someone to take it. So, what are our mechanics 1 _____?

Secretary: 2 _____, Carl has an air conditioner installation at the new City Annex.

Owner: I thought he 3 _____ last week.

Secretary: No, the 4 _____ didn't arrive until yesterday.

Owner: Okay. They've been waiting all week, so we'd better install it 5 _____. What else is there?

Secretary: Well, Janet is 6 _____ over at the Packard Building.

Owner: When is she supposed to finish? Maybe she can take the emergency call after.

Secretary: She should be done by noon. But she also has to visit a house on 9th Avenue for an inspection.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

What are our mechanics ...?

I thought s/he ...

What else ...?

Student A: You are an owner of a heating and cooling company. Talk to Student B about:

- an emergency call
- mechanics' schedules

Student B: You are a secretary. Talk to Student A about today's schedule.

Writing

- 9 Use the conversation from Task 8 to fill out the company's schedule for the day. For each job, include: location, description, and urgency level.

7 Air conditioning and refrigeration

Customer Reviews

Looking for an HVAC company? Check out our customer reviews before making a decision!



Company:	Company:
Anderson AIR SYSTEMS	ACME REFRIGERATION COMPANY
Services: Air Conditioner and Evaporative Cooler sales and repairs	Services: Refrigerator, Ice Machine and Walk-In Cooler sales and repairs
Ratings: Cost: A+ Service: B+ Efficiency: A	Ratings: Cost: A Service: A- Efficiency: B+
Customer Reviews:	Customer Reviews:
<p>August 7 Anderson replaced the condenser on my air conditioner. They fixed it the same day I called. - Mary S.</p> <p>September 22 I'm thrilled that I didn't have to buy a new system. Anderson fixed the heat exchanging pipes in my existing system. - Pete J.</p> <p>September 1 I was really suffering in the heat, but I didn't want to pay the costs of running an air conditioner. Anderson installed an energy efficient evaporative cooler that costs much less to use. - Joe Z.</p>	<p>June 13 Acme installed the refrigerators, ice machines and walk-in coolers for our new restaurant. And they did it a lower cost than any of their competitors. - Fred J., Jackson's Diner</p> <p>June 1 Acme came immediately when our refrigerators stopped working. All we needed was refrigerant, but if Acme hadn't responded quickly, we'd have lost our inventory and business for the day. Thanks, Acme! - Mona P., Homestyle Restaurant</p>

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What is an air conditioner used for?
- 2 What kinds of cooling systems do people use in your country?

Reading

2 Read the reviews of two companies. Then, mark the following statements as true (T) or false (F).

- 1 ___ An air conditioner is cheaper to run than an evaporative cooler.
- 2 ___ Acme Refrigeration has a higher service rating than Anderson Air Systems.
- 3 ___ Acme Refrigeration replaced Homestyle Restaurant's refrigerators.

Vocabulary

3 Match the words (1-5) with the definitions (A-E).

- | | |
|------------------------|----------------------------|
| 1 ___ condenser | 4 ___ heat |
| 2 ___ refrigeration | 5 ___ heat exchanging pipe |
| 3 ___ air conditioning | |

- A a tube that moves hot and cold gases out of a system
- B a device that removes hot air and inserts cold air
- C a process that cools or freezes something
- D a device that changes gases into liquids or solids
- E a measure of how much warmth an object contains



- 4 Fill in the blanks with the correct words and phrases: *ice machine, refrigerant, refrigerator evaporative, cooler, walk-in cooler.*

- 1 A(n) _____ uses water to cool the air.
- 2 As the _____ evaporates, the refrigeration system cools the food.
- 3 The _____ needs a water supply to make ice cubes.
- 4 When the restaurant's steaks were delivered, the cook put them in the _____.
- 5 Mary has a(n) _____ in her kitchen to keep her food cool.

- 5 Listen and read the reviews of two companies again. Who couldn't afford to pay for an air conditioner?

Listening

- 6 Listen to a conversation between a mechanic and a customer. Choose the correct answers.

- 1 Why does the woman call the mechanic?
 - A Her walk-in cooler failed.
 - B Her ice machine isn't working.
 - C Her air conditioning system is not working.
 - D Her refrigerator is not keeping food cold.
- 2 What did the last mechanic claim was wrong?
 - A the vents were clogged
 - B the condenser had failed
 - C there was a refrigerant leak
 - D the heat exchanging pipe was broken

- 7 Listen again and complete the conversation.

Customer: A man from Jackson Mechanics said the air conditioner was 1 _____. He said he took care of it, but whatever he did isn't working any more.

Mechanic: Is air blowing out of the vents?

Customer: No air is coming out.

Mechanic: Can you hear the 2 _____?

Customer: 3 _____. The system is dead.

Mechanic: You definitely have big problems. 4 _____ to tell you more.

Customer: Can you come in soon?

Mechanic: Let me 5 _____. It looks like we can 6 _____ in about an hour. Does that work?

Customer: 7 _____. Thanks so much.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Can you hear the ...?
Can you come in soon?
Does that work?

Student A: You are a mechanic. Talk to Student B about:

- an air conditioning problem
- making an appointment

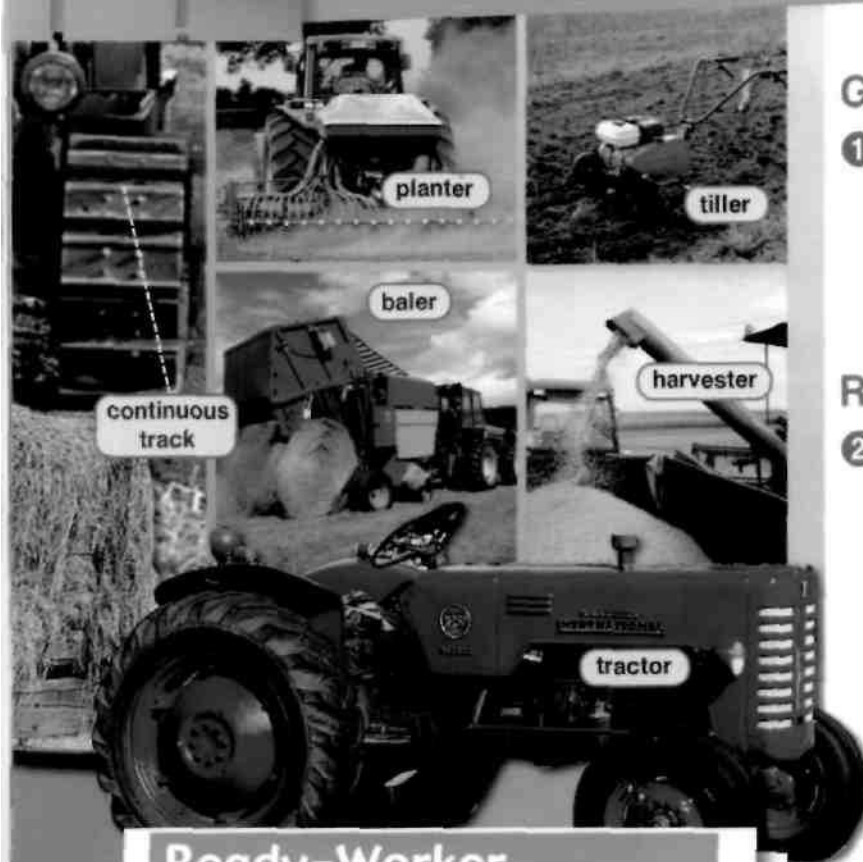
Student B: You are a restaurant owner. Talk to Student A about problems with your air conditioning system.

Writing

- 9 Use the reviews and conversation from Task 8 to write a report on repairs to an air conditioning system. Include: the problem, former repairs, and what you fixed.



8 Farm machines



Ready-Worker

Employment Resources for Mechanics

Is farm equipment maintenance right for you?

If you are a mechanic, you have lots of job opportunities aside from automotive maintenance. **Farmers** and farm supply companies also need mechanics to keep their machines in working order.

Ready Worker's job experts recommend studying major types of farm equipment before applying for these jobs. The **tractor** is especially important because it is necessary for moving other machines. Some tractors have regular wheels while others have **continuous tracks**, so learn the functions of both.

Also learn about **planters** and **tillers**, which are essential for growing crops. **Balers** and **harvesters** are important for making crops ready for sale. Every farm depends on these machines to stay productive. With expert maintenance, you can help farms maximize a machine's **service life**.

Modern **irrigation systems** are complex and cover huge areas of land. Without reliable water distribution, farmers risk losing crops, which means losing profits. The right mechanic can keep these systems running smoothly.

Equipment is always becoming more sophisticated, so make sure you are familiar with the latest technology. Since many of today's machines are powered by **hydraulics**, you should know a **hydraulic pump** inside and out. Consider taking a course on using new **diagnostic equipment**, which can save enormous amounts of time on repairs.

Get ready!

① Before you read the passage, talk about these questions.

- 1 What are some machines that are used in modern farming?
- 2 What are two types of tractor wheels?

Reading

② Read the brochure. Then, choose the correct answers.

- 1 What is the purpose of the passage?
 - A to list the requirements for a position
 - B to describe the knowledge needed for a job
 - C to advertise job openings for farm mechanics
 - D to explain recent changes in farming machines
- 2 Which is NOT a suggestion made in the brochure?
 - A Be aware of new technology.
 - B Study modern irrigation methods.
 - C Become familiar with diagnostic equipment.
 - D Be ready to work on different types of tractors.
- 3 According to the passage, how can mechanics contribute to farm productivity?
 - A by developing new diagnostic equipment
 - B by making farm systems more sophisticated
 - C by expanding irrigation to cover more land
 - D by improving the service life of farm machines

Vocabulary

③ Match the words (1-6) with the definitions (A-F).

- | | |
|-------------|-----------------------|
| 1 — tiller | 4 — hydraulics |
| 2 — baler | 5 — continuous track |
| 3 — planter | 6 — irrigation system |

- A a machine that presses crops together
- B a machine that puts seeds in the ground
- C the science of using water to create power
- D a machine that prepares land for growing
- E a process for distributing water to land
- F a belt along the ground that moves a vehicle

- 4 Read the sentence pair. Choose where the words best fit the blanks.

1 diagnostic equipment / hydraulic pump

- A The motor would not start because the _____ needed replacing.
B The new _____ is helping the mechanics find engine problems much faster.

2 farmer / harvester

- A The farm will remain unproductive until we replace the old _____.
B The corporate office hired a new _____ to oversee the south field.

3 service life / tractor

- A The manufacturer of the new machines promises an excellent _____.
B Eddie was frustrated because his expensive _____ did not last as long as he expected.

- 5 Listen and read the brochure again. As well as farm vehicles, what else do farm mechanics work on?

Listening

- 6 Listen to a conversation between an equipment dealer and a mechanic. Mark the following statements as true (T) or false (F).

- 1 _____ Most of the woman's experience is in automotive mechanics.
2 _____ The woman has taken a course on irrigation systems.
3 _____ The man decides to hire the woman.

- 7 Listen again and complete the conversation.

Equip. dealer: Well, Pauline, your application shows that you have 1 _____ with farm equipment.

Mechanic: Yes, Sir. My last three jobs were on large commercial farms.

Equip. dealer: I see you recently worked for Agropol Industries. What 2 _____ there?

Mechanic: I was the head mechanic for the central branch. I primarily 3 _____ tractors and harvesting equipment.

Equip. dealer: That's excellent. Our rental service rents out lots of those machines to small farms. Did you work on 4 _____ machine brands?

Mechanic: Yes, I'm familiar with the parts on all the major 5 _____.

Equip. dealer: Good. Do you have any experience with irrigation systems?

Mechanic: Agropol actually sent me to a course on irrigation maintenance. That's also 6 _____ to use computerized diagnostic equipment.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

I see that ...
I'm familiar with ...
Do you have ...

Student A: You are an equipment dealer. Talk to Student B about:

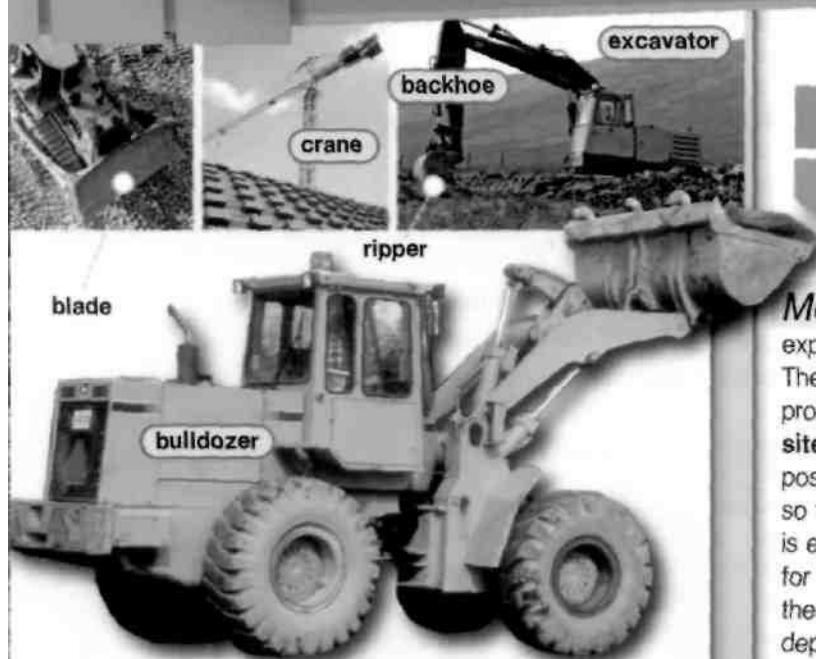
- an application
- job qualifications
- job experience

Student B: You are a mechanic. Talk to Student A about your job experience.

Writing

- 9 Use the conversation from Task 8 to fill out the equipment dealer's interview notes. Include: the mechanic's experience, education, and skills.

9 Construction and demolition machines



Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some types of jobs that require large equipment?
- 2 What are some machines used for large constructions jobs?

Reading

2 Read the job postings. Then, choose the correct answers.

- 1 What is purpose of the web page?
 - A to offer job training for mechanics
 - B to describe the typical duties of a mechanic
 - C to advertise jobs available for mechanics
 - D to notify job seekers of a new mechanical company
- 2 What is true of Pickwick Builders?
 - A They rarely use cranes or excavators.
 - B They would prefer not to train a mechanic.
 - C They perform most repairs at their own shop.
 - D They offer better salaries than most companies.
- 3 What is the most important quality that D&D is looking for?
 - A ability to maintain business productivity
 - B dedication to ensuring safety
 - C familiarity with hydraulic shears
 - D experience using paving machines

Welcome to

J O B L I S T E R

J O B S

I N D U S T R I A L

M E C H A N I C S

Mechanic wanted – Pickwick Builders is seeking an experienced mechanic to maintain construction equipment. The successful applicant will be able to efficiently **analyze** problems and make speedy repairs. All repairs are done **on-site** to allow builders to get back to work as quickly as possible. Pickwick specializes in parking areas and roadwork, so familiarity with **backhoes**, **paving machines** and **graders** is especially important. We also use **cranes** and **excavators** for our commercial building jobs. We prefer experience with these machines, but we will train the right person. Salary depends on experience. Ad #0071213

Come work for us! – Are you a mechanic looking for a great career opportunity? D&D Demolition Services is now hiring! At D&D, safety is our priority. We need mechanics who can ensure our machines don't endanger our workers. D&D has a large fleet of **bulldozers** that need frequent service. If you can **dismantle** and then safely **reassemble** engines and replace **blades** and **rippers**, then we need your expertise. Familiarity with safe operation and repair of **hydraulic shears** is a plus. Our salaries are competitive because we know mechanics keep our business productive and our workers safe. When you work for D&D, D&D works for you. Ad #0071214

Vocabulary

3 Write a word that is similar in meaning to the underlined part.

- 1 The roadwork resumed after the company got a new machine for laying asphalt.
_ a v _ _ g m _ _ _ i n _
- 2 After the mechanic separated the parts of the tractor, she saw the problem right away.
d _ _ m _ _ _ l e d
- 3 We need a vehicle that moves large amounts of material to demolish the old house.
_ _ l l _ o _ _ r
- 4 Richard had to take a course before he could operate the machine that cuts through metal.
_ y _ _ a u _ _ c _ h _ _ _ s
- 5 We repaired the piece of metal that pushes material after the machines collided.
b _ _ _ e
- 6 Mel used a machine for scooping dirt to redo the landscaping in his yard. _ a c _ h _ _

- 4 Fill in the blanks with the correct words: *ripper, crane, excavator, reassemble, analyze, grader, on-site*.

- 1 The mechanic was fired because she could not properly _____ machines after repair.
- 2 The mechanic performed a(n) _____ inspection of the vehicles.
- 3 Use a(n) _____ to break up the rocks before laying the foundation.
- 4 If the ground is uneven, use a(n) _____ to smooth it out.
- 5 We need a(n) _____ to lift the old cars out of the junkyard.
- 6 The owner brought in a specialist to _____ the problem with the engine.
- 7 Olivia rented a(n) _____ to dig a hole for the new swimming pool.

- 5 Listen and read the job postings again. What non-essential skill would be useful for someone applying to D&D Demolition?

Listening

- 6 Listen to a conversation between the owner of a construction company and a mechanic. Mark the following statements as true (T) or false (F).

- 1 ___ The man expects to work on the backhoe immediately.
- 2 ___ The man cannot repair the damaged blade.
- 3 ___ The woman wants the man to stop working on the bulldozer.

- 7 Listen again and complete the conversation.

- O: Dave, 1 _____ on that backhoe for the 12th Street job?
- M: Not yet, Lisa. It's on my list for this week.
- O: When do you think 2 _____ to use?
- M: I'm not sure. I probably won't get to it for the next 3 _____.
- O: We really need that machine back on the job. They can't start work without it. 4 _____ so long?
- M: I'm working on 5 _____. They need it right away over at the Simpson job.
- O: You've had that bulldozer for a week now. What's wrong with it?
- M: There's serious damage to the blade. I couldn't repair it, so 6 _____ replace it.
- O: You're telling me that it's taken a week to replace the blade?
- M: No, of course not. But the engine needed work too, and I just received the part from the warehouse.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Did you ...
I probably ...
I'm working on ...

Student A: You are an owner of a construction company. Talk to Student B about:

- a backhoe
- work plans
- a bulldozer

Student B: You are a mechanic. Talk to Student A about your work plans.

Writing

- 9 Use the conversation from Task 8 to fill out the mechanic's schedule. Include: machine types, descriptions of problems, and likely completion times.

Mechanic's Schedule

Machine type(s): _____

Likely problem: _____

Likely completion time: _____

Machine type(s): _____

Likely problem: _____

Likely completion time: _____

10 Welding

Southwest Welding Supply Experts in Coalescence

PRODUCT DESCRIPTIONS

Stockton MIG Welder - This metal inert gas welder is the best in the business. Heavy duty and long lasting, it's a must-have for all your industrial welding needs. This unit comes with three sizes of electrode wire.

Stockton TIG Welder - This tungsten inert gas welder uses a high quality nonconsumable tungsten electrode. Works well for bonding stainless steel and aluminum. It's perfect for auto **collision** repair.

110 Volt Metalman Stick Welder - The Metalman Stick Welder is portable and convenient for the professional shop or hobby garage.

CUTSMAN Plasma cutter - The CUTSMAN Plasma Cutter is fast and precise for cutting flat or curved metal of any thickness. It leaves little residual heat and no sharp burrs.

Stockton Wire Feeder - The Stockton Wire Feeder makes welding jobs easier, safer, and smoother.

CUTSMAN Guns and Torches - Choose from our large selection of CUTSMAN Welding torches and guns.

Stockton Respirators - Half face or full face piece versions available. Meets all safety guidelines.

Stockton Welding Helmets - Protect against flash burn and **UV light**. Stockton Welding helmets exceed all industry guidelines for safety.

BUY
a new welder
today and get a
FREE
slag hammer!

welding

MIG welder

welding helmet

stick welder

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are two types of welder?
- 2 What protects a worker's head and face when he or she is welding?

Reading

2 Read the website for a welding supply company. Then, mark the following statements as true (T) or false (F).

- 1 ☐ The TIG welder uses a consumable electrode.
- 2 ☐ The company offers two types of respirators.
- 3 ☐ The plasma cutter protects against flash burn.

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | |
|---------------------------------------|--|
| 1 <input type="checkbox"/> MIG welder | 4 <input type="checkbox"/> gun |
| 2 <input type="checkbox"/> respirator | 5 <input type="checkbox"/> plasma cutter |
| 3 <input type="checkbox"/> TIG welder | 6 <input type="checkbox"/> UV light |

- A a machine for bonding metal surfaces that uses a nonconsumable electrode
- B a machine for bonding metal surfaces that uses a consumable electrode
- C a mask that protects against harmful chemicals
- D the part of a welder that the operator holds when welding
- E a tool for cutting metal using concentrated heat
- F electromagnetic radiation with a wavelength shorter than is humanly visible

- 4 Fill in the blanks with the correct words and phrases from the word bank.

word BANK

stick welder welding helmet torch
collision welding wire feeder

- The welder held the _____ in his hand as he was welding.
- Two cars were damaged in the _____.
- A _____ is more portable than other welders.
- This _____ holds several spools at once.
- _____ was required to fix the steel frame.
- The _____ protected the welder's eyes from UV light.

- 5 Listen and read the website for a welding supply company again. What are the features of a CUTSMAN plasma cutter?

Listening

- 6 Listen to a conversation between a shop owner and a mechanic. Choose the correct answers.

- Why does the woman want new welding equipment?
 - to increase business
 - to improve shop safety
 - to speed up repair times
 - to replace broken equipment
- What will the woman likely do next?
 - place the order
 - repair the MIG welder
 - compare welder prices
 - get a mechanic's opinion



respirator

- 7 Listen again and complete the conversation.

Owner: I'm 1 _____ some new welding equipment.

Mechanic: Really? I like the idea, but what 2 _____?

Owner: We're sending too many collision repair jobs across town. More welding capability would mean 3 _____.

Mechanic: 4 _____. What kind of welders are you considering?

Owner: I think 5 _____ new TIG welder for the main bay, a Stockton.

Mechanic: Those do a 6 _____. But they're harder to use than the MIGs.

Owner: Well, we'll still have the old MIG. And I'm thinking of a 7 _____ too.

Mechanic: That will be handy. Of course, you'll have to get some new safety gear too.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

I think we could use ...
I'm thinking of getting ...
What kind of ...?

Student A: You are a shop owner. Talk to Student B about:

- new welding equipment
- effect of equipment
- equipment he or she wants

Student B: You are a mechanic. Talk to Student A about buying new welding equipment.

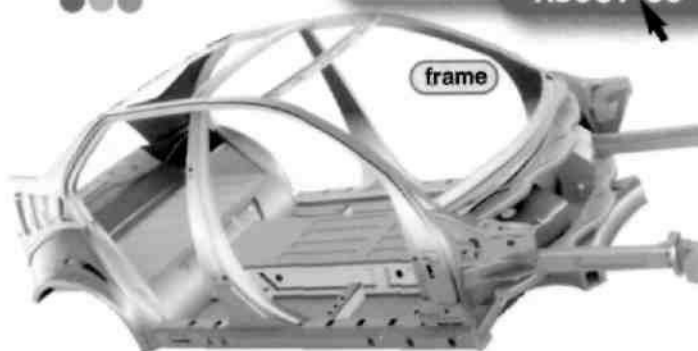
Writing

- 9 Use the website and conversation from Task 8 to write a request for new welding equipment. Include: the equipment you want, your reasons, and what safety items are needed.

11 Frame repair

HOME

ABOUT US



FRAME REPAIR EQUIPMENT SUPPLY



*Providing Quality Alignment
Equipment for over 30 Years!*

FRAME REPAIR is an equipment supply company. We produce and distribute the essential tools for the repair and **alignment** of automobile **frames**. From **frame racks** to **power pullers**, we have what you need at FRAME REPAIR.

What sets us apart from other distributors? For one, we offer more options when it comes to alignment measurement systems. Most companies specialize in only one type. We have them all. For you old-fashioned mechanics out there, we have **mechanical measurement systems**. They are affordable and dependable if you prefer a mechanical system. Our state-of-the-art **electronic measurement systems** are adaptable to the **manufacturer specifications** of almost any vehicle. And our **laser measurement systems** are simply the best on the market.

Our brands of **wheel aligners** cannot be purchased anywhere else. We sell only the most trusted brands of **alignment lifts**. For organizing your shop we have several varieties of **clamp racks**, **hooks**, and **tool boards**. We have been in this business for 33 years and we know our stuff. So for the very best in frame repair equipment, order from FRAME REPAIR today!

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What is a car's frame?
- 2 What tools can be kept on a tool board?

Reading

2 Read the webpage of a frame repair equipment supply company. Then, choose the correct answers.

- 1 What is the purpose of the website?
 - A to describe a business
 - B to explain product prices
 - C to compare equipment brands
 - D to give instructions on frame repair
- 2 Brands of which products are only available at FRAME REPAIR?
 - A tool boards
 - B wheel aligners
 - C laser measurement systems
 - D mechanical measurement systems
- 3 How is this supplier different from other suppliers?
 - A It specializes in frame racks.
 - B It has more sizes of tool boards.
 - C It builds its own wheel aligners.
 - D It offers three types of measurement systems.

Vocabulary

3 Place the words and phrases from the word bank under the correct heading.

word BANK

alignment lift tool board
mechanical measurement system
electronic measurement system
laser measurement system
hook frame rack

Tools to determine proper alignment
Tools to raise vehicles
Tools to hang object

4 Read the sentence pair. Choose where the words best fit the blanks.

1 frame / alignment

- A The car's _____ was bent in the accident.
B Uneven tire wear is a sign of bad _____.

2 clamp / manufacturer specifications

- A The mechanic used a _____ to hold the sheet in place until it was welded.
B Refer to the _____ to see the dimensions.

3 wheel aligner / power puller

- A Sam used a _____ to bend the frame.
B A _____ was needed to balance the steering mechanism.

5 Listen and read the webpage again. How long have FRAME REPAIR been in business?

Listening

6 Listen to a conversation between a mechanic and a supplier. Mark the following statements as true (T) or false (F).

- 1 _____ Mechanical measurement systems are the easiest systems to use.
2 _____ Electronic systems cost more than laser systems.
3 _____ The woman recommends the most accurate system.

7 Listen again and complete the conversation.

- S: It's true. If your budget can afford one, it's worth looking into an electronic or laser system.
M: What's the difference?
S: The laser technology is the most accurate. But it's also the most expensive.
M: Well, 1 _____. Will both systems work for any vehicle?
S: Yes, 2 _____ the vehicle manufacturer specifications.
M: Okay. Now, what about maintenance?
S: With the laser system, you don't 3 _____ but clean it.
M: And the electronic system?
S: You just have to change the batteries occasionally.
M: Hmm. So 4 _____?
S: In your situation? The 5 _____. It's more accurate than a mechanical system, for a lower price than the 6 _____.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

- Will both systems ...?*
What about ...?
Which one would you ...

Student A: You are an equipment supplier. Talk to Student B about:

- measurement systems
- system costs
- system accuracy

Student B: You are a mechanic. Talk to Student A about deciding upon a measurement system.

Writing

9 Use the webpage and conversation from Task 8 to write an equipment supplier's comparison of measurement systems. For each system include: ease of use, cost, and accuracy.

FRAME REPAIR - Equipment Supply

Measurement System

Mechanical: _____

Electronic: _____

Laser: _____



12 Refinishing

MIKE'S AUTO REFINISHING Service Report

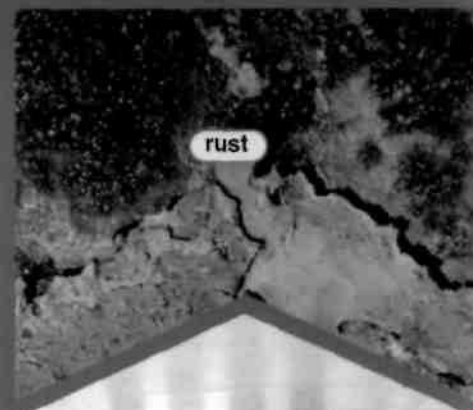
Customer Name: Chad Gordon Date: May 22

Vehicle Make/Model/Year: Tolento Cyclone 2006

Intake notes: The vehicle was in a minor **accident**. There are major **dents** in two passenger-side panels. The front bumper is damaged and will need to be replaced. There are areas of **rust** on the rear bumper, driver-side panels, and hood.

Refinishing Services Provided: Knocked dents out of passenger-side panels. Replaced the front bumper. Cleaned work areas with soap and **degreaser**. Buffed and **sanded** side panels, rear bumper, and hood until **smooth**. Applied **body filler** to damaged side panels, hood, and rear bumper as needed. Applied **masking** tape to all areas not to be **painted** to prevent **overspray**. Applied **primer** to side panels, hood, and rear bumper using **spray gun** No. 7. Applied two coats of Fire Engine Red No. 217 in **spray booth** No. 3.

Materials:	UNIT	PRICE	TOTAL
1/2 can of degreaser		\$5	\$250.00
3 sheets of No. 2 sandpaper		\$1	\$3.00
1 can of RUSSO body filler		\$10	\$10.00
1 roll of masking tape		\$4	\$4.00
3 sheets of masking paper		\$2	\$6.00
1 can of Primex primer		\$40	\$40.00
2 cans of Fire Engine Red paint No. 217		\$60	\$120.00
Labor Hours: 6		\$80	\$480.00
		Total:	\$665.50



Get ready!

- 1 Before you read the passage, talk about these questions.

- Why do cars need to be refinished?
- Where is a car repainted?

Reading

- 2 Read the service report. Then, mark the following statements as true (T) or false (F).

- ☐ The passenger-side panels had rust damage.
- ☐ The mechanic replaced the front bumper.
- ☐ Body filler was not required to repair the hood.

Vocabulary

- 3 Write a word that is similar in meaning to the underlined part.

- The cost of fixing and painting the outer surface of Tom's truck was \$1,200. e _ i _ _ _ _ i _ _
- To paint the limousine, the mechanic drove it into the vehicle painting room. _ _ r _ _ b _ _ t _
- Before painting the motorcycle, Sue applied two coats of preparatory paint-like substance. _ _ i _ m _ r
- Dan sanded the surface of the car until it was evenly textured and free of bumps. _ m _ o _ h
- The car needed to be repainted after the collision with another vehicle. _ c _ i _ _ _ t
- Masking was placed on the tires to prevent inadvertently getting paint on them. _ _ _ _ r _ p _ a _
- When the rock struck the hood of the car it left a concave mark. _ e _ _

MIKE'S AUTO REFINISHING

- 4 Fill in the blanks with the correct words and phrases from the word bank.

word BANK

sand body filler degreaser
paint rust spray gun

- The customer asked us to remove the _____ spots from the door.
- It took Sam one hour to _____ the car red.
- Before repainting the car, he had to _____ off the old paint.
- Toni used a _____ to apply the paint.
- The hole was patched with _____.
- Before you sand the hood, clean off the residual oil with _____.

- 5 Listen and read the service report again. What was the most expensive product used?

Listening

- 6 Listen to a conversation between two mechanics. Choose the correct answers.

- What is the conversation mainly about?
 - A replacing damaged parts
 - B assigning refinishing tasks
 - C assessing damage from an accident
 - D selecting the correct refinishing tools
- What parts are supposed to be masked?
 - A wheels and driver-side panels
 - B driver-side panels and bumpers
 - C wheels and bumpers
 - D driver-side panels

- 7 Listen again and complete the conversation.

- Mechanic 1:** That's right. You're going to 1 _____ and repaint the whole car.
- Mechanic 2:** Okay. But we're repainting the whole thing? 2 _____ the damaged panels?
- Mechanic 1:** Apparently, the customer wants to paint it white. He decided if we'll be painting anyway, he 3 _____ take care of it now.
- Mechanic 2:** That's going to 4 _____ paint.
- Mechanic 1:** It sure is. I want you to use spray booth number one. But 5 _____ knock out those dents.
- Mechanic 2:** Do you think I'll have to 6 _____?
- Mechanic 1:** Probably. Once you're done, use the sander to remove the old paint from the entire vehicle.
- Mechanic 2:** Will do.
- Mechanic 1:** And be sure to 7 _____. You don't want to be inhaling that paint dust.
- Mechanic 2:** All right. Then should I apply the primer?
- Mechanic 1:** Yes. But don't forget to put masking on the wheels and bumpers first.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

First, I need you to ...
But we're repainting ...?
Do you think I'll have to ...?

Student A: You are a mechanic. Talk to Student B about:

- knocking out dents
- painting the vehicle

Student B: You are a mechanic. Talk to Student A about a refinishing job.

Writing

- 9 Use the service report and conversation from Task 8 to write a description of refinishing services provided. Include: work to the body, painting, and materials used.

13 Hybrids



A Bright Future for Hybrids

Just a few years ago, hybrids were viewed with a mix of suspicion and awe. Some saw them as the car of the future. Others worried their **lithium ion batteries** would run out at crucial moments even though they had **generators** on board. In a short time, however, they caught on. Rising gas prices played a part. But so did improvements to their technology.

The first generation of successful hybrids were **parallel hybrids**. With an internal combustion engine that could work alongside the electric motor, the cars were reliable for commutes or long-distance trips. Improvements to their **regenerative braking systems** increased their ability to **charge** on the go, and a **continuously variable transmission** has only added to their appeal.

Today, two new varieties of hybrids give us a glimpse of what's ahead. **Plug-in hybrids** are decreasing the dependency on an internal combustion engine. Another type, the **two-mode hybrid**, takes existing hybrid technology to the next level of efficiency. Both are selling well, which means the industry will almost certainly invest in creating even more powerful and effective hybrid technologies.

Get ready!

① Before you read the passage, talk about these questions.

- 1 How are hybrids different from other cars?
- 2 How popular are hybrid cars in your country?

Reading

② Read the magazine article. Then, choose the correct answers.

- 1 What is the article mostly about?
 - A the evolution of hybrid technologies
 - B consumer responses to plug-in hybrids
 - C comparing two types of hybrids
 - D predicting future demand for hybrids
- 2 What initially worried consumers about hybrids?
 - A limited power
 - B high costs
 - C inefficiency on highways
 - D reliability of batteries
- 3 What will likely happen according the author?
 - A Three-mode hybrids will be developed.
 - B Companies will develop even better hybrids.
 - C More hybrids will result in lower gas prices.
 - D Cars will become completely electric powered.

Vocabulary

③ Check (✓) the sentence that uses the underlined parts correctly.

- 1 — A When you charge a battery, it fills up.
— B A plug-in hybrid uses gasoline.
- 2 — A A lithium ion battery replaces the motor in some cars.
— B Some engines use a generator to make electricity.
- 3 — A A two-mode hybrid has two electrical motors.
— B A hybrid has two different power sources.
- 4 — A A regenerative braking system is electrically powered.
— B A parallel hybrid has an electric motor and an gas-powered engine.

4 Write a word that is similar in meaning to the underlined part.

- 1 A partially electrically-powered car with a plug obtains electricity from a wall socket. _ l _ _ _ n _ _ b _ _ _
- 2 Some vehicles use a(n) electrical storage device to provide electrical power. _ i _ _ _ u _ _ _ n _ _ t _ _ _
- 3 Most hybrids use brakes that collect energy.
_ _ g _ _ _ _ t _ _ _ _ r _ _ _ _ _ s _ _ _
- 4 An electric and gasoline powered vehicle is most efficient when driving at higher speeds.
_ _ o - m _ _ _ _ _ _ _ _ d

5 Listen and read the magazine article again. What must the industry do to improve hybrid vehicles?

Listening

6 Listen to a conversation between a salesman and a customer. Mark the following statements as true (T) or false (F).

- 1 _ The woman confuses two-mode and plug-in hybrids.
- 2 _ Two-mode hybrids do not require gasoline for highway driving.
- 3 _ The man will show the woman a plug-in model.

7 Listen again and complete the conversation.

Customer: I've heard about the two-mode hybrids that you can plug in at home.

Salesman: Actually, that's not correct. What you are referring to is called a plug-in hybrid.

Customer: Oh, then what's a 1 _____?

Salesman: Its engine and 2 _____ work together to increase efficiency at high speeds.

Customer: Interesting. I didn't know that. I always thought hybrids just ran on gasoline when driving 3 _____.

Salesman: Not the new two-mode hybrids.

Customer: Hmm. Now you mentioned the 4 _____ . What about those?

Salesman: Their key selling point is that you can charge the battery by plugging it in.

Customer: So you 5 _____ buy gas?

Salesman: That depends on how much you drive. I've heard of some drivers getting around town 6 _____ the electric motor.

Speaking

8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Actually, that's not correct ...
Their key selling point is ...
So you don't ...?

Student A: You are a salesperson. Talk to Student B about:

- pros and cons of plug-in hybrids
- pros and cons of two-mode hybrids
- models you have available

Student B: You are a car buyer. Talk to Student A about hybrids.

Writing

9 Use the article and conversation from Task 8 to write a comparison of hybrid models. Include information on: engines, efficiency, and power sources.



14 Electric cars



solar panel

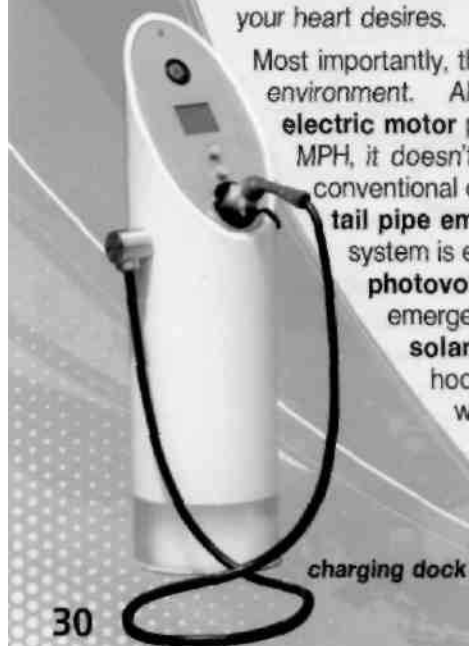
Planetary Motors is proud to introduce its first electric car,

THE ISOTOPE.

The Isotope is an Earth-friendly car that can save you money and reduce your carbon footprint. When you drive the Isotope, there's no need to stop for gas. The **onboard charger** lets you power up at your home **charging dock** for less than \$2 per charge. Just plug an electric cord into the **charging port** and you're good to go.

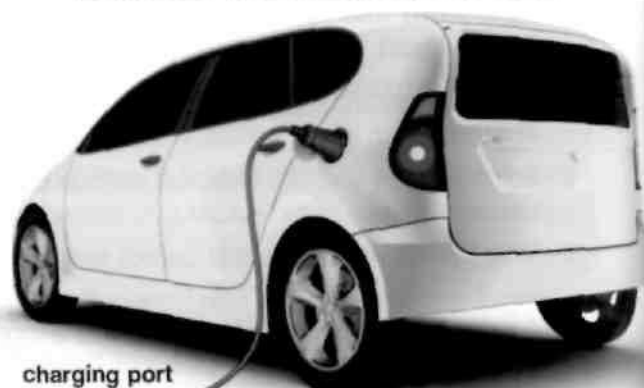
With the Isotope, you can complete your commute to work and errands without needing a drop of gas. Isotope has a **range** of 100 miles per charge, so there's no need to worry about reaching your destination. And Planetary Motors is developing a network of national **charging stations**. Soon you will be able to drive and recharge wherever your heart desires.

Most importantly, the Isotope is safe for the environment. Although the Isotope's **electric motor** provides speeds up to 90 MPH, it doesn't harm our planet. Unlike conventional cars, the Isotope has zero **tail pipe emissions**. Even its backup system is eco-friendly. The Isotope's **photovoltaic** system charges the emergency battery through small **solar panels** located on the hood. So, what are you waiting for? Come check out the Isotope and see what zero emission driving can be.



charging dock

THE ISOTOPE.



charging port

Get ready!

1 Before you read the passage, talk about these questions.

- 1 How are electric cars powered?
- 2 What do people think of electric cars in your country?

Reading

2 Read the advertisement for a new electric car. Then, mark the following statements as true (T) or false (F).

- 1 ☐ Isotope owners can install a charging dock at home.
- 2 ☐ Planetary Motors recently completed a system of charging stations.
- 3 ☐ The photovoltaic system powers the electric motor.

Vocabulary

3 Match the words (1-5) with the definitions (A-E).

- 1 ☐ onboard charger
 - 2 ☐ range
 - 3 ☐ solar panel
 - 4 ☐ tail pipe emissions
 - 5 ☐ charging station
- A the gases produced by an engine
 B the distance a car can travel on one charge
 C a device that changes sunlight into electricity
 D a business that provides electricity for cars
 E the device on the car that supplies power to the battery

- 4 Fill in the blanks with the correct words and phrases from the word bank.

word BANK

charging dock electric car
miles per charge
photovoltaic charging port

- 1 The range of John's new car is 50 _____.
- 2 To charge the battery, Mary plugged the power cord into the _____.
- 3 Solar panels are part of a(n) _____ system.
- 4 Mike had a(n) _____ installed in his house so that he can charge his car at home.
- 5 Fred's _____ produces zero tail pipe emissions.

- 5 Listen and read the advertisement for a new electrical car again. What is the car's top speed?

Listening

- 6 Listen to a conversation between two mechanics. Choose the correct answers.

- 1 Why does the car need to be serviced?
 - A the solar panel is broken
 - B it takes too long to charge
 - C the car is not holding a charge
 - D it only goes 50 miles per charge
- 2 What will the man most likely do next?
 - A replace the battery
 - B locate the charging port
 - C turn on the charging station
 - D check the photovoltaic system

- 7 Listen again and complete the conversation.

- Mechanic 2:** Oh, yeah? I've never 1 _____.
But I'm not sure I like those cars.
- Mechanic 1:** 2 _____? I mean, they're really good for the environment.
- Mechanic 2:** Maybe. But you can only drive, what, fifty miles 3 _____?
- Mechanic 1:** Actually, 4 _____. This model has a 100 mile range.
- Mechanic 2:** Hmm. But still, there's nowhere to charge them if it 5 _____.
- Mechanic 1:** That's changing, though. Charging stations are 6 _____.
- Mechanic 2:** Yeah, I guess that's true, too. I guess we'll be seeing more of them in the shop, won't we?
- Mechanic 1:** Absolutely. That's why you need to 7 _____ today.
- Mechanic 2:** Will do. So, what's the problem with this one?
- Mechanic 1:** It's not holding a charge. We have to check 8 _____.
- Mechanic 2:** Okay. Where do we start?
- Mechanic 1:** Let's start at the charging port. Let me show you where it is.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

I'm not sure I like those cars.
Actually, that's not true.
We have to check the ...

Student A: You are a mechanic. Talk to Student B about:

- doubts about electric cars
- popularity of electric cars
- problems with an electric car

Student B: You are a mechanic. Talk to Student A about electric cars.

Writing

- 9 Use the advertisement and conversation from Task 8 to write an advertisement for an electric car. Include: environmental benefits, range, and charging options.

15 Troubleshooting problems

CHAPTER 10:

FIX-IT-AT-HOME: CARS

Troubleshooting Problems

These days, mechanics can just plug into a **Data Link Connector (DLC)** to find out what's wrong with a car. An **on-board diagnostic (OBD) system** displays a code that tells mechanics what circuit is malfunctioning. But most of us don't have that equipment, and so we have to **troubleshoot** problems by the evidence we find.

Leaks usually mean trouble. But what kind of trouble depends on the liquid you find. **Greasy** substances suggest an oil leak, but **slippery** yellow or blue liquids point to a coolant leak. Of course, if the leak is **watery** and below the air conditioner, it may just be normal **condensation**.

Smoke can indicate several problems, depending on its color. Black smoke in cars with carburetors suggests a bad air and fuel mix, but blue smoke means the engine is burning oil. A white **vapor** may be evidence of coolant getting into the engine.

Smells and sounds are important, too. Smells like **burning** rubber? A belt might be melting. Is the smell **acidic**? You may be burning oil. If you hear a **squeal** when you start your engine, a belt might need adjustment, but a hiss could mean your radiator has a leak. A **rattle** could be anything from a loose screw to a dashboard component.

But what you feel while driving can diagnose trouble, too. If your car **pulls**, your alignment could be off. If it **vibrates**, your tires may need balancing.



Get ready!

- 1 Before you read the passage, talk about these questions.

- 1 What problems can affect a car?
- 2 Which part of a car produces smoke when there is a problem?

Reading

- 2 Read the chapter on troubleshooting auto problems. Then, mark the following statements as true (T) or false (F).

- 1 ☐ A yellow leak likely comes from the air conditioner.
- 2 ☐ Burning oil creates a blue colored smoke.
- 3 ☐ Leaking radiators cause rattling sounds.

Vocabulary

- 3 Match the words (1-8) with the definitions (A-H).

- | | |
|------------------------------------|-----------------------------------|
| 1 <input type="checkbox"/> squeal | 5 <input type="checkbox"/> pull |
| 2 <input type="checkbox"/> smoke | 6 <input type="checkbox"/> greasy |
| 3 <input type="checkbox"/> vapor | 7 <input type="checkbox"/> watery |
| 4 <input type="checkbox"/> vibrate | 8 <input type="checkbox"/> acidic |

- A to move in a certain direction
B a long, high-pitched sound
C to shake rapidly
D being clear and thin
E being harsh and irritating
F a cloud that indicates burning
G a collection of liquid particles in the air
H being covered in a layer of oil

- 4 Fill in the blanks with the correct words and phrases from the word bank.

Word Bank

DLC OBD system
troubleshoot condensation
slippery burning rattle

- 1 Plug into the _____ to find out what's wrong.
- 2 The _____ was caused by a loose screw.
- 3 Transmission fluid is very _____.
- 4 Mechanics can _____ problems by observing a car.
- 5 The _____ displays what is wrong with the car.
- 6 _____ often occurs beneath air conditioners.
- 7 We smelled _____ when the hose rested against the hot radiator.

- 5 Listen and read the chapter on troubleshooting auto problems again. What will an engine with the wrong mixture of gas and air do?

Listening

- 6 Listen to a conversation between two mechanics. Choose the correct answers.

- 1 What signs of trouble does the car show?
A It is leaking a yellow, slippery fluid.
B It is vibrating and pulling to the left.
C It is emitting blue smoke and acrid smells.
D It is making a squeal after the engine stops.
- 2 What does the woman believe is wrong?
A The engine is burning oil.
B There is a damaged hose.
C A belt needs to be adjusted.
D The transmission fluid is burning.

- 7 Listen again and complete the conversation.

Mechanic 2: Ah, too bad. So what do we know?
Mechanic 1: The 1 _____ after it's been on for a while.
Mechanic 2: Okay, is the smoke 2 _____?
Mechanic 1: It's pretty light.
Mechanic 2: Hmm. If it's light gray, it might be 3 _____. But if it's more of a blue color, it could be oil.
Mechanic 1: It's definitely more of a blue.
Mechanic 2: 4 _____ a smell?
Mechanic 1: Yeah, it's 5 _____, too.
Mechanic 2: I'd say you've got an 6 _____, then.

Speaking

- 8 With a partner, act out the roles below based on Task 7. Then switch roles.

USE LANGUAGE SUCH AS:

What do we know?

Is the ...

If it's ..., it might be ...

Student A: You are a mechanic. Talk to Student B about:

- identifying a car's problem
- evidence that can be seen or felt
- evidence that can be heard or smelled

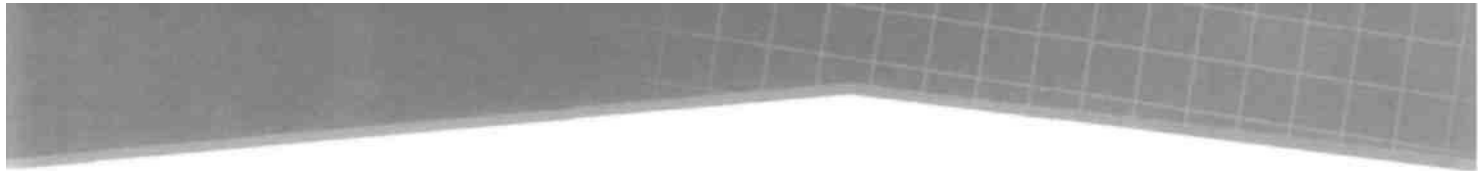
Student B: You are a mechanic. Ask Student A for help troubleshooting a car's problem.

Writing

- 9 Use the chapter and conversation from Task 8 to write a summary of a car's problems for the owner. Include: the evidence of the problem, the likely cause, and what repairs are needed.

Glossary

- AC** [N-UNCOUNT-U1] **AC (Alternating Current)** is a flow of electric current that changes directions very quickly and at regular intervals.
- accident** [N-COUNT-U12] An **accident** is an unintended event, such as the collision of a vehicle with another vehicle or object.
- acrid** [ADJ-U15] If something is **acrid**, its smell burns or irritates one's nose.
- air conditioner** [N-COUNT-U7] An **air conditioner** is a device that removes heat from indoor air and replaces it with cool air.
- air conditioning** [N-UNCOUNT-U7] **Air conditioning** is a system which removes heat from indoor air and replaces it with cool air.
- air duct** [N-COUNT-U6] An **air duct** is a pipe that is used to move air from one area to another.
- air handler** [N-COUNT-U6] An **air handler** is a box that conditions air and blows it through ducts to ventilate a building.
- air quality** [N-UNCOUNT-U6] **Air quality** is a measure of the pollutants present in the air in a particular area.
- alignment** [N-UNCOUNT-U11] **Alignment** is the adjustment of wheels, axles, and steering mechanisms with respect to the frame of an automobile such that the vehicle works properly, and tires wear evenly.
- alignment lift** [N-COUNT-U11] An **alignment lift** is an automotive lift platform with integrated alignment equipment that raises a vehicle above the ground so that its alignment can be measured and adjusted.
- amp** [N-COUNT-U1] An **amp** is a unit used in measuring the strength of the flow of electricity.
- analyze** [V-T-U9] To **analyze** something is to determine the nature of something by looking at it very carefully.
- anti-static wristband** [N-COUNT-U2] An **anti-static wristband** is a small device worn on the wrist to prevent a person from discharging static electricity when working on sensitive devices.
- backhoe** [N-COUNT-U9] A **backhoe** is a machine with a large machine-powered bucket that is used to scoop up and move dirt and other materials.
- baler** [N-COUNT-U8] A **baler** is a farm machine that presses loads of a particular crop tightly together.
- battery tender** [N-COUNT-U4] A **battery tender** is a device that charges a battery, while ensuring the battery does not overcharge.
- belt drive** [N-COUNT-U3] A **belt drive** is type of drive train that uses a belt to transfer power from the engine to the rear wheel.
- blade** [N-COUNT-U9] A **blade** is a flat or curved piece of metal on the front of a bulldozer used for pushing large amounts of material.
- blade connector** [N-COUNT-U2] A **blade connector** is a flat blade-like connector that is inserted into a blade receptacle.
- blower** [N-COUNT-U6] A **blower** is a part of a ventilation system that pushes air into a desired area.
- body filler** [N-UNCOUNT-U12] **Body filler** is a substance used to cover imperfections and patch holes in the body of a vehicle before it is painted.
- boiler** [N-COUNT-U5] A **boiler** is a type of furnace that contains hot water.
- bulldozer** [N-COUNT-U9] A **bulldozer** is a large vehicle with a machine-powered metal blade that is used to move large amounts of dirt, rocks or other material.
- burning** [ADJ-U15] If something is **burning** it is on fire.
- capacitance** [N-UNCOUNT-U1] **Capacitance** is the amount of electric charge a body can hold.
- central heat** [N-UNCOUNT-U5] **Central heat** is a system for warming a building that distributes heat through pipes from a central furnace.
- chain drive** [N-COUNT-U3] A **chain drive** is type of drive train that uses a chain and sprockets to transfer power from the engine to the rear wheel.
- chain guide** [N-COUNT-U4] A **chain guide** is a cover that leads a motorcycle chain to the sprocket.
- chain tension** [N-UNCOUNT-U4] **Chain tension** is how tight or loose a motorcycle chain is.
- chain wear** [N-UNCOUNT-U4] **Chain wear** is damage to a motorcycle chain that leaves the chain worn down and weakened.



channel lock pliers [N-COUNT-U2] **Channel lock pliers** are a small hand-held gripping tool that can be adjusted to grip objects of different widths.

charge [V-T-U13] To **charge** something is to provide it with a store of electrical power.

charging dock [N-COUNT-U14] A **charging dock** is a device that electric cars are connected to in order to renew the electricity in the battery.

charging port [N-COUNT-U14] A **charging port** is the connection where the electric car is attached to the power source.

charging station [N-COUNT-U14] A **charging station** is a business that supplies electricity for recharging electric cars.

circuit [N-COUNT-U1] A **circuit** is the complete path that an electric current flows around.

circuitry [N-UNCOUNT-U1] A **circuitry** is a system of circuits that an electric current flows around.

clamp [N-COUNT-U11] A **clamp** is a metal fastener that holds something in position using a bolt mechanism.

clutch lever [N-COUNT-U3] A **clutch lever** is a part that a motorcycle driver presses to be able to change gears.

coaxial connector [N-COUNT-U2] A **coaxial connector** is a type of wire used for connecting cable television and for computer networks.

collision [N-COUNT-U10] A **collision** is when two things run into each other.

condensation [N-UNCOUNT-U15] **Condensation** is the formation of liquid from a vapor.

condenser [N-COUNT-U7] A **condenser** is a device that changes gas to liquids or solids.

conductivity [N-UNCOUNT-U1] **Conductivity** is the degree to which a substance can permit the flow of electricity.

conductor [N-COUNT-U1] A **conductor** is an object or substance that permits the flow of electricity through something.

continuity detector [N-COUNT-U2] A **continuity detector** is small hand-held tool used to check if a wire carries current.

continuous track [N-COUNT-U8] A **continuous track** is a metal belt attached to a vehicle that is propelled along the ground by two wheels in order to move the vehicle.

continuously variable transmission [N-UNCOUNT-U13] A **continuously variable transmission** is a transmission system that lacks fixed gears and can change into an infinite number of gear ratios.

crane [N-COUNT-U9] A **crane** is a machine with a long arm that is used to move large or heavy objects.

crimper [N-COUNT-U2] A **crimper** is a small hand-held tool used to bend the end of a wire into a connector.

current [N-COUNT-U1] A **current** is a flow of electrical charge.

damper [N-COUNT-U6] A **damper** is a valve that controls the flow of air through a duct.

data link connector [N-COUNT-U15] A **data link connector (DLC)** is a slot into which mechanics can plug in to receive information on a car's systems.

DC [N-UNCOUNT-U1] **DC (Direct Current)** is a flow of electric current that always moves in the same direction.

degreaser [N-UNCOUNT-U12] **Degreaser** is a chemical solution used to break down grease in cleaning and working on engine and vehicle parts.

dent [N-COUNT-U12] A **dent** is a concave imperfection in the surface of something usually caused by a collision with something else.

deposit [N-COUNT-U4] A **deposit** is a solid substance that forms in improperly stored fuel.

diagnostic equipment [N-UNCOUNT-U8] **Diagnostic equipment** is computerized equipment that is used to determine the cause of machine problems without requiring the machine to be disassembled.

dismantle [V-T-U9] To **dismantle** something is to separate the parts of something.

electric car [N-COUNT-U14] An **electric car** is an automobile that is powered by electricity.

electric motor [N-COUNT-U14] An **electric motor** is a device that changes electrical energy into power that is used to move a car.

electricity [N-UNCOUNT-U1] **Electricity** is a form of energy based on the transfer of electrons.

electronic measurement system [N-COUNT-U11] An **electronic measurement system** is a network of devices used to determine the proper alignment of a vehicle through a reading of electronic pulses.

evaporative cooler [N-COUNT-U7] An **evaporative cooler** is a system that cools the air through water evaporation.

excavator [N-COUNT-U9] An **excavator** is a machine that is used to dig large holes.

Glossary

- excessive** [ADJ-U4] If something is **excessive**, it is more than what is usual or expected.
- fan coil unit** [N-COUNT-U6] A **fan coil unit** is a device that controls the temperature in a room or small space without the use of ducts. The unit contains a heating or cooling mechanism and a fan to distribute the air.
- farmer** [N-COUNT-U8] A **farmer** is a person who operates or works on a farm.
- filter** [N-COUNT-U6] A **filter** is a part of a ventilation system that cleans air by catching particles of dirt and dust as the air passes through.
- fish tape** [N-UNCOUNT-U2] **Fish tape** is a band of spring steel used to guide wire through a wall.
- flashlight** [N-COUNT-U2] A **flashlight** is a small hand-held tool used to shine a beam of light.
- float bowl** [N-COUNT-U4] A **float bowl** is a compartment in a carburetor into which fuel is pumped for immediate use by the engine.
- fork tube** [N-COUNT-U3] **Fork tubes** are a pair of tubes forming the motorcycle's front suspension and connecting the front wheel to the frame.
- frame** [N-COUNT-U11] A **frame** is the main skeleton of an automobile, to which the engine, wheels and body are attached.
- frame** [N-COUNT-U3] A **frame** is the body of a motorcycle to which all other main parts are attached.
- frame rack** [N-COUNT-U11] A **frame rack** is an automotive lift to raise a vehicle above the ground so that it can be more easily worked on.
- fuel contamination** [N-UNCOUNT-U4] **Fuel contamination** is the process in which improperly stored fuel is spoiled as deposits and varnish form.
- fuel stabilizer** [N-COUNT-U4] A **fuel stabilizer** is an additive that prevents fuel from becoming stale and leaving deposits.
- fuel tank** [N-COUNT-U3] A **fuel tank** is the part of the motorcycle that stores fuel used by the engine.
- furnace** [N-COUNT-U5] A **furnace** is a container that produces heat.
- gas heater** [N-COUNT-U5] A **gas heater** is a type of furnace that produces heat by burning gas.
- generator** [N-COUNT-U13] A **generator** is a machine that makes electricity.
- give out** [V-PHRASAL-U4] If a piece of equipment **gives out**, it breaks or becomes unusable.
- grader** [N-COUNT-U9] A **grader** is a machine that is used to create a particular slope along the ground's surface.
- greasy** [ADJ-U15] If something is **greasy**, it has a layer of oil or similar substance on it.
- gun** [N-COUNT-U10] A **gun** is the part of a welding torch that is held during welding.
- handlebars** [N-COUNT-U3] **Handlebars** are a bar with grips on the ends used to steer a motorcycle.
- harvester** [N-COUNT-U8] A **harvester** is a farm machine that collects a crop from where the crop is grown.
- heat** [N-UNCOUNT-U7] **Heat** is the amount of warmth an object has.
- heat exchanging pipes** [N-COUNT-U7] **Heat exchanging pipes** are tubes used in cooling systems to move hot and cold gases in and out of the system.
- heating system** [N-COUNT-U5] A **heating system** is a utility for making and keeping a building warm.
- high voltage connector** [N-COUNT-U2] A **high voltage connector** is a connector wire used for voltages above 500V.
- hook** [N-COUNT-U11] A **hook** is a curved or bent piece of metal, such as those attached to a tool board, on which tools can be hung.
- humidity** [N-UNCOUNT-U6] **Humidity** is the amount of moisture that is present in the air.
- hybrid** [N-COUNT-U13] A **hybrid** is a vehicle that has both an electric motor and a gasoline or diesel engine.
- hydraulic pump** [N-COUNT-U8] A **hydraulic pump** is a pump that uses energy from flowing water to create power.
- hydraulic shears** [N-COUNT-U9] **Hydraulic shears** are a tool powered by hydraulics that are used to cut through metal.
- hydraulics** [N-UNCOUNT-U8] **Hydraulics** is the science of using water or other liquids to create power or movement.
- ice machine** [N-COUNT-U7] An **ice machine** is a device that freezes water into ice.
- inflate** [V-T-U4] To **inflate** a tire is to force air into it.
- install** [V-T-U5] To **install** something is to put or attach something in a particular place.
- insulator** [N-COUNT-U1] An **insulator** is an object or substance that stops electricity from passing through something.
- irrigation system** [N-COUNT-U8] An **irrigation system** is a process for distributing water to farmland.

laser measurement system [N-COUNT-U11] A **laser measurement system** is a set of devices used to determine proper alignment of a vehicle using lasers.

lithium ion battery [N-COUNT-U13] A **lithium ion battery** is a type of rechargeable electrical storage device used on many hybrids.

magnetism [N-UNCOUNT-U1] **Magnetism** is the motion of electric charge that results in attracting and repulsing forces between objects.

maintain [V-T-U5] To **maintain** something is to keep something working properly, often by regularly repairing or replacing parts.

manufacturer specifications [N-COUNT-U11] **Manufacturer specifications** are the details, dimensions, and compatibility characteristics of a machine or part as published by the manufacturer.

masking [N-UNCOUNT-U12] **Masking** is material placed over surfaces adjacent to those being painted in order to protect them from overspray.

mechanical exhaust [N-COUNT-U6] A **mechanical exhaust** is a system for removing odors or moisture from the air in a particular space.

mechanical measurement system [N-COUNT-U11] A **mechanical measurement system** is a set of devices used to determine proper alignment of a vehicle using measurements of physical dimensions and positions.

MIG welder [N-COUNT-U10] An **MIG welder** is a machine that uses a power source to feed inert gas and a wire electrode through a welding gun to perform metal inert gas welding.

miles per charge [N-COUNT-U14] **Miles per charge** is the number of miles a driver can expect to drive an electric car, when the battery is full of electrical power.

motorcycle [N-COUNT-U3] A **motorcycle** is a two-wheeled mechanized vehicle.

multimeter [N-COUNT-U2] A **multimeter** is small hand-held device used to measure voltage, current, and resistance.

ohm [N-COUNT-U1] An **ohm** is a unit used in measuring electrical resistance.

oil-fired [ADJ-U5] If something is **oil-fired**, it produces heat by burning oil.

onboard charger [N-COUNT-U14] An **onboard charger** is a device built into an electric car that supplies electricity to the battery to fill it with power.

on-board diagnostic system [N-COUNT-U15] An **on-board diagnostic system** is a computer program that monitors a car's systems and reports malfunctions.

on-site [ADJ-U9] If something is **on-site**, it is at the place where normal business happens.

overspray [N-UNCOUNT-U12] **Overspray** is the unintended application of paint to surfaces other than those being painted.

package unit [N-COUNT-U6] A **package unit** is an air conditioner with its evaporator coil and condensing mechanism combined into one unit that is installed indoors.

paint [V-T-U12] To **paint** something is to cover its surface with a colored substance such as paint, in order to protect it and affect its appearance.

parallel hybrid [N-COUNT-U13] A **parallel hybrid** is a type of hybrid vehicle in which the gasoline engine and electric motor can be used at the same time or separately to power the vehicle.

paving machine [N-COUNT-U9] A **paving machine** is a machine that is used to lay asphalt or concrete along the ground.

photovoltaic [ADJ-U14] If a device is **photovoltaic**, it is able to produce electricity when exposed to light such as the sun.

planter [N-COUNT-U8] A **planter** is a farm machine that is used to put seeds in the ground.

plasma cutter [N-COUNT-U10] A **plasma cutter** is a tool for cutting metal by using intensely concentrated heat.

plug-in hybrid [N-COUNT-U13] A **plug-in hybrid** is a type of hybrid vehicle that can be plugged into an electrical socket to charge its battery and has increased electrical storage capacity.

pollutant [N-COUNT-U6] A **pollutant** is a substance that causes something, such as air, to be dirty or unsafe.

power puller [N-COUNT-U11] A **power puller** is a machine for pushing and pulling an auto frame, wheels and or steering apparatus when doing alignment or frame repair.

primer [N-UNCOUNT-U12] **Primer** is a substance applied to a surface before it is painted to improve the adhesion of the paint and better protect the surface being painted.

Glossary

- pull** [V-I-U15] To **pull** is to move in a direction without being intentionally steered that way.
- pump** [N-COUNT-U5] A **pump** is a device that moves heat from one area to another.
- radiator** [N-COUNT-U5] A **radiator** is a device that produces heat when hot water or steam circulates through its pipes.
- range** [N-COUNT-U14] A **range** is the estimated distance an electric car can travel on one complete battery charge.
- rattle** [N-COUNT-U15] A **rattle** is a series of hard sounds.
- reassemble** [V-T-U9] To **reassemble** something is to put the parts of something together after it has been dismantled.
- refinish** [V-T-U12] To **refinish** something is to repair its outer surface and aspects of its appearance including paint.
- refrigerant** [N-COUNT-U7] A **refrigerant** is a liquid used in cooling systems. As it evaporates, heat is reduced and the air gets cooler.
- refrigeration** [N-UNCOUNT-U7] **Refrigeration** is a process that is used to cool or freeze something.
- refrigerator** [N-COUNT-U7] A **refrigerator** is an appliance or room that keeps food or other items cold.
- regenerative braking system** [N-COUNT-U13] A **regenerative braking system** is a braking system that recovers energy generated during braking and stores it for use in the electric motor.
- repair** [V-T-U5] To **repair** something is to make something work properly, especially after it has been broken.
- resistance** [N-UNCOUNT-U1] **Resistance** is the power of something to stop the flow of electricity.
- respirator** [N-COUNT-U10] A **respirator** is a mask designed to prevent its wearer from inhaling harmful chemicals.
- ring terminal** [N-COUNT-U2] A **ring terminal** is a flat metal ring-shaped connector through which a screw is passed.
- ripper** [N-COUNT-U9] A **ripper** is a part of a bulldozer that is used to break up hard material.
- rust** [N-UNCOUNT-U12] **Rust** is any number of iron oxides, often reddish in color, that form as iron or steel corrodes in the presence of oxygen and water.
- sand** [V-T-U12] To **sand** something is to rub a surface with abrasive sand paper in order to make it smooth.
- service life** [N-COUNT-U8] A **service life** is the period of time that a machine is expected to be functional before it wears out or becomes too old to use.
- shaft drive** [N-COUNT-U3] A **shaft drive** is type of drive train that uses a shaft to transfer power from the engine to the rear wheel.
- shift lever** [N-COUNT-U3] A **shift lever** is a part that a motorcycle driver presses to change gears.
- shock absorber** [N-COUNT-U3] A **shock absorber** is a part of the rear suspension of a motorcycle, that dampens the effects of driving on an uneven road surface.
- side stand** [N-COUNT-U3] A **side stand** is a metal leg that pivots down from the side of a motorcycle and is used to prop up the motorcycle when not in use.
- side-cutting pliers** [N-COUNT-U2] **Side-cutting pliers** are a small hand-held tool used to make a diagonal cut in a wire.
- slag** [N-UNCOUNT-U10] **Slag** is molten metal or metal residue that solidifies around a joint after welding.
- slippery** [ADJ-U15] If something is **slippery**, it has little friction and items slide over it easily.
- smoke** [N-UNCOUNT-U15] **Smoke** is a cloud of particles produced when something burns.
- smooth** [ADJ-U12] If something is **smooth**, it is of an even and uniform texture without bumps.
- solar panel** [N-COUNT-U14] A **solar panel** is a device that can convert the sun's light into electrical energy.
- soldering iron** [N-COUNT-U2] A **soldering iron** is a small hand-held tool used to melt metal to connect wires together or to surfaces.
- spade terminal** [N-COUNT-U2] A **spade terminal** is a two-pronged flat metal connector through which a screw is passed.
- spray booth** [N-COUNT-U12] A **spray booth** is a room with ventilation and paint nozzles built into the walls and or ceiling so that paint can be applied to a vehicle driven into the room.
- split system** [N-COUNT-U6] A **split system** is an air conditioner with its evaporator coil indoors and its condensing mechanism outdoors.
- spray gun** [N-COUNT-U12] A **spray gun** is the nozzle for applying paint to automobiles.
- sprocket teeth** [N-PL-U4] **Sprocket teeth** are the points on a sprocket that grab the chain and transfer energy to the wheel.

squeal [N-COUNT-U15] A **squeal** is a long, high-pitched sound.

stale gas [N-UNCOUNT-U4] **Stale gas** is fuel that has formed deposits and varnish.

stick welder [N-COUNT-U10] A **stick welder** is a simple type of welder that joins metal by striking an arch between a consumable electrode and the work piece.

swingarm [N-COUNT-U3] A **swingarm** is a part of the rear suspension of a motorcycle, that connects the rear wheel to a motorcycle's frame, and pivots vertically to absorb shock.

tail pipe emissions [N-COUNT-U14] **Tail pipe emissions** are gases that are produced by a gasoline- or diesel-powered engine. The tail pipe is the tube at the back of the car that carries the emissions away from the engine.

thermostat [N-COUNT-U5] A **thermostat** is a device that adjusts the amount of heat in a room according to a desired temperature setting.

throttle [N-COUNT-U3] A **throttle** is a device that a driver uses to control the amount of fuel sent to a motorcycle's engine.

TIG welder [N-COUNT-U10] A **TIG welder** is a machine that uses a constant current power source, a nonconsumable tungsten electrode, and inert gas to bond metals such as stainless steel, aluminum, magnesium, and copper alloys.

tiller [N-COUNT-U8] A **tiller** is a farm machine that prepares the ground for growing crops.

tire wear [N-UNCOUNT-U4] **Tire wear** is the process in which tires lose their outer layers of rubber.

tool board [N-COUNT-U11] A **tool board** is a specially designed board with hooks on which to hang automotive tools.

torch [N-COUNT-U10] A **torch** is the part of a welder that is held in the hand during welding. It includes a control switch, a contact tip, a gas nozzle, an electrode conduit, and a gas hose.

tractor [N-COUNT-U8] A **tractor** is a machine that pulls equipment on a farm.

triple tree [N-COUNT-U3] A **triple tree** is a part that holds the two fork tubes together.

troubleshoot [V-T-U15] To **troubleshoot** a problem is to evaluate evidence in order to identify and solve it.

two-mode hybrid [N-COUNT-U13] A **two-mode hybrid** is a type of hybrid that operates like a parallel hybrid at low speeds and at higher speeds uses both a motor and an engine to maximize efficiency.

unit ventilator [N-COUNT-U6] A **unit ventilator** is a type of fan coil unit that is mounted on a wall or window and draws air from outside the room.

UV light [N-UNCOUNT-U10] **UV (ultra violet) light** is electromagnetic radiation invisible to humans, with a wavelength slightly shorter than that of the visible color violet. It is produced during welding and can be harmful to the skin and eyes.

vapor [N-UNCOUNT-U15] **Vapor** is a visible cloud or collection of liquid particles in the air.

varnish [N-UNCOUNT-U4] **Varnish** is a substance that is left behind when gasoline evaporates and degrades.

ventilation [N-UNCOUNT-U6] **Ventilation** is the process of letting fresh air flow through an area such as a room or building.

vibrate [V-I-U15] To **vibrate** is to shake rapidly.

voltage [N-COUNT-U1] A **voltage** is a measurement of the power in an electric current.

voltage connector [N-COUNT-U2] A **voltage connector** is a small device used to connect two or more electrical wires.

walk-in cooler [N-COUNT-U7] A **walk-in cooler** is a room-sized space equipped with a cooling system that is used to keep food cold.

water heater [N-COUNT-U5] A **water heater** is a container that stores and heats water.

watery [ADJ-U15] If a liquid is **watery**, it is thin and clear.

welding [N-UNCOUNT-U10] **Welding** is the bonding of two metal surfaces by melting or compressing them together.

welding helmet [N-COUNT-U10] A **welding helmet** is a protective hood worn over the face and head during welding to prevent exposure of the skin and eyes to excessive heat, sparks, and ultraviolet light.

wheel aligner [N-COUNT-U11] A **wheel aligner** is a machine for measuring various aspects of a vehicle's wheels, frame, and axles in order to determine proper alignment.

wire [N-COUNT-U2] A **wire** is long, thin, cylindrical piece of metal (often with a protective coating) used to carry electricity.

wire feeder [N-COUNT-U10] A **wire feeder** is a machine that provides smooth wire feed for certain welding applications.

wire stripper [N-COUNT-U2] A **wire stripper** is a small hand-held tool used to remove the outer covering of a wire.



Mechanics

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