

**CAREER
PATHS**

Electrician[⚡]

Virginia Evans

Jenny Dooley

Tres O'Dell




PROSVESHCHENIYE
PUBLISHERS



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Scope and sequence

Unit	Topic	Reading context	Vocabulary	Function
1	General tools	Company manual	tool kit, side cutters, long nose (needle nose) pliers, diagonal cutters, end cutting pliers, wire strippers, screwdriver, flashlight, utility knife, measuring tape	Stating a preference
2	More tools	Web forum	allen wrench, torque wrench, tool belt, electrical tape, duct tape, hammer, nut driver, crimper, socket wrench, hacksaw, Phillips screwdriver	Asking for something
3	Power tools - drills and saws	Catalog page	drill, drill bit, spade bit, auger bit, wood auger, hole saw bit, twist bit, circular saw, reciprocating saw, jigsaw	Stating an opinion
4	Specialized tools	Company webpage	conduit bender, fish tape, multimeter, plug-in analyzer, stepped drill bit, level, labeling machine, lineman's pliers, hammer drill, stud punch, masonry drill bit	Thanking someone
5	Materials	Trade magazine article	mortar, stone, block, brick, wood, plywood, steel, concrete, drywall, copper, rotary drill, rotary hammer, cement, plaster	Asking for advice
6	Safety	Safety poster	safety glasses, steel toe boots, leather gloves, electrical hot gloves, rubber mat, arc shield, hard hat, hot stick, arc flash blanket, arc flash clothing, electric shock	Getting someone's attention
7	Actions	Occupational manual	lift, stand, climb, stoop, kneel, turn on, turn off, split, grab, release	Asking for information
8	More actions	DIY instructions	push, pull, connect, install, bind, test, twist, strip, splice, inspect	Giving instructions
9	Numbers	Chart	is, equal, come to, and, plus, add, minus, less, subtract, times, multiplied by, divided by, over, eighth, hundred	Talking about calculations
10	Measurements	Magazine article	imperial, metric, round off, inch, centimeter, foot, yard, millimeter, meter, degree, Celsius, Fahrenheit, convert, caliper, micrometer	Pointing out a mistake
11	Elements of electricity	College course catalog	voltage, current, resistance, electron, AC, DC, volt, ampere, ohm, watt	Asking for clarification
12	Electrical safety	Safety pamphlet	electrocution, burn, shock, static electricity, live wire, lockout/tagout procedure, paralyze, hazard, risk, de-energize	Giving commands
13	Types of wires	Magazine article	knob and tube (K&T) wiring, armored cable (AC), metalclad (MC) cable, nonmetallic sheath (NM) cable, underground feeder (UF) cable, service entrance (SE) cable, conductor, insulated, jacket, replace	Checking for understanding
14	Wire codes	Cheat sheet	code, diameter, ought, gauge, embossed, sheath, maximum, rating, resistant, location	Asking for repetition
15	Wire connectors	Store webpage	twist-on connector, winged connector, grounding connector, crimp-on connector, underground connector, waterproof connector, push-in connector, thermoplastic, shell, spring	Offering help

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Talbot
Electrical Services

Employee Manual

Section 2.1 Tools Needed

All employees of Talbot Electrical Services will bring their own **tool kits**. Tool kits need to contain the basic tools needed for electrical jobs. These basic tools are sold at most hardware stores.

Pliers are needed for pulling and cutting wires. Your kit needs to include **long nose pliers** and **end cutting pliers**. **Side cutters** and **diagonal cutters** are recommended.

You must have **wire strippers** in your kit. Make sure they are able to strip the most common wires. You will also need several types of **screwdrivers** on the job.

A **flashlight**, **measuring tape** and **utility knife** will round out your kit.

Get ready!

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

- 1 How could some of the tools in the pictures be useful for electricians?
- 2 Why is it important to have a well-equipped tool kit?

Reading

2 Read the page from the company manual. Then, mark the following statements as true (T) or false (F).

- 1 ☐ Employees can buy the tools at hardware stores.
- 2 ☐ Side cutters and diagonal cutters are needed in the tool kit.
- 3 ☐ Wire strippers are used for cutting and pulling wire.

Vocabulary

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

- 1 Jack forgot his pliers that are only used for cutting wire at the job site.
_ _ a _ _ n _ _ c _ t _ _ r _ _
- 2 A small, battery operated light is good for seeing in dark spaces. _ l _ _ h _ _ g _ _
- 3 Mary used a tool with a thin, sharp slanted blade to cut open the box.
_ t _ _ _ t _ _ _ _ f _ _
- 4 The electrician bought a tool used for pulling out staples for his kit.
_ n _ _ _ t _ _ _ _ p _ _ e _ _

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

- | | |
|---|---|
| 1 ☐ tool kit | 4 ☐ long nose pliers |
| 2 ☐ side cutters | 5 ☐ measuring tape |
| 3 ☐ screwdriver | 6 ☐ wire stripper |

- A a tool with blades able to grip or cut wires
 B a tool used to tighten or loosen screws
 C a tool for cutting, twisting or pulling wires
 D a tool used to pull the covering off of wires
 E a tool used for finding the length of an object
 F a bag or box used to hold a set of tools

5 Listen and read the page from the company manual again. Which tools are recommended for the tool kit?

Listening

6 Listen to a conversation between two electricians. Check (✓) the tools that are mentioned by the electricians.

- 1 ☐ screwdrivers
- 2 ☐ side cutters
- 3 ☐ flashlight
- 4 ☐ diagonal cutters
- 5 ☐ wire strippers

7 Listen again and complete the conversation.

Old Electrician: How's your 1 _____ going?

New Electrician: Not bad. I have to buy some tools.

Old Electrician: An 2 _____ are important. What do you need?

New Electrician: I need some wire strippers and 3 _____. What kind do you use?

Old Electrician: I like to use tools 4 _____ Patton.

New Electrician: Really? I heard Berkley tools are better.

Old Electrician: I had a pair of Berkley diagonal cutters that broke after one day. I 5 _____ their tools after that.

New Electrician: Maybe 6 _____ Patton tools, then.

Speaking

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

USE LANGUAGE SUCH AS:

- I have to buy some ...
- I like to use ...
- Maybe I'll go with ...

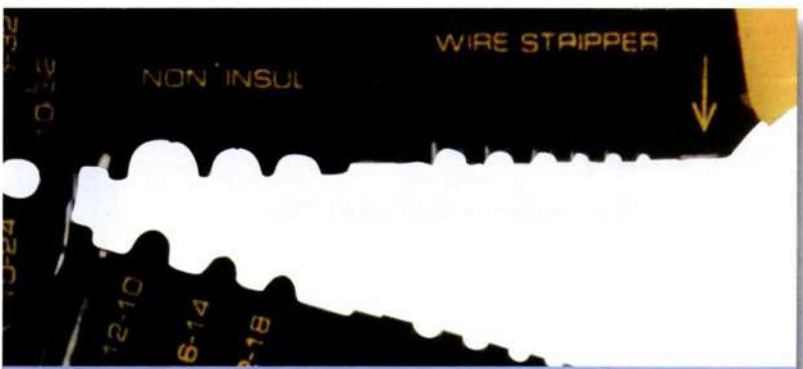
Student A: You are a new electrician. Talk to Student B about:

- what tools you need to buy
- what kind of tools he or she uses
- what you've heard from others about tool brands

Student B: You are an experienced electrician. Talk to Student A about tools.

Writing

9 Use the conversation from Task 8 to fill out the new electrician's notes about tools.



Electrician's notes

About Tools

Tools Needed: _____

Brands of Tools: _____

Information on Brands: _____

Get ready!

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

- 1 What tools usually come in a range of sizes
- 2 What else might electricians keep in their tool kits besides actual tools?

Reading

2 Read the web forum. Then, choose the correct answers.

- 1 What is the webpage mostly about?
 - A the best tool kits to buy
 - B the tools electricians need
 - C the different types of wrenches
 - D the kinds of tape electricians use
- 2 What advice is NewGuy12 looking for?
 - A which basic tools he needs for jobs
 - B which tool brand works the best
 - C which additional tools he needs
 - D which tools do not get used much
- 3 Which is NOT in NewGuy12's tool kit yet?

A tool belt	C hacksaw
B hammer	D Phillips screwdriver

Vocabulary

3 Choose the sentence that uses the underlined part correctly.

- 1 A John put the tool belt around his waist.
B A crimper can easily cut through metal.
- 2 A I used an allen wrench to hit the nail.
B Sam covered the wires with electrical tape.
- 3 A I need a torque wrench to tighten the loose bolt.
B The wires need to be cut by a hacksaw.

www.electriciantalk.com

NewGuy12

I have the basic stuff I need to go on jobs (**hammer, Phillips screwdrivers, tool belt, etc.**). What else do I need in my tool kit?

MasterElectrician

You need wrenches for different things. I'd get **allen wrenches, socket wrenches, and torque wrenches**. Also, get **electrical tape** and **duct tape** for your kit.

WiredUp

My tool kit has a **hacksaw, nut drivers, and crimpers** in it. I don't use them a lot. But they're there if I need them!

NewGuy12

Thanks for the advice! Going to the store now.



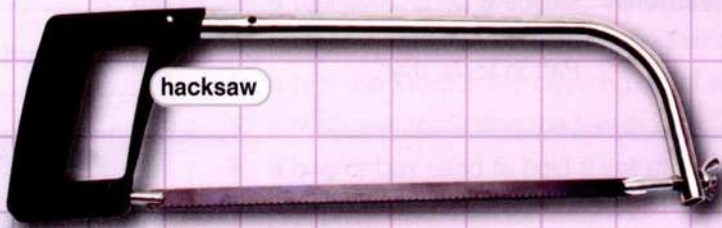
Phillips screwdriver



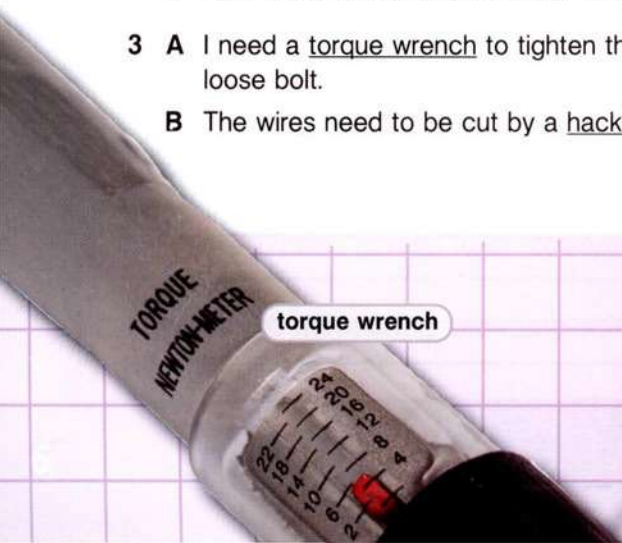
socket wrench



allen wrench



hacksaw



torque wrench

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

- 1 — crimper
- 2 — hacksaw
- 3 — hammer
- 4 — allen wrench
- 5 — duct tape
- 6 — nut driver
- 7 — socket wrench
- 8 — Phillips screwdriver

- A tool with a thin blade that cuts through metal
- B tool used to tighten bolts
- C tool used for tightening nuts
- D kind of tape made of mesh used on air ducts
- E a tool with a metal top used for hitting nails
- F tool used to tighten screws with a cross head
- G tool used for pushing connectors around bare wires
- H a tool with a six-sided head used for tightening screws or bolts

5 Listen and read the web forum again. Why does MasterElectrician suggest several kinds of wrenches?

Listening

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

- 1 — The woman needs a socket wrench.
- 2 — The man's wrenches are too small.
- 3 — The man left his tool kit in the truck.

7 Listen again and complete the conversation.

Electrician 1: Looks like I need an allen wrench to 1 _____. Hand me one.

Electrician 2: Okay. I have some in my 2 _____. Here you go.

Electrician 1: It isn't the right size. 3 _____ a bigger one.

Electrician 2: That's the biggest one I have.

Electrician 1: You need to get more wrenches for your tool kit. I have one that's the right size in mine. I left it 4 _____, though.

Electrician 2: Do you want me to 5 _____?

Electrician 1: Yes, please. I really need an 6 _____.

Electrician 2: All right. I'll be back in a minute.

Speaking

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

USE LANGUAGE SUCH AS:

Looks like I need ...
Give me ...
I left it in ...

Student A: You are an electrician. Talk to Student B about:

- what tool you need
- why the tool won't work
- where you left your tool kit

Student B: You are an electrician. Talk to Student A about what he or she needs from you.

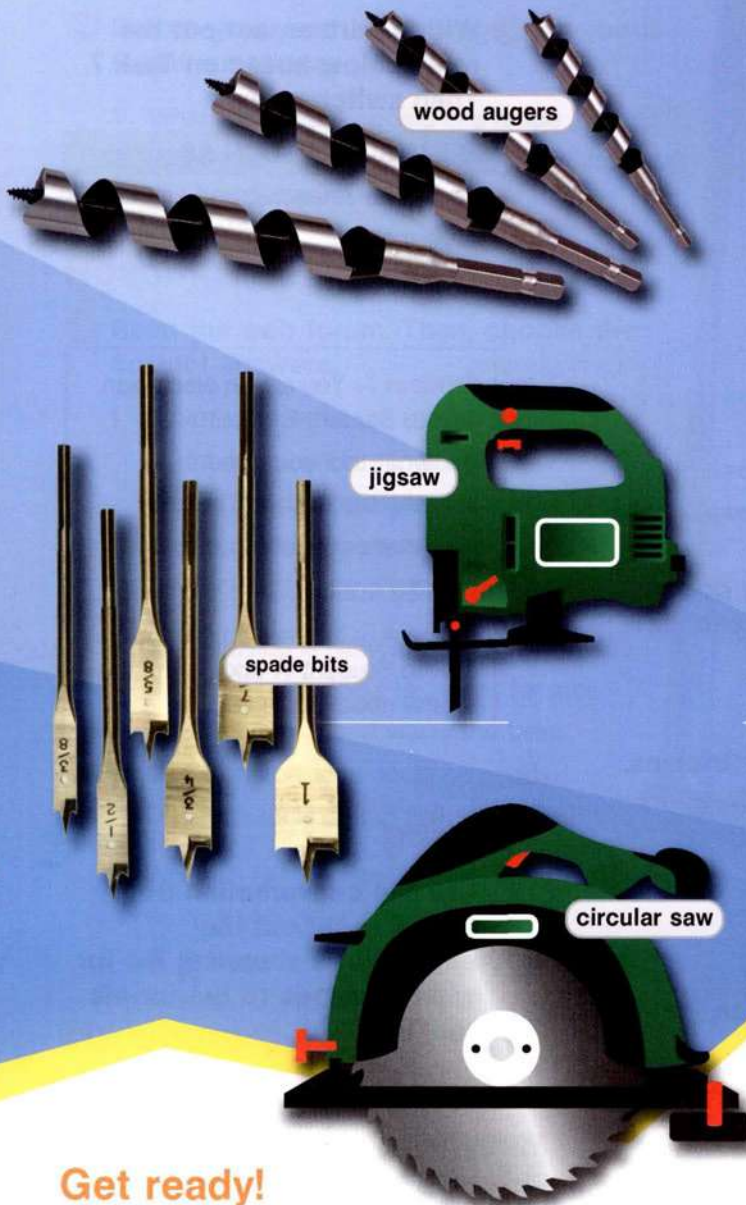
Writing

9 Use the conversation from Task 8 to fill out the electrician's shopping list for what he needs to get for his tool kit.

Shopping List

Tools Needed: _____

Why: _____



Electrical Source

SPRING CATALOG

Power Drills and Saws

Electrician's Drill Bit Kit

\$59.95

All electricians need a high-quality **drill**. Along with it, they need lots of **drill bits**. The Electrician's Drill Bit Kit has everything you need. It contains several **spade bits**. These bits are perfect for most jobs. For other jobs, the kit has **auger bits**, **hole saw bits** and **wood augers**. Also included are twelve **twist bits**.

Electrician's Power Saw Set

\$169.99

This set includes three saws all electricians should have. The tough **circular saw** cuts through anything! The powerful **reciprocating saw** comes with five blades. Finally, the **jigsaw** is perfect for cutting.

Vocabulary

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

1 circular saw / reciprocating saw

A I need to change the blade on the _____.

B The round blade fits on the _____.

2 twist bit / wood auger

A Use the _____ to make a hole in the cupboard.

B A _____ can be used on a variety of materials.

3 spade bit / auger bit

A The sharp point of the _____ will work best.

B I need the longest _____ that is in the kit.

Get ready!

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

- 1 Why are power tools useful to have?
- 2 Why do power tools come with different attachments?

Reading

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

- 1 ☐ The drill bit kit comes with a drill.
- 2 ☐ One spade bit is included with the set.
- 3 ☐ The jigsaw works best for straight lines.

4 Match the words (1-4) with the definitions (A-D).

- 1 — drill 3 — hole saw bit
2 — jigsaw 4 — drill bit

- A the sharp end of a drill used to make holes
B a metal tube-shaped drill bit with sharp edges used to cut rings
C a saw with a thin blade that cuts straight and rounded edges
D a tool that makes holes in different materials

5 Listen and read the page from the catalog again. Why should an electrician buy the kits?

Listening

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

- 1 What is the conversation mostly about?
A what size the hole needs to be
B what to use to make a hole
C where the hole needs to be made
D how to run wires through the hole
- 2 What will the woman likely do next?
A run the wires C find the spade bit
B smooth the hole D get the wood auger

7 Listen again and complete the conversation.

- Electrician 1:** I need to 1 _____ for the wires.
Electrician 2: Okay. What 2 _____ do you want to use?
Electrician 1: I think I'll use a 3 _____.
Electrician 2: Really? That's not what I'd use.
Electrician 1: What would you use then?
Electrician 2: 4 _____, a wood auger is better.
Electrician 1: Why is that?
Electrician 2: The wood auger makes a smoother hole. It's 5 _____ the wires through it.
Electrician 1: I see 6 _____. I'll use the wood auger instead.

Speaking

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

USE LANGUAGE SUCH AS:

- I need to ...*
I think I'll use ...
In my opinion ...

Student A: You are an electrician. Talk to Student B about:

- what you need to do
- what drill bit you want to use
- what drill bit he or she would use

Student B: You are an electrician. Talk to Student A about drill bits.

Writing

9 Use the conversation from Task 8 to fill out the electrician's work order.

Sam's Electrical Service

Job: _____

What Needs to be Done: _____

Tools to be Used: _____

www.zaptools.com

Welcome to

ZapTools!

ZapTools has the best selection and lowest prices on everything electricians need.

We carry specialized tools such as **conduit benders**, **levels**, **fish tapes** and **stud punches**. We also have the largest selection of **lineman's pliers** on the Internet.

Be sure to check out our power tools too. We have saws and drills, including **hammer drills**. To go with the drills, we have specialized drill bits. We have the toughest brands of **stepped drill bits** and **masonry drill bits**.

We also sell electronic equipment for electricians. We have **multimeters**, **plug in analyzers** and **labeling machines**.

Get ready!

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

- Which specialized tools in the pictures do you consider most helpful?
- What can an electrician do if he/she doesn't have a specialized tool?

Reading

2 Read the company webpage. Then, complete the table using information from the webpage.

Category	Tools
1 Specialized	
2 Power	
3 Electronic	

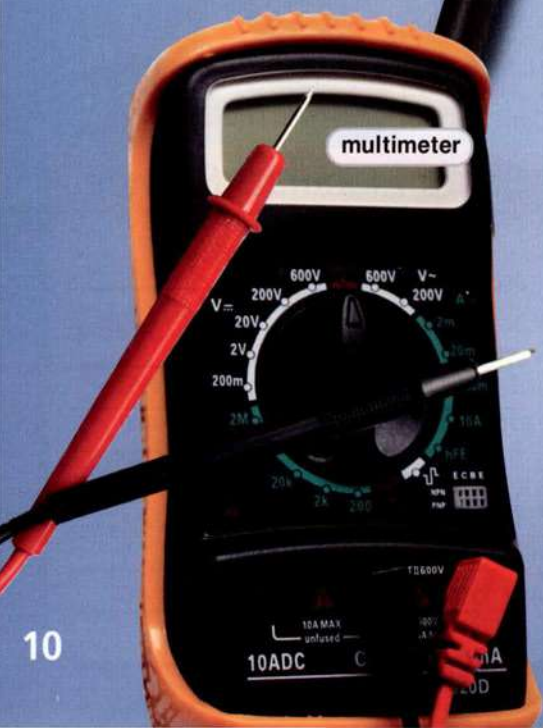
Vocabulary

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

Word BANK

fish tape level multimeter
hammer drill labeling machine

- We used a _____ to keep track of the wire connections.
- The _____ showed the wire had a lot of voltage.
- The wires were put behind the wall using a _____.
- Kate used a _____ to make sure the picture was straight.
- The _____ broke through the concrete quickly.



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

1 lineman's pliers / stud punch

A Sam used a _____ on the wall.

B _____ are good for cutting wires.

2 stepped drill bit / masonry drill bit

A I need a _____ to drill through the metal.

B A _____ will make a hole in the concrete.

3 plug-in analyzer / conduit bender

A The _____ indicates there are some loose wires.

B Mark the conduit before you use the _____ on it.

5 Listen and read the company webpage again. What are some electronic tools electricians use?

Listening

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

1 ___ The man wants to order a hammer drill.

2 ___ The woman suggests masonry drill bits.

3 ___ The man orders several different items.

7 Listen again and complete the conversation.

Employee: Thank you for calling ZapTools. How can
1 _____?

Customer: Hi, I'd like to order some drill bits for my 2 _____.

Employee: All right. What kind are you looking for?

Customer: Well, I need to be able to drill 3 _____.

Employee: It sounds like you need some 4 _____
_____. They're \$11 each.

Customer: Great. I'd like 5 _____.

Employee: All right. Can I do anything else for you?

Customer: No, that's it. I 6 _____!

Speaking

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

USE LANGUAGE SUCH AS:

How can I help ...

I'd like to order ...

I need to be able to ...

Student A: You are an electrician.
Talk to Student B about:

- what you want to order
- what you need to do
- how many items you want to order and price

Student B: You are an
employee at ZapTools. Talk to
Student A about his or her order.

Writing

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

ZapTools Order Form

Item Ordered: _____

Price per Item: _____

Number Ordered: _____



CHOOSING THE RIGHT DRILL FOR THE JOB

Most jobs can be done using a simple **rotary drill**. It can be used for **wood** and **plywood**. It can also be used for **drywall**, **plaster**, **copper** and **steel**. Of course, you need to have the right drill bits too.

What about for harder materials like **brick** and **concrete**? A hammer drill works well for **blocks**, **brick**, **mortar** and **stone**. A **rotary hammer** works best for materials like concrete and **cement**.

Sometimes the terms hammer drill and rotary hammer are used to mean the same tool. However, a hammer drill chips away at the material. A rotary hammer pounds away at it to make a hole.

Get ready!

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

- What are some materials electricians work with on the job?
- What are some tools electricians might need to work with those materials?

Reading

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

Drill Type	Material
Rotary drill	1 _____
Hammer drill	2 _____
Rotary hammer	3 _____

Vocabulary

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

- The substance that comes from trees was rotting.
_ o _ d
- Reddish brown metal pipes are often found in old homes.
_ _ p _ e _
- The ceiling was covered in a thin coat of a mixture of lime, sand and water.
p _ _ s _ _ r
- I tried drilling the mixture used to hold bricks or stones together but the drill bit broke.
_ _ r _ _ r
- The workers used a mixture of ground limestone and clay for the outside of the building.
c _ _ _ n _

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

- | | | |
|-------------|---------------|----------------|
| 1 ___ block | 4 ___ brick | 7 ___ concrete |
| 2 ___ stone | 5 ___ plywood | |
| 3 ___ steel | 6 ___ drywall | |

- A a board made of plaster and covered in paper
 B a metal that is made from combining iron and carbon
 C a piece of material that is solid with flat surfaces on each side
 D a board made of thin layers of wood glued together
 E a hard material made with cement, small stones, sand and water
 F a block of clay that is baked until it is hard
 G the hard substance rocks are made from

5 Listen and read the trade magazine article again. What is the difference between a rotary hammer and a hammer drill?

Listening

6 Listen to a conversation between an experienced and a new electrician. Mark the following statements as true (T) or false (F).

- 1 ___ The floor is made of cement.
 2 ___ The man needs a rotary hammer.
 3 ___ The woman lends the man a tool.

7 Listen again and complete the conversation.

- Experienced Electrician:** You 1 _____ through this concrete floor.
- New Electrician:** I'm not sure what to use, though. Can you help me 2 _____?
- Experienced Electrician:** Well, you don't want to use a regular 3 _____ on concrete.
- New Electrician:** So, I need a 4 _____ or rotary hammer, then.
- Experienced Electrician:** You're on the right track.
- New Electrician:** Hammer drills are better for 5 _____, right?
- Experienced Electrician:** Yes. So, what do you need?
- New Electrician:** I need to use a rotary hammer. But I don't have one in my 6 _____.
- Experienced Electrician:** You can borrow mine.

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 ...

You don't want to use ...

Hammer drills are better for ...

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

- what you need to drill through
- which drill you should use
- whether you have the right drill

Student B: You are an experienced electrician. Talk to Student A about what he or she needs to do.

Writing

9 Use the conversation from Task 8 to fill out the electrician's notes about what to use to drill through the floor.



Electrician's Notes

Type of Material to be Drilled: _____

Possible Drills to Use: _____

Which Drill to Use and Why: _____



hard hat

BE SAFE AT WORK!

Working with electrical wiring is often dangerous. The proper safety equipment can save your life. Remember these tips:

- 1 Always protect your head, eyes, hands and feet. Never work without wearing the following items:
 - a A hard hat
 - b A pair of leather gloves
 - c Steel toe boots
 - d Safety glasses
- 2 On the job, there is sometimes danger of **electric shock** or explosion. In these cases, dress properly. Wear the following:
 - a An arc shield
 - b Arc flash clothing
 - c Electrical hot gloves
- 3 When working with live wires, be extra careful. Protect yourself from shocks. Use an **arc flash blanket** and stand on a **rubber mat**. Finally, hold onto a **hot stick**.

Get ready!

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

- 1 What are some of the dangers of working on the job?
- 2 What are some things electricians can wear to stay safe?

Reading

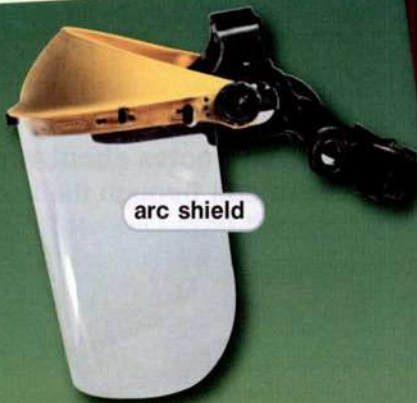
2 Read the safety poster. Then, mark the following statements as true (T) or (F).

- 1 ☐ Safety glasses should be worn if needed.
- 2 ☐ Arc flash clothing helps if there is an explosion.
- 3 ☐ Hold a hot stick when working with dead wires.

Vocabulary

3 Choose the sentence that uses the underlined part correctly.

- 1 A James put on leather gloves before picking up the hammer.
B The electrician stood on the arc shield while working.
- 2 A Steel toe boots protect your feet if something falls on them.
B A hot stick is worn when working with electricity.
- 3 A Oliver held on to the electrical hot gloves while touching the wire.
B Marie put a hard hat on her head before entering the building.



arc shield



safety glasses



steel toe boots



hot stick

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

- | | |
|--------------------|---------------------------|
| 1 _ arc shield | 5 _ electrical hot gloves |
| 2 _ rubber mat | 6 _ arc flash blanket |
| 3 _ hot stick | 7 _ arc flash clothing |
| 4 _ safety glasses | |

- A clear glasses that are made of thick plastic
 B a blanket used to protect from explosions or shock
 C a fiberglass rod that protects from shocks
 D gloves made of rubber that protect from shocks
 E a mat made of rubber that electricians stand on
 F pants, shirts, jackets, and shoes designed to protect from shocks or explosions
 G a protective plastic shield for the eyes and face

5 Listen and read the safety poster again. What items should you always wear? Why should you wear them?

Listening

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

- 1 What is the conversation mostly about?
 A cutting a live wire correctly
 B wearing the right safety gear
 C watching out for co-workers
 D treating electrical injuries
- 2 What should the woman be wearing?
 A arc shield
 B electrical hot gloves
 C steel toe boots
 D arc flash blanket

7 Listen again and complete the conversation.

- Electrician 1:** Hey, Alice! 1 _____.! Stop!
- Electrician 2:** What's wrong, Jake?
- Electrician 1:** Be careful. You were going to 2 _____.
- Electrician 2:** I know. I wanted to cut it.
- Electrician 1:** But that's a 3 _____. And you're not wearing an arc shield!
- Electrician 2:** Do you really think I need one?
- Electrician 1:** Definitely! There might be an 4 _____. You could burn your eyes or face.
- Electrician 2:** I didn't 5 _____. I'll put one on. Thanks!
- Electrician 1:** Use an 6 _____ too - just in case!

Speaking

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

USE LANGUAGE SUCH AS:

Watch out!
What's wrong?
You're not wearing ...

Student A: You are an electrician. Talk to Student B about:

- being careful
- possible dangers of cutting live wires
- what safety equipment to use

Student B: You are an electrician. Talk to Student A about what you need to do to stay safe.

Writing

9 Use the conversation from Task 8 to fill out the safety report.

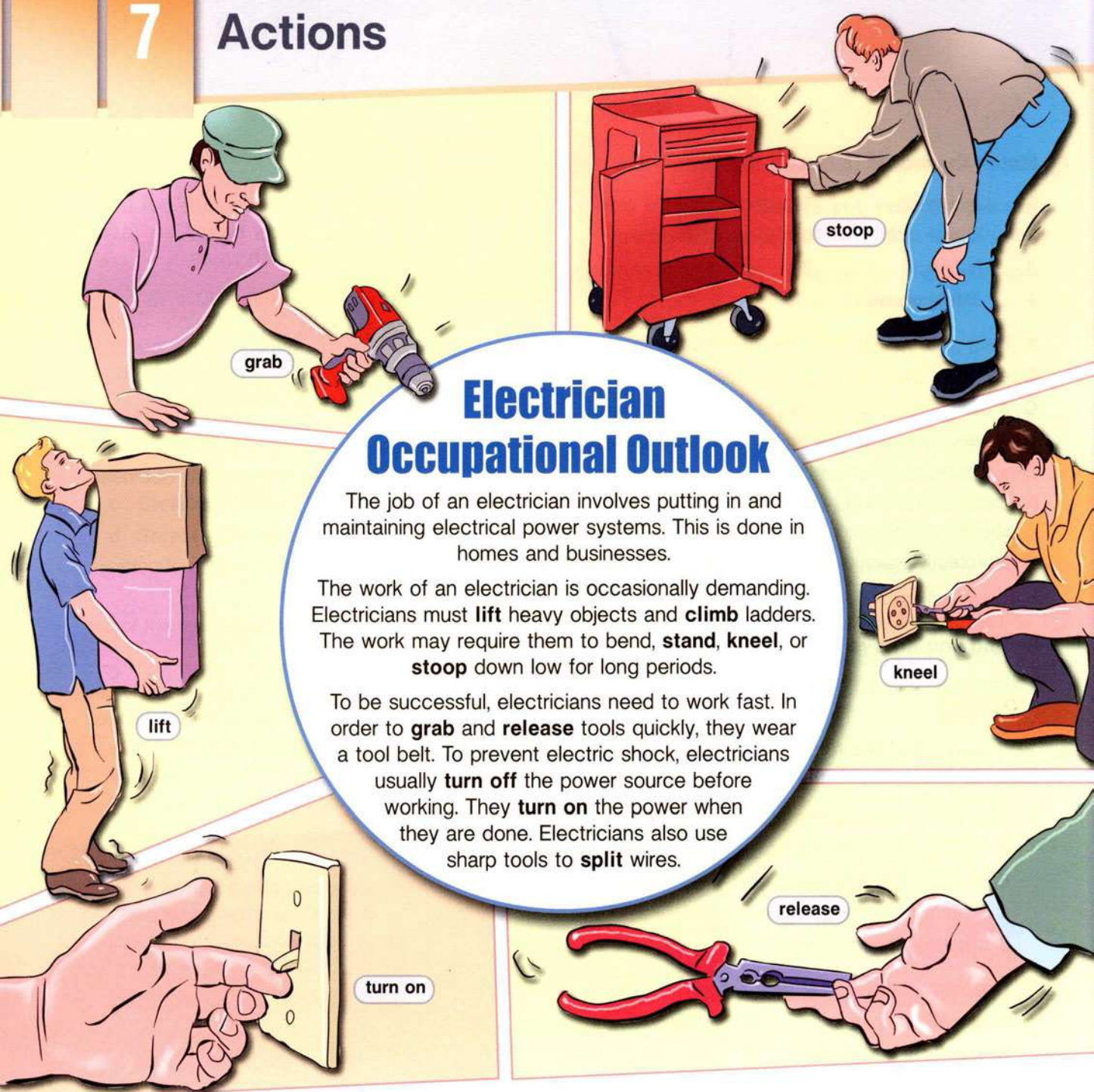
Safety Report

Job # 2651

Electrician(s): _____

Problem: _____

Action Taken: _____



Electrician Occupational Outlook

The job of an electrician involves putting in and maintaining electrical power systems. This is done in homes and businesses.

The work of an electrician is occasionally demanding. Electricians must **lift** heavy objects and **climb** ladders. The work may require them to bend, **stand**, **kneel**, or **stoop** down low for long periods.

To be successful, electricians need to work fast. In order to **grab** and **release** tools quickly, they wear a tool belt. To prevent electric shock, electricians usually **turn off** the power source before working. They **turn on** the power when they are done. Electricians also use sharp tools to **split** wires.

Get ready!

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

- 1 What are some actions an electrician performs on the job?
- 2 How can electricians minimize bodily strain when working?

Reading

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

- 1 ___ Electricians are expected to work quickly.
- 2 ___ Electricians must wear helmets to work.
- 3 ___ Electricians work in homes and businesses.

Vocabulary

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

- | | |
|-------------|---------------|
| 1 ___ lift | 4 ___ turn on |
| 2 ___ stand | 5 ___ release |
| 3 ___ stoop | |

- A to stop holding something
- B to be in a vertical position
- C to make something work by giving it power
- D to move something up to a higher place
- E to bend forward while standing up

4 Choose the sentence that uses the underlined part correctly.

- 1 A He released the rope and didn't let go.
B The electrician climbed the ladder.
- 2 A She split the check and paid it all herself.
B He can't lift heavy weights since his accident.
- 3 A He grabbed the bag and ran away.
B I turned on the light so it would be dark.
- 4 A He stooped to reach the top of the shelf.
B Please turn off the TV before you leave.
- 5 A It's hard to stand all day in an uncomfortable chair.
B I had to kneel to pick up the papers on the floor.

5 Listen and read the occupational manual again. How do electricians prevent electric shocks?

Listening

6 Listen to a conversation between an intern and an electrician. Mark the following statements as true (T) or false (F).

- 1 ___ The woman started out as an apprentice.
- 2 ___ The woman loves traveling for her work.
- 3 ___ The woman began working when she was twenty.

7 Listen again and complete the conversation.

Intern: I still have a few questions about your job. What do you do each day?

Electrician: Well, I travel around with my tools and 1 _____. _____ that people have with their electricity.

Intern: When did you get into the 2 _____?

Electrician: About twenty years ago, when I became 3 _____ like you.

Intern: What is your favorite part of this job?

Electrician: I love the 4 _____. I like climbing ladders and lifting objects.

Intern: Wow. The job of 5 _____ sounds difficult but exciting!

Electrician: 6 _____. See you tomorrow!

Speaking

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

USE LANGUAGE SUCH AS:

I still have a few questions ...

When did you ...

What is your favorite ...

Student A: You are an intern.

Talk to Student B about:

- what he or she does each day
- how long he or she has done the job
- the best part of the job for him or her

Student B: You are an electrician.

Talk to Student A about your job.

Writing

9 Use the conversation from Task 8 to fill out the interview notes.

Interview Notes

Job: _____

Person Interviewed: _____

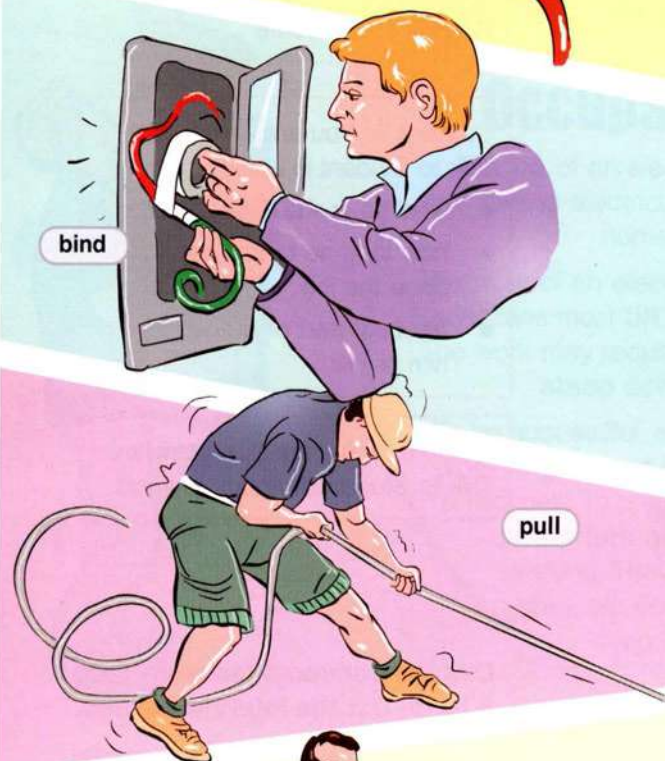
How long in the field: _____

Best part of the job: _____

What was your opinion of the job after the discussion?



connect



bind



pull



push



inspect

Get ready!

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

- 1 Why do wires need insulation?
- 2 Why should damaged wires be replaced?

Reading

2 Read the instructions for fixing underground wires. Then, choose the correct answers.

- 1 What are the instructions mostly about?
 - A why it is important to replace wires
 - B how to fix a damaged wire
 - C what insulation is made out of
 - D how to inspect an electric circuit
- 2 Why should the electricity be switched off?
 - A to make sure the wires aren't damaged
 - B to avoid getting shocked by the wires
 - C to make it easier to find the wires
 - D to check that the wires are connected
- 3 What is the last step in the instructions?
 - A strip the insulation from the wires
 - B inspect the underground wires
 - C install waterproof insulation
 - D turn on the electricity again

Do-it-Yourself: Fixing Underground Wires

Fixing underground wires sounds difficult. But it's actually simple. You just need to **splice** some wires.

To begin, switch off the electricity. Accidental shocks are always a risk when working with electricity. Next, **test** the electricity to make sure it is off. **Push** a button on the same circuit. If it is safe, dig into the ground. **Inspect** the wires, and find the damaged part. Cut it off. Next, **strip** the insulation off the wires. **Twist** the ends of the wires together. Then, **pull** on them to make sure they are joined. If they are, **bind** the ends together with tape. After that, **install** waterproof insulation plastic covering on the wires. Then **connect** the electricity.

Vocabulary

3 Match the words (1-4) with the definitions (A-D).

1 _ install 2 _ inspect 3 _ connect 4 _ test

- A to look at something closely
B to turn on power or electricity
C to try something to make sure it works
D to connect something so it can be used

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

1 twist / push

- A If you _____ that wire too much, it will break.
B I had to _____ the box up the hill.

2 pull / bind

- A The wagon has a handle so you can _____ it.
B I used string to _____ the flowers together.

3 stripped / splice

- A I tried to _____ the wires, but they wouldn't stay together.
B After he _____ the wires, he threw the covering away.

5 Listen and read the instructions for fixing underground wires again. What needs to be done to the wires after the damaged part is cut off?

Listening

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

- 1 _ The damaged part of the wire is replaced.
2 _ The ends of the wires are spliced together.
3 _ The power is turned off after the wire is fixed.

7 Listen again and complete the conversation.

- Elec. 1: Okay, Jim. Let's fix the 1 _____. Do you remember what to do first?
Elec. 2: Yes, we have to 2 _____ the power. I'll do that now.
Elec. 1: Good. Next, you need to 3 _____ off the cable.
Elec. 2: All right. I see the damaged wire. It's 4 _____.
Elec. 1: You're right. You need to cut that part out.
Elec. 2: Okay. What's next?
Elec. 1: Now, 5 _____ together.
Elec. 2: Then, I bind the ends and 6 _____ the plastic, right?
Elec. 1: Right! We're done!

Speaking

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

USE LANGUAGE SUCH AS:

Do you remember ...

Next ...

You need to ...

Student A: You are an electrician.

Talk to Student B about:

- what to do first
- how to find the damaged wire
- what to do with the damaged wire

Student B: You are an electrician. Talk to Student A about how to fix the wire.

Writing

9 Use the conversation from Task 8 to fill out the directions.

Directions for fixing a wire

First, _____

Next, _____

After that, _____

Finally, _____

How do they say it?

Symbol/ Number	Interpretation/ Pronunciation	Example
=	is, equals, comes to	$\frac{1}{2} = 0.5$ One half equals point five.
+	and, plus, add	$10 + 5 = 15$ Ten and five comes to fifteen.
-	minus, less, subtract	$10 - 5 = 5$ Ten less five is five.
x	times, multiplied by	$10 \times 5 = 50$ Ten times five equals fifty.
÷	divided by, over	$10 \div 5 = 2$ Ten divided by five is two.
$\frac{7}{8}$	seven eighths	$\frac{1}{8}$ The cable measured one eighth of a meter.
1,200	one thousand two hundred or twelve hundred	The repair cost twelve hundred dollars.



Vocabulary

- 3 Fill in the blanks with the 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.

- One **fourth** / **times** is equal to 0.25.
- Nine **over** / **less** eight equals one.
- Start with seven. **Subtract** / **Add** three. This equals four.
- Six **multiplied by** / **divided by** two is twelve.
- Six **over** / **plus** three equals two.
- Twenty **less** / **divided by** four equals five.
- Five plus six **equals** / **over** eleven.

Get ready!

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

- Why are numbers and math important for electricians to know?
- What are some errors people can make when working with numbers?

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.

- 5 Listen and read the chart again. What are some ways to describe a total amount after subtracting numbers?

Listening

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

- What is the conversation mostly about?
 - how much money electricians make
 - why the deposit slip total is in error
 - the number of checks being deposited
 - the mistake the man made in adding
- What did the man do wrong?
 - He miscounted the number of checks.
 - He wrote down the wrong total.
 - He forgot to add in one of the checks.
 - He made an error in multiplication.

- 7 Listen again and complete the conversation.

Electrician 1: Sarah, can you help me for a second?

Electrician 2: Sure, Steve. 1 _____?

Electrician 1: I'm getting ready to go to the bank. But I can't get the deposit slip total to 2 _____. The cash comes to fifty dollars in bills and eighty cents in coins. It's the checks I can't figure out.

Electrician 2: 3 _____. There are four checks. Three checks for one hundred dollars. And one for one thousand, three hundred.

Electrician 1: Yeah. I multiplied the hundred dollar checks by four and added 4 _____.

Electrician 2: 5 _____.

Electrician 1: What do you mean?

Electrician 2: You 6 _____ the wrong number.

Electrician 1: Oh, what a simple mistake! Thanks.

Speaking

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

USE LANGUAGE SUCH AS:

Can you help me ...

There are ... checks.

Yeah, I multiplied ...

Student A: You are an electrician. Ask Student B about:

- a problem with a deposit slip
- amount of cash deposited
- how you counted the checks

Student B: You are Student A's co-worker. Help Student A find the correct total for the deposit slip.

Writing

- 9 Use the conversation from Task 8 to fill out the deposit slip correctly.



SPRINGDALE BANK AND TRUST Deposit Slip

Date: April 3

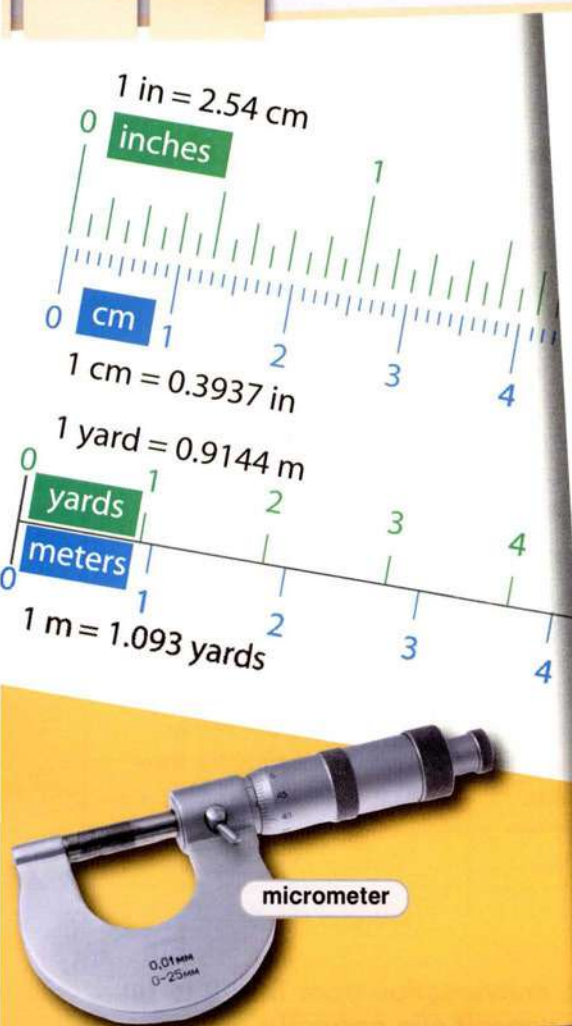
Bills: _____

Coins: _____

Number of Checks: _____

Amount of each Check: _____

Total Deposit: _____



Do-It-Yourself Monthly

Issue 12

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.

You will also need to know larger measurements, such as **feet**, **yards**, and **meters**. These measurements are often used in building plans.

Temperature measurements are also important to know. Some countries measure **degrees** using the **Fahrenheit** scale and others use the **Celsius** scale. You may need to **convert** from one scale to the other.

Get ready!

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

- 1 What kinds of measurements are used by electricians?
- 2 What can happen if measurements aren't accurate?

Reading

2 Read the magazine article about measurements. Then, mark the following statements as true (T) or false (F).

- 1 ☐ Millimeters are often used in building plans.
- 2 ☐ Inches are used for imperial tools.
- 3 ☐ Using the wrong size tool can cause injury.

Vocabulary

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

- | | |
|--------------------------------------|---------------------------------------|
| 1 ☐ degree | 5 ☐ convert |
| 2 ☐ yard | 6 ☐ Celsius |
| 3 ☐ imperial | 7 ☐ centimeter |
| 4 ☐ round off | 8 ☐ micrometer |

- A to change from one system into another
- B a metric measure of length or distance
- C a unit used to measure temperature
- D to damage a screw or bolt
- E a tool that measures small distances
- F the system that uses inches
- G a measurement equaling three feet
- H the metric temperature scale

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

- 1 Jack needs two units equaling twelve inches of steel gauge wire. e t
- 2 I have imperial wrenches, but I need one that is part of the system based on the meter. e i c
- 3 The board measured three units of measurement equal to 39 inches across. m e
- 4 The size of the screw was eight units equal to 1/10 of a centimeter. l m r s
- 5 The thermometer measures both non-metric temperature scale and Celsius. h n t
- 6 How many units of imperial length is that cable? e s

- 5 Listen and read the magazine article about measurements again. What are some reasons you should make sure you have the right size tool for a job?

Listening

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

- What is the conversation mostly about?
 - why metric tools are better than imperial
 - the reason why a tool is not working right
 - what size wrench to use on certain jobs
 - types of tools to keep in a tool kit
- What is the problem?
 - The wrench and bolt are different sizes.
 - The man forgot his wrenches in the tool kit.
 - The man cannot tighten the bolt enough.
 - The wrench is slippery in the man's hand.

- 7 Listen again and complete the conversation.

Electrician 1: Keith, are you 1 _____.
_____ over there?

Electrician 2: Yeah. My wrench keeps 2 _____.
_____ this bolt on the panel box.

Electrician 1: Let's see. I'm pretty sure that's the
wrong size wrench.

Electrician 2: Really? It seemed like the 3 _____.
_____.

Electrician 1: No, 4 _____. You
can't use a metric wrench with an
imperial bolt.

Electrician 2: I didn't realize I had 5 _____.
_____.

Electrician 1: I have some imperial wrenches
6 _____. I'll
go get them.

Electrician 2: Thanks, Jackie. I appreciate it.

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 ...

I'm pretty sure ...

You can't use a ... with a ...

Student A: You are an electrician. Talk to Student B about:

- a problem repairing a panel box
- using the correct tool
- making sure of the correct measurement system

Student B: You are an electrician. Talk to Student A about using proper size tools.

Writing

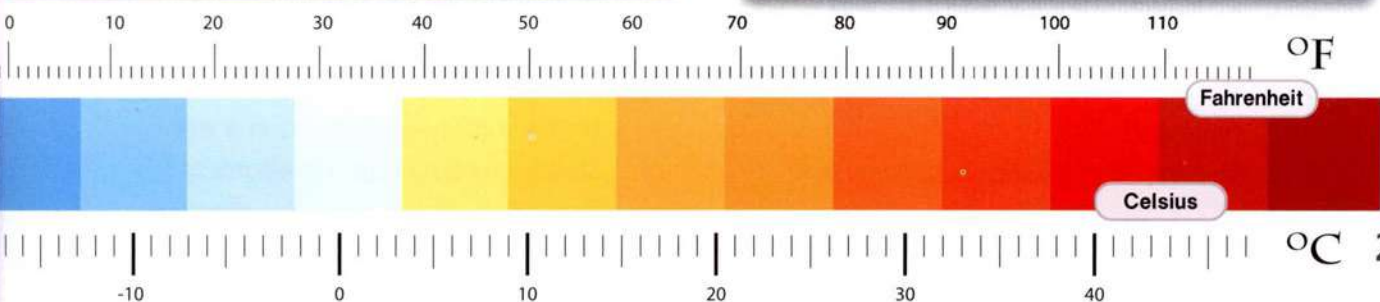
- 9 Use the conversation from Task 8 to fill out the work order.

Job: 8776

What is being repaired?

Which tools are required?

What is the required measurements system?

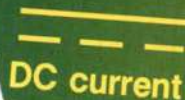


Spring Class Catalog

Electricity 101



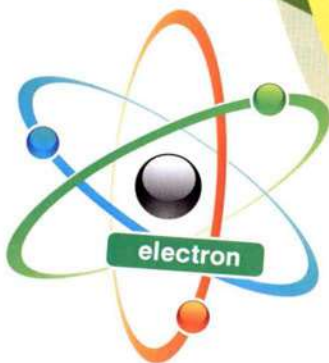
AC current



DC current

 Ω Ohm

Elements of Electricity



Get ready!

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

- 1 What are some of the different ways to measure electricity?
- 2 Why must electricians understand how to calculate ohms?

Reading

2 Read the college course catalog describing an electricity class. Then, mark the following statements as true (T) or false (F).

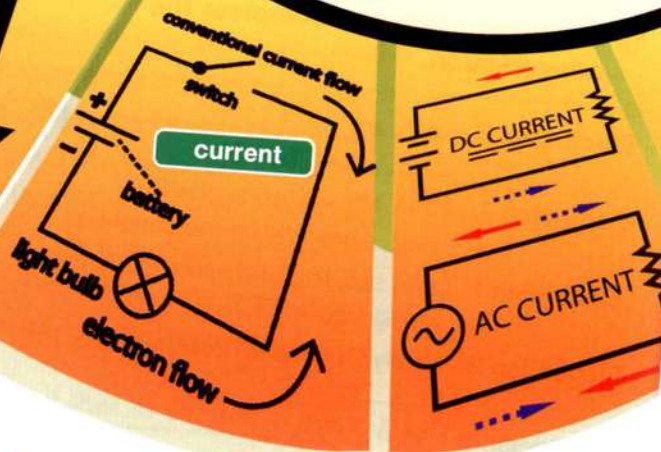
- 1 — Students will learn how to calculate measurements for electricity.
- 2 — The class is for anyone who works as an electrician.
- 3 — Students should understand currents before they enter the class.

Do you want to be an electrician?
Do you want to have a
high **voltage** summer?

Then take this class!

In this course, students learn the basics of electricity. They start by learning about **electrons**, the source of electricity. Then, they study electric **currents**. For instance, they learn the differences between **AC** and **DC**. Students also learn the different units of measurement. They will be able to calculate **amperes**, **volts** and **watts** in a circuit. The class will even use **ohms** to calculate **resistance**. By the end, students will have all the basics. They will be on their way to being great electricians!

voltage



Vocabulary

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

- | | |
|-------------|-------------|
| 1 — voltage | 4 — ohm |
| 2 — AC | 5 — current |
| 3 — DC | 6 — volt |

- A a measurement of the force of electricity
- B a current that flows in two directions
- C a measurement showing resistance
- D the quantity of electricity in a wire
- E the strength of moving electricity
- F a current that flows in one direction

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

Word BANK

electron resistance watt amperes

- 1 A(n) _____ is too small to see without a powerful microscope.
- 2 Many wires are made out of copper because of its low _____.
- 3 A(n) _____ measures how much electrical power is being used.
- 4 A common way to measure electric current is _____.

- 5 Listen and read the college course catalog describing an electricity class again. What kinds of calculations will students learn to do?

Listening

- 6 Listen to a class about electricity. Mark the following statements as true (T) or false (F).

- 1 ___ The woman doesn't understand the difference between two types of currents.
- 2 ___ Remembering what the letters stand for helps the woman.
- 3 ___ The woman is learning about AC and DC for the first time.

- 7 Listen again and complete the conversation.

Instructor: Yesterday, we discussed AC and DC. Now, let's move on to ...

Student: Excuse me, Mr. Green. I still don't understand 1 _____ AC and DC. Can you explain that again?

Instructor: Sure, do you remember what the letters 2 _____?

Student: Yes. AC is alternating 3 _____. DC is direct current.

Instructor: Good! Now, simply remember this: the difference is in the 4 _____.

Student: What do you mean?

Instructor: Alternating current alternates 5 _____. It goes back and forth. Direct current does not.

Student: Oh, 6 _____! Thanks!

Speaking

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

USE LANGUAGE SUCH AS:

I still don't understand ...

Do you remember ...

What do you mean?

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

- the topic of the lesson
- what the letters AC and DC stand for
- the difference between AC and DC

Student B: You are a student. Talk to Student A about what you don't understand about the types of currents.

Writing

- 9 Use the conversation from Task 8 to complete the quiz.

101 Quiz

Electricity

- 1 What does AC stand for? (5 points)

- 2 What does DC stand for? (5 points)

- 3 How are they different? (5 points)

ELECTRICAL SAFETY

Although electricity is a part of everyday life, it still has many **hazards**. Following a few simple safety rules can save your life.

Electricity **shocks** people when their bodies become part of an electrical path between

- A **live wire** and the ground or
- Two live wires with opposite charges

Being shocked can cause serious **burns**. It can also **paralyze** muscles.

Electrocution is also a major **risk** when working with electricity.

To reduce electrical safety hazards always

- **De-energize** power sources before working with electrical equipment
- Follow **lockout/tagout procedures**

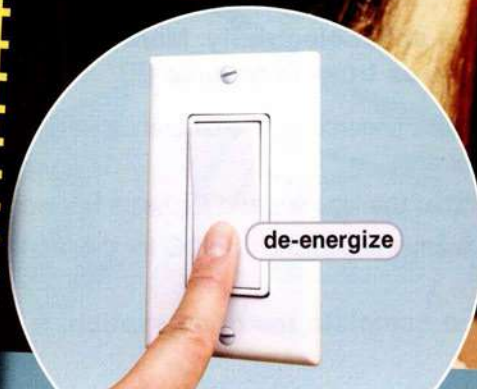
Remember: all electricity, including **static electricity**, can be dangerous. Never take risks.



lockout/tagout procedure



static electricity



Get ready!

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

- 1 What are some of the hazards of working with electricity?
- 2 What are some of the risks people may take when doing electrical repairs?

Reading

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

- 1 ☐ Static electricity is not dangerous.
- 2 ☐ Lockout/tagout procedures cause electrocution.
- 3 ☐ Electric shocks can paralyze muscles.

Vocabulary

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

1 burn / live wire

- A Touching a _____ is very dangerous.
B A serious _____ should be seen by a doctor.

2 de-energize / electrocution

- A Electricians _____ sockets before they work on them.
B _____ can be prevented by following safety rules.

3 risk / static electricity

- A _____ often builds up on door knobs.
B There is always a _____ of getting hurt at work.

4 Match the words (1-4) with the definitions (A-D).

- 1 — shock 3 — lockout/tagout procedure
2 — paralyze 4 — hazard
- A something that is not safe
B to make the muscles stop moving
C to pass electricity through the body
D a rule to lock energy sources and label electrical equipment when it's being repaired

5 Listen and read the safety pamphlet again. What are some safety rules that reduce electrical hazards?

Listening

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

- 1 Why is the man working with the woman?
A to learn how to work with electricity
B to learn safety procedures on the job
C to learn which safety equipment to wear
D to learn how to turn off electricity
- 2 What is the last step in the procedure?
A turn off the electricity
B lock the electrical box
C turn on the power again
D put a tag on the equipment

7 Listen again and complete the conversation.

- Electrician 1:** Thanks for letting me 1 _____.
_____ this week.
- Electrician 2:** No problem. This job has a lot of 2 _____. It's important to learn safety procedures.
- Electrician 1:** So yesterday you were telling me about the 3 _____.
- Electrician 2:** Right. Basically, never start working on electrical equipment until you know the 4 _____.
- Electrician 1:** Okay, that makes sense. Is that all?
- Electrician 2:** No. Then you 5 _____
_____ so that no one can turn it on again.
- Electrician 1:** Got it.
- Electrician 2:** Finally, 6 _____ being repaired.

Speaking

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

USE LANGUAGE SUCH AS:

Make sure to ...
It's important that ...
Never ...

Student A: You are an electrician. Talk to Student B about:

- why safety is important
- a specific safety procedure to be described
- what rules can keep people safe

Student B: You are an electrician. Talk to Student A about safety.

Writing

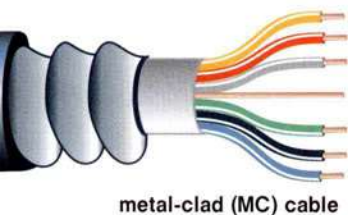
9 Use the conversation from Task 8 to fill out a safety checklist.

Safety Checklist

Name of safety procedure: _____

What are the steps of the procedure?

Why is the procedure important?



metal-clad (MC) cable



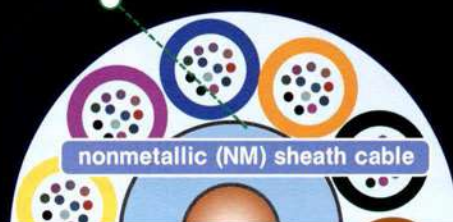
underground feeder (UF) cable



service entrance (SE) cable

Home Wiring

Tips and Types:



nonmetallic (NM) sheath cable

There are many different types of electrical wire and cable. **Knob and tube (K&T) wiring** is one of the oldest types of wiring. Older types of cable are **armored cable (AC)** and **metal-clad (MC) cable**. Both of these are **insulated** by steel. These were **replaced** in newer construction by **nonmetallic (NM) sheath cable**. However, replacement is not required if the wire or cable **jacket** is still good. Check them to make sure there is no bare **conductor** or wire showing. **Underground feeder (UF) cable** and **service entrance (SE) cable** are used outdoors. However, SE cable is only approved for above-ground use.

Get ready!

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

- 1 Why might an electrician need to know the types of wires?
- 2 What are some different types of wire?

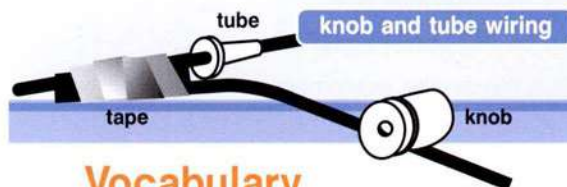
Reading

- 2 Read the excerpt from a magazine article. Then, choose the correct answers.

- 1 What is the main idea of the article?
 - A Wiring in older houses is dangerous.
 - B Metal-clad cable is not recommended in homes.
 - C Several types of wires and cables can be found in buildings.
 - D Indoor and outdoor wires vary from each other.
- 2 Which of the following is NOT true according to the article?
 - A Armored cable is a newer kind of wire.
 - B NM cable is found in newer buildings.
 - C Wires are unsafe in old buildings
 - D SE cable is not used underground.
- 3 When do older wires need to be replaced?
 - A when they are found in older homes
 - B when NM cable is available for use
 - C when bare wires or conductors are seen
 - D when they are used for service entrances



armored cable (AC)



knob and tube wiring

Vocabulary

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

- | | |
|-------------------|----------------------|
| 1 — SE cable | 4 — NM sheath cable |
| 2 — knob and tube | 5 — UF cable |
| 3 — armored cable | 6 — metal-clad cable |

- A a cable with an insulating material like thermoplastic
- B wires that run through porcelain covers found in old homes
- C wires for above ground use encased in a PVC jacket
- D wires in steel insulation with a grounding wire
- E wires for underground, wet areas in a thermoplastic jacket
- F wires encased in spiraled steel or aluminum

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

1 conductor / jacket

A It looks like the _____ is bare.

B The _____ is cracked.

2 required / insulated

A Modern wires should always be _____.

B UF or SE cable are _____ for outdoor wiring.

5 Listen and read the excerpt from the magazine article again. When do you not need to replace older types of wiring?

Listening

6 Listen to a conversation between a homeowner and an electrician. Mark the following statements as true (T) or false (F).

1 ___ The homeowner has lived in the house for many years.

2 ___ The wiring is nonmetallic sheath cable.

3 ___ The electrician will replace the wiring tomorrow.

7 Listen again and complete the conversation.

Homeowner: Thanks for 1 _____ so quickly. We just bought this house ... it's about 150 years old.

Electrician: It looks like it's still in 2 _____.

Homeowner: Yes, but we're worried whether or not the wiring is safe.

Electrician: 3 _____. It looks like you've got knob and tube wiring.

Homeowner: Is that good or bad?

Electrician: It depends on the condition of the 4 _____, if you know what I mean?

Homeowner: Sure. Well, what does 5 _____?

Electrician: No cracks or 6 _____. That's good news.

Speaking

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

USE LANGUAGE SUCH AS:

We're worried whether or not ...

It looks like you've got ...

It depends on ...

Student A: You are an electrician. Talk to Student B about:

- what Student B is worried about
- what type of wiring he or she has
- the condition of the wiring

Student B: You are a new homeowner. Talk to the electrician about your wiring.

Writing

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

Eddie's Electric

Customer Feedback Form

What type of service did we provide today?

___ consultation

___ repair / rewiring

Was our electrician on time? Y / N

Was he or she helpful? If so, please explain.



sheath

diameter

Wilson Wire Co.

embossed

Reading Wire Codes

Wiring **codes** are complicated. Here are some tips to make your job simpler:

1

Before installing any wire, read the **gauge**. Each wire has a number **embossed** on its **sheath**. The number refers to the **diameter** of the wire.

2

Know the **rating** for wire gauges. Wires with larger numbers are lesser in diameter. So, zero, or **ought** gauge wire has a bigger diameter than a 14 gauge.

3

Remember that different kinds of wires go in different **locations**. An 'H' on a wire means the **maximum** amount of heat it can stand is 165° Fahrenheit. A 'W' means you can put it in a damp area. It is water **resistant**.

Get ready!

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

- Why do electricians need to know wire codes?
- Why do you think codes are printed on wire jackets?

Reading

- 2 Read the cheat sheet about wiring codes. Then, choose the correct answers.

- What is the purpose of the cheat sheet?
 - to help electricians choose the right wires
 - to explain why wiring codes are complicated
 - to give advice about the best kind of wire
 - to give an example of why following the codes is important
- What is NOT a tip given on the cheat sheet?
 - Large gauge wires are wider in diameter.
 - Certain wires are used for specific locations.
 - Wires are marked on the protective casing.
 - Wires are rated depending on thickness.
- What should electricians do before installing a wire?
 - find a good location
 - read the wire's heat marking
 - determine the wire gauge
 - inspect the water resistant marking



Vocabulary

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

- | | | |
|--------------|------------|-----------|
| 1 — diameter | 3 — ought | 5 — gauge |
| 2 — rating | 4 — sheath | 6 — code |

- set of letters or numbers that give information
- a device that shows the measurement of an object
- a list that rates an object on its worth
- nothing or zero
- a protective covering
- a line that shows the width of a circle

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

Word BANK

resistant maximum
embossed location

- I want to keep the _____ of the party a secret.
 - The _____ amount of weight for the ride is 250 pounds.
 - The wires are heat _____ up to 200 degrees.
 - I had the watch _____ with her name.
- 5 Listen and read the cheat sheet about wiring codes again. What does it mean if a wire is embossed with an 'H' or a 'W'?

Listening

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

- ___ The wire the electricians are installing needs to be protected from rain.
- ___ The electricians disagree about the right wire gauge.
- ___ The wire is going to be buried.

- 7 Listen again and complete the conversation.

Electrician 1: What kind of wire should we put in the 1 _____?

Electrician 2: I think a 2 _____ will work.

Electrician 1: I missed that 3 _____. Do you mind repeating it?

Electrician 2: I said I think we can use a 12-gauge.

Electrician 1: Oh! This area gets a lot of rain. We probably need a wire with a 'W' 4 _____ on it, right?

Electrician 2: Sorry, I didn't catch what you said.

Electrician 1: I asked if we need a wire with a 'W'?

Electrician 2: Yes. That would be a 5 _____.

Electrician 1: Okay. I found the 6 _____.

Speaking

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

USE LANGUAGE SUCH AS:

What kind of ...

I think ...

We probably need ...

Student A: You are an electrician. Talk to Student B about:

- where the wire will go
- what is the best wire gauge
- what special markings the wire should have

Student B: You are an electrician. Talk to Student A about why a certain kind of wire is best for the location.

Writing

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

Work Order Record

Location of Wiring Job: _____

Wire Gauge Used: _____

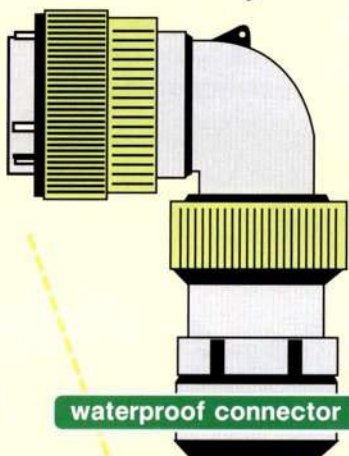
Special Considerations: _____

HOME

ABOUT US

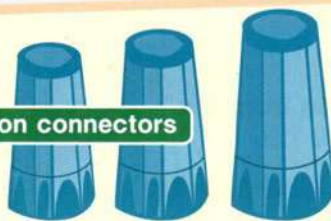
SERVICES

CONTACT

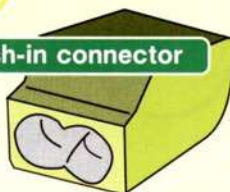


waterproof connector

twist-on connectors



push-in connector



winged connector



strap type

adjustable type

grounding connectors



Most wire connectors have a **thermoplastic shell** and a **spring** inside. The color depends on the gauge of the wire.

Which Wire Connector is Right for You?

Ask these questions:

Is the wire indoors?

Yes

Try ordinary **twist-on** or **crimp-on connectors**.

No

Try **underground** or **waterproof connectors** to protect the wires outdoors.

Can you twist the wires?

Yes

Try an ordinary twist-on connector, or a **winged connector** for extra leverage.

No

Try a **push-in connector**.

Are you making a ground connection?

Yes

Try a **grounding connector**.

No

Try a twist-on connector.

Reading

2 Read the store webpage on wire connectors. Then, choose the correct answers.

- What is the main purpose of the webpage?
 - to explain how a wire connector works
 - to help someone choose the right wire connector
 - to show that waterproof connectors protect the wires
 - to show how a wire connector is used
- Which of the following is NOT true according to the webpage?
 - Use push-in connectors when you can't twist the wires.
 - Underground connectors protect wires outdoors.
 - Crimp-on and twist-on connectors are both used indoors.
 - Make a grounding connection with an underground connector.
- What does the color of a wire connector depend on?
 - the voltage of the wire
 - the number of wires
 - the gauge of the wire
 - the type of shell

Vocabulary

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

- | | |
|------------------------|------------------------|
| 1 — spring | 4 — push-in connector |
| 2 — thermoplastic | 5 — crimp-on connector |
| 3 — twist-on connector | 6 — shell |

- a fire-resistant material
- the outer part of the connector that protects wires
- a connector that uses holes instead of twisting to splice wires
- a connector that is put into place with a special tool
- a connector that splices wires together by twisting
- the part of the connector that creates pressure to tightly splice wires

Get ready!

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

- What are some different kinds of wire connectors?
- Why is it important to use the right kind of wire connector?

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

1 waterproof connector / underground connector

A He needed a(n) _____ for the wires he planned to bury.

B It is best to use a _____ when there's a possibility wires may get wet.

2 grounding connector / winged connector

A Using a _____ is a good way to prevent shocks.

B A _____ is easier to tighten than other types.

5 Listen and read the store webpage on wire connectors again. Why is it best to use an underground connector or a waterproof connector when a wire is outside?

Listening

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

- 1 ___ The customer wants to wire the lights on her deck.
- 2 ___ The salesperson says the customer needs a twist-on connector.
- 3 ___ The salesperson will show the customer where to find the right connector.

7 Listen again and complete the conversation.

Clerk: Welcome to Home Improvement Plus! How can I help you today?

Customer: Thanks. Actually I'm looking for a 1 _____. I need to wire the lights on my deck.

Clerk: An 2 _____ deck? You should check out our underground or 3 _____ connectors.

Customer: Oh, really? I thought I could use a twist-on connector. I used to have some at home, but I must have 4 _____.

Clerk: Normally those are great. But for outdoor wiring, the waterproof connectors are the best choice. They help 5 _____.

Customer: Okay, that makes sense.

Clerk: I could 6 _____ where those are.

Customer: Thanks, that would be great!

Speaking

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

USE LANGUAGE SUCH AS:

Welcome to ...

I'm looking for a ...

I thought ...

Student A: You are a store clerk. Talk to Student B about:

- what he or she needs
- your recommendation
- why another product is not needed

Student B: You are a customer. Talk to Student A about what product you should buy.

Writing

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

Home Improvement Plus

Customer Feedback Form

What did you purchase? _____

Did you get help from an employee?
Y / N

Was he or she helpful? If so, please explain.

Glossary

AC [N-UNCOUNT-U11] **AC**, or alternating current, is a type of electric current that constantly flows back and forth in different directions.

add [V-T-U9] To **add** numbers is to combine them.

allen wrench [N-COUNT-U2] An **allen wrench** is an L-shaped piece of metal with a six-sided head used to tighten screws and bolts.

ampere [N-COUNT-U11] An **ampere** is a unit of measurement for electricity.

and [CONJ-U9] **And** is used when combining or adding numbers. For example, one and one equals two.

arc flash blanket [N-COUNT-U6] An **arc flash blanket** is a blanket electricians use to protect themselves from electrical blasts and fires.

arc flash clothing [N-UNCOUNT-U6] **Arc flash clothing** is pants, shirts, jackets, and shoes designed to protect electricians from electric shock.

arc shield [N-COUNT-U6] An **arc shield** is a protective plastic shield for the eyes and face that fits onto a hard hat.

armored cable (AC) [N-COUNT-U13] An **armored cable (AC)** is a wire encased in a spiraled steel insulation with no grounding wires.

auger bit [N-COUNT-U3] An **auger bit** is a bit that cuts into wood. These bits are usually from 17 to 25 centimeters long.

bind [V-T-U8] To **bind** is to put two things together with rope or tape.

block [N-COUNT-U5] A **block** is a piece of stone, wood or other material that is solid with flat surfaces on each side.

brick [N-COUNT-U5] A **brick** is a block of clay that is baked until it is hard and used for building.

burn [N-COUNT-U12] A **burn** is a painful injury to the body caused by heat.

caliper [N-COUNT-U10] A **caliper** is a small measuring device.

Celsius [N-UNCOUNT-U10] **Celsius** is the metric temperature scale where water freezes at 0 degrees and boils at 100 degrees.

cement [N-UNCOUNT-U5] **Cement** is a mixture of ground limestone and clay.

centimeter [N-COUNT-U10] A **centimeter** is a metric unit that measures length or distance, equal to ten millimeters.

circular saw [N-COUNT-U3] A **circular saw** is an electric or gas-operated saw with a round blade.

climb [V-T-U7] To **climb** is to ascend or move up towards the top of something.

code [N-COUNT-U14] A **code** is a set of numbers or letters that gives information about something.

come to [V PHRASE-U9] To **come to** a number is to equal that number.

concrete [N-UNCOUNT-U5] **Concrete** is a hard material made by combining cement, small stones, sand and water.

conductor [N-COUNT-U13] A **conductor** is a wire. It is the metal part of a cable that carries electricity.

conduit bender [N-COUNT-U4] A **conduit bender** is an instrument that twists objects made of metal.

connect [V-T-U8] To **connect** is to plug in or turn on electricity or power.

convert [V-T-U10] To **convert** something is to change it from one state or mode into another.

copper [N-UNCOUNT-U5] **Copper** is a reddish brown metal that is often used for pipes or wires.

crimper [N-COUNT-U2] A **crimper** is a tool used for pushing connectors around bare wires.

crimp-on connector [N-COUNT-U15] A **crimp-on connector** is a type of connector that is fixed in place by using a crimping tool.

current [N-COUNT-U11] A **current** is the quantity of electricity that is flowing in a wire at a specific time.

DC [N-UNCOUNT-U11] **DC**, or direct current, is a type of electricity that goes in one direction, not two.

de-energize [V-T-U12] To **de-energize** is to prevent power from reaching an object, especially electrical equipment.

degree [N-COUNT-U10] A **degree** is a unit that is used to measure temperature.

diagonal cutters [N-PLURAL-U1] **Diagonal cutters** are pliers that are only used for cutting wire and do not grip.

diameter [N-COUNT-U14] The **diameter** of a circle is an imaginary line that runs through it showing its width.

divided by [V PHRASE-U9] If a number is **divided by** a second number, you calculate how many times the second number goes into it.

drill [N-COUNT-U3] A **drill** is a machine used to make holes in different kinds of material.

drill bit [N-COUNT-U3] A **drill bit** is the sharp end of a drill used to cut into objects to make holes.

drywall [N-UNCOUNT-U5] **Drywall** is a board made of plaster and covered in paper that is used in building.

duct tape [N-UNCOUNT-U2] **Duct tape** is a kind of tape made of mesh that is used to seal air ducts.

electric shock (N-COUNT-U6) An **electric shock** is a shock of electricity to the body.

electrical hot gloves [N-PLURAL-U6] **Electrical hot gloves** are gloves made of rubber that protect electricians from electric shock.

electrical tape [N-UNCOUNT-U2] **Electrical tape** is a kind of tape made of plastic or vinyl that is used to insulate electrical wires.

electrocution [N-UNCOUNT-U12] **Electrocution** is death or injury caused by electricity running through the body.

electron [N-COUNT-U11] An **electron** is a small part of an atom that contains a negative charge.

embossed [ADJ-U14] If an object is **embossed**, it has a pattern, number or design engraved on it.

end cutting pliers [N-PLURAL-U1] **End cutting pliers** are pliers used for pulling out staples etc.

equal [V-T-U9] If the answer to a mathematical problem **equals** a number, it is that number.

Fahrenheit [N-UNCOUNT-U10] **Fahrenheit** is the non-metric temperature scale where water freezes at 32 degrees and water boils at 212 degrees.

fish tape [N-COUNT-U4] A **fish tape** is a long, metal instrument that electricians use to put electrical wires in walls.

flashlight [N-COUNT-U1] A **flashlight** is a small, battery operated light that can be carried around.

foot [N-COUNT-U10] A **foot** is a unit of length that equals 12 inches.

gauge [N-COUNT-U14] A **gauge** is a device which calculates and shows the amount or degree of what is inside an object, such as a gas tank or wire.

grab [V-T-U7] To **grab** something is to take hold of it suddenly.

grounding connector [N-COUNT-U15] A **grounding connector** is for making ground connections. It is used for splicing wires that need to be grounded.

hacksaw [N-COUNT-U2] A **hacksaw** is a saw with a thin blade used to cut through metal.

hammer [N-COUNT-U2] A **hammer** is a tool with a metal top used for hitting nails or other objects.

hammer drill [N-COUNT-U4] A **hammer drill** is a machine which hits a hard substance (like cement) repeatedly to break it apart.

hard hat [N-COUNT-U6] A **hard hat** is a protective hat made of strong plastic.

hazard [N-COUNT-U12] A **hazard** is a known danger.

hole saw bit [N-COUNT-U3] A **hole saw bit** is a metal tube-shaped drill bit with sharp edges used to cut rings into objects.

Glossary

- hot stick** [N-COUNT-U6] A **hot stick** is a fiberglass rod that electricians use to protect themselves from shocks when they are working with wires.
- hundred** [N-COUNT-U9] A **hundred** is combined with another number to express numbers in the thousands. For example, the number 2,300 could be stated twenty-three hundred.
- imperial** [ADJ-U10] If something is **imperial**, it involves the system of measurement based on the inch and the pound.
- inch** [N-COUNT-U10] An **inch** is an imperial unit that measures length or distance.
- inspect** [V-T-U8] To **inspect** is to look at or analyze something carefully.
- install** [V-T-U8] To **install** is to arrange, connect or put something in a certain place so you can use it.
- insulated** [ADJ-U13] If a wire is **insulated**, then it is protected from touching other wires. This helps prevent fires and short circuiting.
- is** [V-T-U9] If something **is** something else, they are equal.
- jacket** [N-COUNT-U13] A **jacket** is the insulated sheath that protects the wires from touching each other or getting too hot.
- jigsaw** [N-COUNT-U3] A **jigsaw** is an electric or gas-operated saw with a thin blade, which cuts straight and rounded edges into objects.
- kneel** [V-I-U7] To **kneel** is to support oneself on one or both knees.
- knob and tube (K&T) wiring** [N-UNCOUNT-U13] **Knob and tube (K&T) wiring** is wires encased in porcelain knobs and tubes. It is usually found in older homes.
- labeling machine** [N-COUNT-U4] A **labeling machine** is an instrument electricians use to make labels for different objects.
- leather gloves** [N-PLURAL-U6] **Leather gloves** are gloves that are made of leather and used to protect the hands.
- less** [PREP-U9] **Less** is used when taking a number away from another.
- level** [N-COUNT-U4] A **level** is a tool electricians use to ensure they install things in a straight line.
- lift** [V-T-U7] To **lift** something is to move it to a higher position.
- lineman's pliers** [N-PLURAL-U4] **Lineman's pliers** are tools workers use to twist and slice wires.
- live wire** [N-COUNT-U12] A **live wire** is a wire with electrical energy running through it.
- location** [N-COUNT-U14] A **location** is a place or site.
- lockout/tagout procedure** [N-COUNT-U12] A **lockout/tagout procedure** is when a lock is placed on a power source after it has been turned off and a label is placed on the equipment to show that it has been locked.
- long nose (needle nose) pliers** [N-PLURAL-U1] **Long nose pliers** are pliers with long blades able to grip or cut through wires.
- masonry drill bit** [N-COUNT-U4] A **masonry drill bit** is a bit that is made to drill through hard surfaces like stone or concrete. It is usually used with a hammer drill.
- maximum** [ADJ-U14] **Maximum** is the most of something that is achievable.
- measuring tape** [N-COUNT-U1] A **measuring tape** is a tool with a long piece of thin metal, paper or plastic with numbers on it.
- metal-clad (MC) cable** [N-UNCOUNT-U13] **Metal-clad (MC) cable** is wires encased in steel insulation, and it has a green ground wire inside the metal jacket.
- meter** [N-COUNT-U10] A **meter** is a unit of length that measures 100 centimetres or 39 inches.
- metric** [ADJ-U10] If something is **metric**, it involves the system of measurement based on the meter and the kilogram.

micrometer [N-COUNT-U10] A **micrometer** is a type of caliper with a calibrated screw used to measure small distances.

millimeter [N-COUNT-U10] A **millimeter** is a metric unit that measures length or distance, equal to 1/10 of a centimeter.

minus [PREP-U9] **Minus** is used when taking away a number from another.

mortar [N-UNCOUNT-U5] **Mortar** is a mixture of sand, water and lime used to hold bricks or stones in place.

multimeter [N-COUNT-U4] A **multimeter** is a device used to determine a wire's amount of voltage and power.

multiplied by [V PHRASE-U9] If a number is **multiplied by** another, it is added onto itself that number of times.

nonmetallic (NM) sheath cable [N-UNCOUNT-U13] **Nonmetallic (NM) sheath cable** is wires in a non-metal jacket.
The jacket is made of a material like thermoplastic.

nut driver [N-COUNT-U2] A **nut driver** is a tool used for tightening nuts.

ohm [N-COUNT-U11] An **ohm** is a unit of measurement showing electrical resistance.

ought [N-UNCOUNT-U14] **Ought** is nothing or nil.

over [PREP-U9] If one number **over** another number, it is divided by that number.

paralyze [V-T-U12] To **paralyze** is to freeze the muscles so they cannot move.

Phillips screwdriver [N-COUNT-U2] A **Phillips screwdriver** is a tool used to tighten screws that have a cross-shaped head.

plaster [N-UNCOUNT-U5] **Plaster** is a mixture of lime, sand and water used in buildings to cover walls and ceilings.

plug-in analyzer [N-COUNT-U4] A **plug-in analyzer** is a machine used to check circuits to make sure they are correctly installed and safe.

plus [PREP-U9] **Plus** is used when adding numbers.

plywood [N-UNCOUNT-U5] **Plywood** is a board made of thin layers of wood that are glued together.

pull [V-T-U8] To **pull** is to put force on an object in order to move it closer to you.

push [V-T-U8] To **push** is to put force on an object in order to move it away from you.

push-in connector [N-COUNT-U15] Instead of twisting, wires are pushed in through holes in the **push-in connector**.

rating [N-COUNT-U14] A **rating** is a list grading and comparing objects on their worth, usefulness or value.

reciprocating saw [N-COUNT-U3] A **reciprocating saw** is an electric or gas-operated saw that has a few different blades which can be switched.

release [V-T-U7] To **release** something is to let it free or let it go.

replace [V-T-U13] To **replace** is to take away an old wire and put a new wire in its place.

resistance [N-UNCOUNT-U11] Electrical **resistance** is the way certain substances work against electricity.

resistant [ADJ-U14] If an object is **resistant**, it is not affected by certain things such as heat or water.

risk [N-COUNT-U12] A **risk** is a chance that something bad will happen.

rotary drill [N-COUNT-U5] A **rotary drill** is a drill that moves in circles to cut something.

rotary hammer [N-COUNT-U5] A **rotary hammer** hits things hard, while turning, to drill into something.

round off [V PHRASE-U10] To **round off** a screw or bolt is to damage it so that it cannot be moved properly with normal tools.

rubber mat [N-COUNT-U6] A **rubber mat** is a mat made of rubber that electricians stand on to protect themselves from electric shock.

Glossary

safety glasses [N-UNCOUNT-U6] **Safety glasses** are clear glasses made of thick plastic that protect electricians' eyes from flashes and dangerous materials.

screwdriver [N-COUNT-U1] A **screwdriver** is a tool used to tighten or loosen screws.

service entrance (SE) cable [N-COUNT-U13] A **service entrance (SE) cable** is used for wiring outside and above ground.

sheath [N-COUNT-U14] A **sheath** is a plastic casing that protects wires.

shell [N-COUNT-U15] A **shell** is a covering used on connectors to protect wires. It is usually made of fire resistant thermoplastic.

shock [V-T-U12] To **shock** is to pass electricity through the body.

side cutters [N-PLURAL-U1] **Side cutters** are a type of pliers used for cutting, twisting or pulling wires.

socket wrench [N-COUNT-U2] A **socket wrench** is a tool used to tighten bolts.

spade bit [N-COUNT-U3] A **spade bit** is a narrow bit with a sharp tip and edges.

splice [V-T-U8] To **splice** is to join two wires by twisting them and connecting the ends.

split [V-T-U7] To **split** something is to separate it or divide it into more than two parts.

spring [N-COUNT-U15] A **spring** is a device inside the shell of a connector. The spring creates pressure which tightly splices the wires together.

stand [V-T-U7] To **stand** is to be in a vertical position.

static electricity [N-UNCOUNT-U12] **Static electricity** is an electrical charge made by friction.

steel [N-UNCOUNT-U5] **Steel** is a metal that is made from combining iron and carbon.

steel toe boots [N-PLURAL-U6] **Steel toe boots** are boots with a layer of steel in the front so that workers' feet won't be hurt by objects that fall.

stepped drill bit [N-COUNT-U4] A **stepped drill bit** is a drill bit that is used to drill through metal, plastic or wood.

stone [N-UNCOUNT-U5] **Stone** is the hard substance rocks are made from, and is often used in buildings.

stoop [V-I-U7] To **stoop** is to stand with the top half of the body bent forward.

strip [V-T-U8] To **strip** is to take the plastic covering off wires so that only the metal is left.

stud punch [N-COUNT-U4] A **stud punch** is a device that cuts holes for wires to go through.

subtract [V-T-U9] To **subtract** a number is to take it away from another number.

test [V-T-U8] To **test** is to turn something on or try something to see if it works.

eighth [N-COUNT-U9] An **eighth** is one of eight equal parts of something.

thermoplastic [ADJ-U15] **Thermoplastic** describes the fire resistant material that is used to make connector shells.

times [PREP-U9] **Times** is used when multiplying numbers.

tool belt [N-COUNT-U2] A **tool belt** is a belt with loops for carrying tools while working on a job.

tool kit [N-COUNT-U1] A **tool kit** is a bag or box used to hold a set of tools.

torque wrench [N-COUNT-U2] A **torque wrench** is a tool that can be adjusted to create different amounts of force when turning a bolt.

turn off [V PHRASE-T-U7] To **turn** something **off** is to make it cease operating or stop working.

turn on [V PHRASE-T-U7] To **turn** something **on** is to make it operate or start working.

twist [V-T-U8] To **twist** something is to turn it or bend it.

twist bit [N-COUNT-U3] A **twist bit** is a drill bit with a spiral or coil-shaped cutting part.

twist-on connector [N-COUNT-U15] A **twist-on connector** is a wire connector that is twisted on. It connects or splices one or more wires.

underground connector [N-COUNT-U15] When a connection may be exposed to water, moisture, and the elements, or buried underground, an **underground connector** is used.

underground feeder (UF) cable [N-COUNT-U13] An **underground feeder (UF) cable** is used outdoors and can be buried directly underground. It can be used in wet areas.

utility knife [N-COUNT-U1] A **utility knife** is a tool with a thin, sharp slanted blade used to cut things.

volt [N-COUNT-U11] A **volt** measures the strength of the force moving electricity.

voltage [N-UNCOUNT-U11] **Voltage** is the force of moving electricity.

waterproof connector [N-COUNT-U15] A **waterproof connector** is designed to protect wires from water.

watt [N-COUNT-U11] A **watt** is a unit of measurement for electrical power.

winged connector [N-COUNT-U15] A **winged connector** is a twist-on connector with extra plastic wings. This makes it easier to tighten.

wire strippers [N-PLURAL-U1] A **wire stripper** is a tool used for pulling the covering off wires.

wood [N-UNCOUNT-U5] **Wood** is a substance that comes from trees and is used for building.

wood auger [N-COUNT-U3] A **wood auger** is a big drill bit which smooths the rough parts of holes in wood.

yard [N-COUNT-U10] A **yard** is a unit of length that equals 3 feet.

**CAREER
PATHS**

Electrician

Book

2

Virginia Evans

Jenny Dooley

Tres O'Dell



Express Publishing

Scope and sequence

Unit	Topic	Reading context	Vocabulary	Function
1	Electrical connectors	Store webpage	connector, terminal block connector, post connector, insulation displacement connector, plug and socket connector, blade connector, ring terminal, spade terminal, split bolt connector, clamp connector, offset connector, solderless connector	Repeating something back
2	Conduit systems	Newspaper advertisement	conduit, non-metallic tubing, electrical metallic tubing, moisture tight fitting, installation, protection, grounded, flexible, non-corrosive, building code, route	Making an appointment
3	Buried and aerial service entrances	Textbook excerpt	service entrance (SE), utility transformer, buried service, aerial service, service drop, service cable, clearance, right-of-way, utility pole, service lateral, drip loop	Giving advice
4	Panels	Magazine article	main service panel, main switch, branch circuit, overcurrent, accommodate, gadget, hot bus, neutral bus, function, cut off, manually, capacity, safeguard	Offering choices
5	Subpanels	DIY web article	subpanel, secondary, short circuit, hot conductor, neutral return conductor, grounding conductor, bond, feeder cable, continuous, remote, malfunction, safety precaution, component	Giving praise
6	Fuses and circuit breakers	Manufacturer's guide	fuse, circuit breaker, overload, ground fault, cartridge fuse, plug fuse, trip, single pole breaker, double pole breaker, blown fuse, replacement	Describing an object
7	Balancing the load	DIY magazine article	electrical load, balance, analyze, stability, consumption, amperage, parity, appliance, corresponding, owner's manual, transfer, draw, snap	Describing a process
8	Receptacle boxes	Textbook excerpt	outlet box, volume, overcrowded, short, deep, handy box, cut-in box, shallow, pancake box, integral nail box, weatherproof, mount	Giving feedback
9	Receptacles	Web forum	outlet, duplex outlet, single outlet, outlet cap, polarity, grounding pin, plug, grounding slot, narrow slot, wide slot, immediate turn plug, cheater plug, hook up	Giving assurances
10	Switch boxes	DIY webpage	single gang box, two gang box, three gang box, four gang box, grounding screw, coverplate, wall cavity, flush, box extender, bracket, control	Declining something
11	Types of switches	Web forum	residential grade switch, open circuit, commercial grade switch, single pole switch, double pole switch, three-way switch, four-way switch, toggle switch, pilot light switch, timer switch, keyed switch, dimmer switch	Asking for an opinion
12	Grounding systems	Advertisement	equipment grounding conductor, earth grounding system, ground, grounding electrode conductor, ground fault, fault current, surge arrester, stray voltage, ground rod, clamp, estimate	Finding out cost
13	Installing a grounding system	Installation pamphlet	drive, resistance, footer, sphere of influence, ground wire, parallel, panel bond, ditch, soil condition, bonding wire	Agreeing with an assessment
14	Electrical fires	Government fact sheet	electrical fire, combustible, faulty, frayed, ignite, precaution, overheat, flicker, evaluate, fixed wiring, maintenance	Pointing things out
15	Electrical safety at home	Website article	prevention, safety cover, traffic, baseboard, zip cord, temporary, permanent, securely, flammable, fail, worn out, adapter, breaker box	Saying something is dangerous

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HOME

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www.donselectricalsupply.com

Don's Electrical Supply

Don's Electrical Supply has all the **connectors** you need at great prices. Whatever the connection, we have the connector!

Are you looking to connect wires to equipment? We have many connectors to serve your needs. We carry **post connectors**, **blade connectors**, **ring terminals**, and **spade terminals**.

Or perhaps you need to connect wires to other wires. If this is the case, we can provide you with a variety of **solderless connectors**. We have **terminal block connectors**, **plug and socket connectors**, and **clamp connectors**.

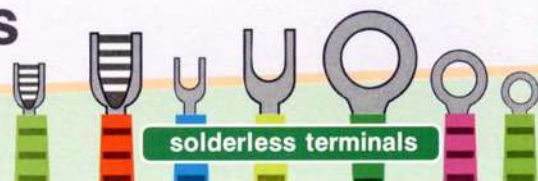
We also have some other items for more specific types of connections:

Insulation displacement connectors are available if you don't want to strip wires.

For connecting larger size wire, we have **split bolt connectors**. For changing the wiring on your electrical box, **offset connectors** are available.

You can place an order online anytime at www.donselectricalsupply.com.

You can also call us at 1-800-376-8532 between 8:00 a.m. and 8:00 p.m.



solderless terminals

split bolt connector

post connector

clamp connector

plug and socket connector

Get ready!

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

- 1 What are some different kinds of wire connectors?
- 2 When is it acceptable for electricians to substitute one kind of connector for another?

Reading

2 Read the store webpage about connectors. Then, mark the following statements as true (T) or false (F).

- 1 ☐ Split bolt connectors are used for changing wires on electrical boxes.
- 2 ☐ Insulation displacement connectors make stripping wires unnecessary.
- 3 ☐ Post connectors splice two different wires.

Vocabulary

3 Match the words (1-4) with the definitions (A-D).

- 1 ☐ offset connector
- 2 ☐ clamp connector
- 3 ☐ split bolt connector
- 4 ☐ insulation displacement connector

- A connects wires without stripping them
- B uses a V-shaped ring to connect wires
- C changes the direction of a wire
- D used for taps and splices in building wiring

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

Word BANK

- terminal block connector
post connector
clamp connector
blade connector
ring terminal spade terminal
plug and socket connector

Connects Wires to Equipment

Connects Wires Together

- 5 Listen and read the store webpage about connectors again. Why are there so many different types of connectors?

Listening

- 6 Listen to a conversation between an electrician and a supplier. Choose the correct answers.

- What is the purpose of the conversation?
A to place an order for different connectors
B to find out which connectors are in stock
C to learn how to use each kind of connector
D to compare the prices of connectors
- Why does the man order a post connector?
A to connect two different kinds of wires
B to connect a wire to some speakers
C to cap off the end of a spliced wire
D to connect a large wire

- 7 Listen again and complete the conversation.

Electrician: I have 1 _____ that I need to order.

Supplier: Okay. We have all types of connectors.

Electrician: Good. First of all, I need something to 2 _____ to some large speakers. What about a post connector?

Supplier: That would work. I'll just check availability. You said 3 _____, right? Okay, I do have those 4 _____ right now.

Electrician: Great. I'll take a pack of those. I also need to connect some wires. Do you have any 5 _____?

Supplier: We sure do. What kind do you need?

Electrician: I'll take two packs of 6 _____ please, and four packs of socket connectors.

solderless connector

Speaking

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

USE LANGUAGE SUCH AS:

First of all ...
What about ...
I'll take ...

Student A: You are an electrician. Talk to Student B about:

- why you need connectors
- what kinds of connectors you need
- the price of the connectors

Student B: You are a supplier. Talk to Student A about the different kinds of connectors.

Writing

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

blade terminals

Purchase Order Form

Item: _____

Quantity: _____

Item: _____

Quantity: _____

Total price: _____

Reason for Order: _____

Additional Information: _____

Need CONDUIT installation?

Look no further! My name is Gary Parsons and I am a highly qualified electrician.

First off, I have all types of conduit tubing. Choose **non-metallic tubing** or **electrical metallic tubing** for your home or business. I will give recommendations based on your needs.

What's most important is that I have the know-how to do any type of job. For those tough **routes**, I have **flexible** conduits. For homes with complicated

building codes, I can use **grounded** connectors.

Have corrosion, fire, or water issues in your home? No problem! Many of my conduits have **protection** against these. For example, **moisture tight fittings** are especially made to keep water out. I also have a variety of **non-corrosive** conduits.

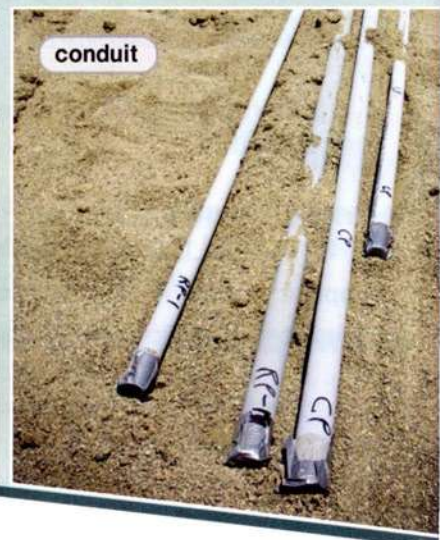
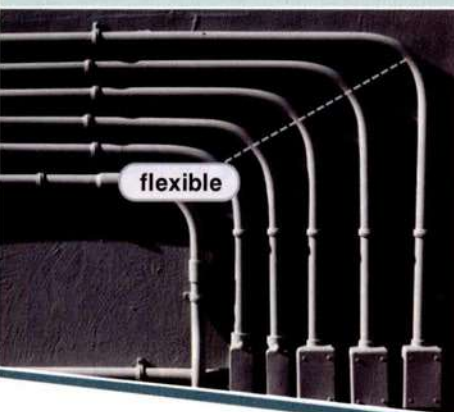
The bottom line is that I understand the needs of your specific **installation**. And if you're not happy with my work, I'll give you your money back!

GND
symbol



grounded

Inner conduit casing



Get ready!

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

- 1 Why do electricians use conduits?
- 2 How are different types of conduits used?

Reading

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

- 1 — The electrician recommends non-metallic tubing instead of metallic tubing.
- 2 — Flexible conduits are needed in homes with complicated building codes.
- 3 — Moisture tight fittings offer extra protection.

Vocabulary

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

- | | |
|----------------|--------------------------------|
| 1 — route | 4 — non-corrosive |
| 2 — grounded | 5 — moisture tight fitting |
| 3 — protection | 6 — electrical metallic tubing |

- A the ability to keep out dangers
 B a conduit made of steel or aluminum
 C a specified course or path
 D not damageable by chemicals
 E a conduit designed to keep water out
 F connected to the earth

4 Read the sentence and choose the correct word.

- 1 We need a **flexible / noncorrosive** conduit to run the wire around that corner.
- 2 This wiring job violates the city's **protection / building code**.
- 3 The electrician chose **non-metallic tubing / electrical metallic tubing** because she prefers working with plastic.
- 4 You should install a **route / conduit** to protect those wires.

5 Listen and read the newspaper advertisement for conduit installation again. Why would an electrician use flexible conduits?

Listening

6 Listen to a conversation between an electrician and a building owner. Choose the correct answers.

- 1 What is the purpose of the conversation?
A to determine if conduits are necessary
B to compare different types of conduits
C to set up a conduit installation
D to describe the advantages of a conduit
- 2 Why is the man bringing moisture tight fittings?
A Some areas are exposed to water.
B They work best with non-metallic tubing.
C The conduits must fit around corners.
D They work better than flexible conduits.

7 Listen again and complete the conversation.

Electrician: 1 _____ - _____ works well most of the time. Do you have any areas with heavy exposure to chemicals or water?

Building Owner: Not too many. We may need some 2 _____, but not a lot.

Electrician: Okay. I'll bring some of those and also some 3 _____ in case we need to get around any corners.

Building Owner: Sounds good. When would be a good time for you 4 _____?

Electrician: How about Wednesday morning? I have a job in the 5 _____, but I could come by around 11:00.

Building Owner: 11:00 in the morning isn't a good time. What about 3:00 on Wednesday afternoon?

Electrician: 3:00 in the afternoon 6 _____. 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 kind of ...
I think ... would be fine.
I'll bring some ... and also some ...

Student A: You are an electrician. Talk to Student B about:

- conduit installation and site conditions
- types of conduits needed
- when you can arrive at the jobsite

Student B: You are a building owner. Talk to Student A about a conduit installation.

Writing

9 Use the conversation from Task 8 to fill out the electrician's work order.

Gary Parsons
ELECTRIC

Work Order

Account #: 7759

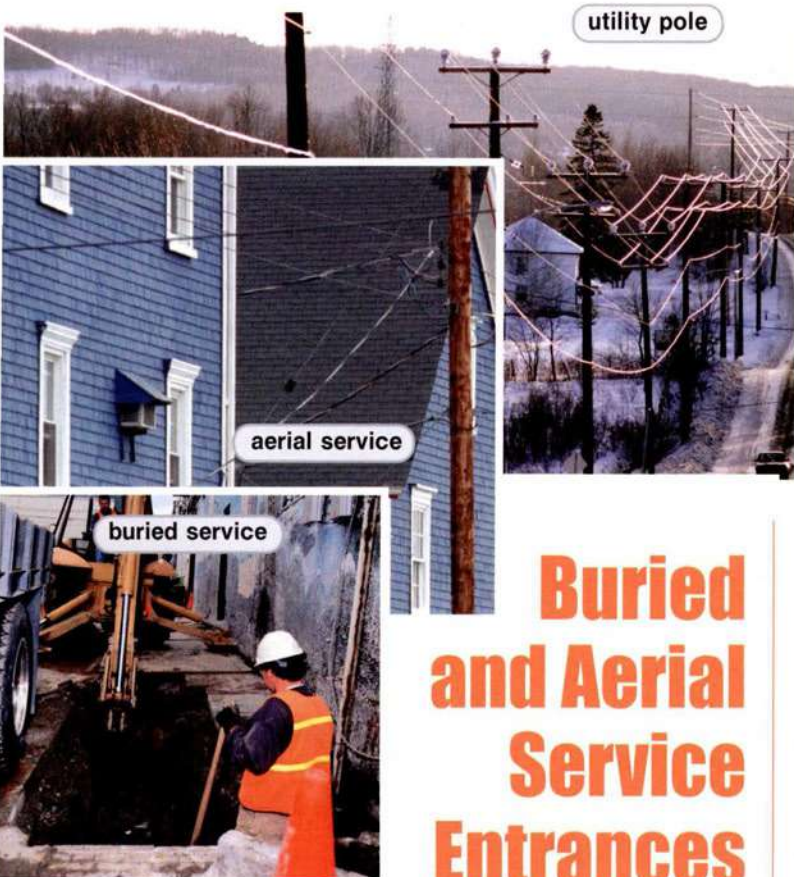
Job Start Time: _____

Building Conditions: _____

Products Needed: _____

Get ready!

- ① Before you read the passage, talk about these questions.
- 1 What are the advantages and disadvantages of a buried service entrance?
 - 2 What are the advantages and disadvantages of an aerial service entrance?



Buried and Aerial Service Entrances

Buried service and **aerial service** entrances both have advantages and disadvantages. Buried service entrances are preferred by some customers. This is because **right-of-way** requirements are smaller. There are also no **clearance** problems with buried services. **Utility poles** are not necessary. There are no **service cables** crossing the roof of the building. Also, there is no visible **service drop**. Fewer trees have to be cut down for a buried service entrance.

Some customers prefer aerial service entrances instead. Problems with the **service entrance (SE)** are easier to see with an aerial service. Also, installing aerial services does not damage landscaping. There is little risk of cutting through aerial utilities and they are cheaper.

Aerial service entrances require a **drip loop** for incoming wires. A **utility transformer** and a **service lateral** are required for buried service.

Reading

- ② Read the textbook excerpt on buried and aerial service entrances. Then, complete the table using information from the excerpt.

Service Entrance	Advantages
Buried	
Aerial	

Vocabulary

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

- | | |
|------------------|-------------------------|
| 1 — drip loop | 4 — service entrance |
| 2 — utility pole | 5 — utility transformer |
| 3 — service drop | |

- A a place where electricity enters a building
 B a line that carries electricity to a building
 C a post that supports overhead wires
 D a bend in electrical wires to a building
 E a device that converts voltage from high to low

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

Word BANK

buried service aerial service
 clearance service lateral
 right-of-way

- 1 The _____ provides power to the underground service entrance.
- 2 We installed _____ to avoid digging up the landscaping.
- 3 The power company has a(n) _____ across my property.
- 4 The truck did not have enough _____ to pass under the wires.
- 5 Some people prefer _____ because they don't like seeing electrical cables.

5 Listen and read the textbook excerpt on buried and aerial service entrances again. What is one reason someone might choose a buried instead of an aerial service entrance?

Listening

6 Listen to a conversation between a customer and an electrician. Choose the correct answers.

- 1 What is the purpose of the conversation?
- A to discuss the cost of a service entrance
- B to explain how to install a service entrance
- C to describe the purpose of a service entrance
- D to compare different types of service entrances
- 2 What will the woman likely do next?
- A She will decide to take the cheapest option.
- B She will consult another electrician.
- C She will choose a buried service entrance.
- D She will ask for the man's advice.

7 Listen again and complete the conversation.

Customer: I'm not sure what kind of electrical 1 _____ I want installed at my home.

Electrician: Well, there are two types of services: buried and aerial.

Customer: What's the 2 _____ those two?

Electrician: A buried service goes under the ground. An aerial service is above ground and 3 _____.

Customer: Is there a difference in the cost?

Electrician: Yes. It costs more to install a 4 _____ because more work is required.

Customer: Which one would 5 _____?

Electrician: In my experience, the buried service is 6 _____ because there are fewer wires around your home.

Speaking

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

USE LANGUAGE SUCH AS:

There are two types ...
Is there a difference in ...
The ... is more popular because ...

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

- types of service entrances
- a cost comparison
- advantages of a type of service entrance

Student B: You are an electrician. Talk to Student A about types of service entrances.

Writing

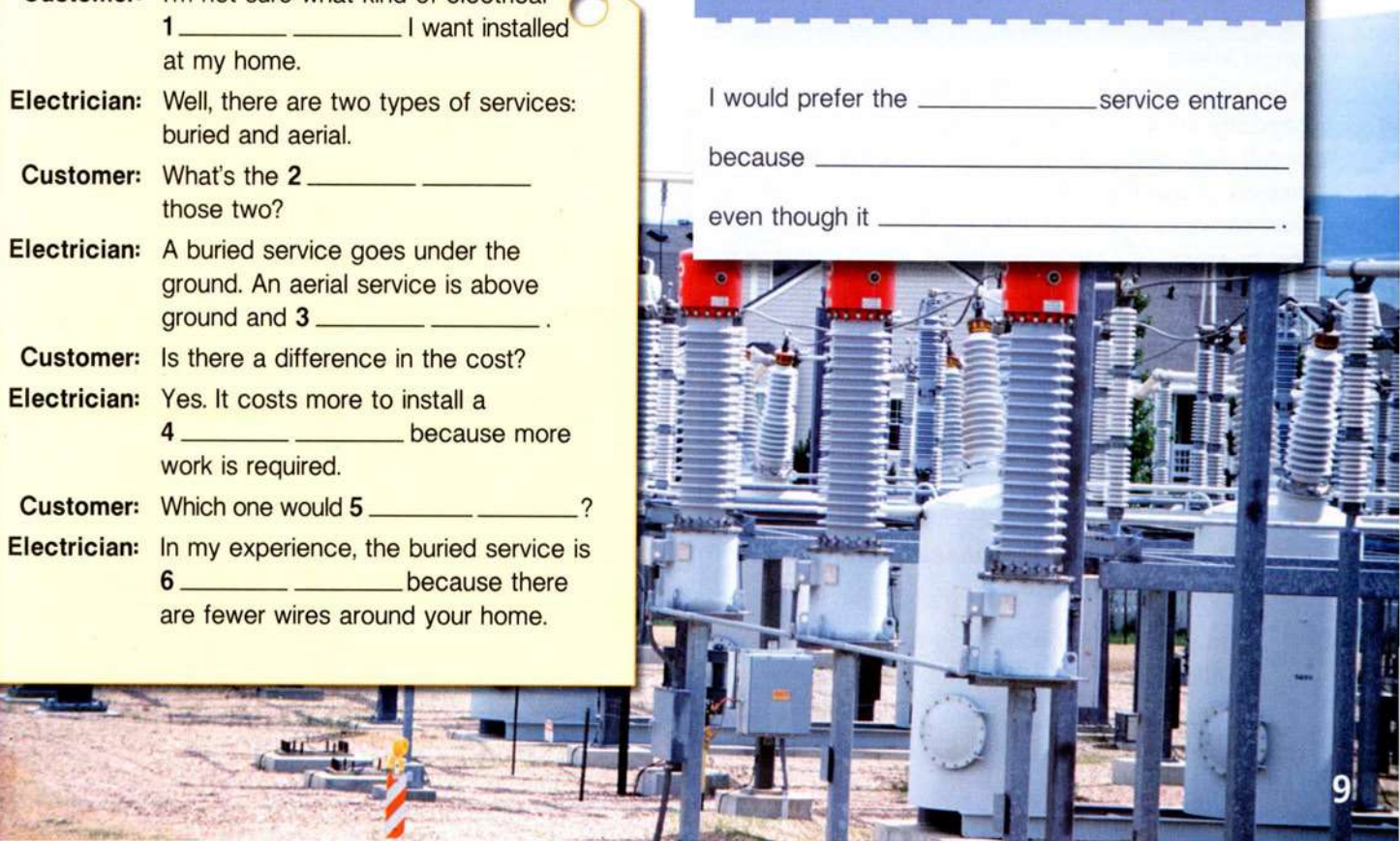
9 Use the conversation from Task 8 to fill out the customer's memo to the electrician.

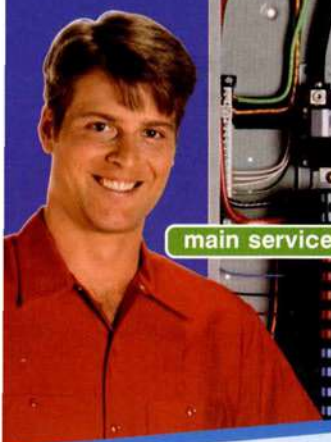
Service Entrances

I would prefer the _____ service entrance

because _____

even though it _____.

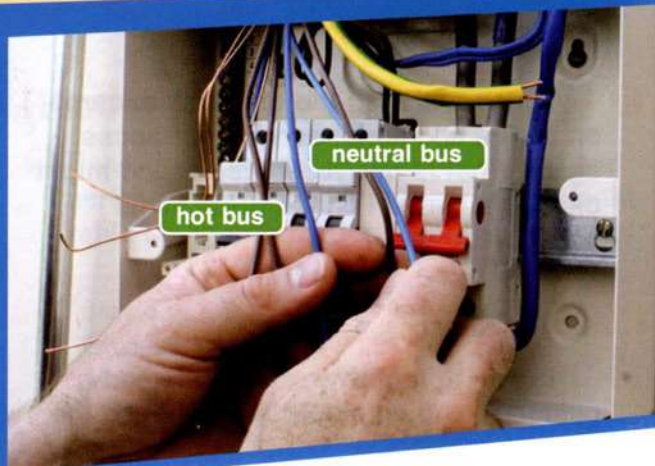




main service panel



overcurrent



hot bus

neutral bus

Smart Improvements Monthly No.9

GET POWERED! Electricity in Your New Home

Today's increased use of high-powered appliances and **gadgets** means you can't risk installing a substandard electrical system.

Before starting installation, you should understand electrical safety **functions**. The **main service panel** is what **safeguards** your system from dangerous malfunctions. This panel houses the **main switch**, where you can **manually** stop the flow of electricity. More importantly, it **cuts off** power to all **branch circuits** automatically when it detects hazardous power levels.

When choosing electrical components, parts with high **capacity** are nearly always better. If you can install a circuit with higher amperage, or two **hot bus** bars instead of one, then go ahead. Having higher capacity than you need poses no dangers. If the capacity is too low, however, you risk **overcurrent**, which can lead to fire or electric shock. You should also make sure your **neutral bus** can safely **accommodate** the spent current as it returns to the service entrance conductor.

Reading

2 Read the magazine article on service panels. Then, mark the following statements as true (T) or false (F).

- 1 ___ The main switch must be switched manually.
- 2 ___ Two neutral bus bars are better than one.
- 3 ___ An electrical system with higher capacity carries increased risk of overcurrent.

Vocabulary

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

- | | |
|--------------------------|-------------------|
| 1 ___ cut off | 4 ___ manually |
| 2 ___ function | 5 ___ overcurrent |
| 3 ___ main service panel | |

- A controlled by a person directly
- B a part that controls power distribution
- C a purpose or intended use
- D an excessive surge of power
- E to stop something abruptly

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

Word BANK

main switch
hot bus

branch circuit
neutral bus

Carries Current	Stops Current
_____	_____
_____	_____
_____	_____

Get ready!

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

- 1 In your country, how does today's technology affect the need for electricity?
- 2 What is a safety concern when installing an electrical system?

- 5 Listen and read the magazine article on service panels again. Why might someone choose to have more electrical capacity than needed?

Listening

- 6 Listen to a conversation between an electrician and a homeowner. Choose the correct answers.

- 1 What is the purpose of the conversation?
- A to discuss the advantages of lower capacity
 - B to determine the capacity of a certain panel
 - C to choose the proper amperage for a panel
 - D to review the cost of a new installation
- 2 Why does the woman want a particular type of panel?
- A It is the same panel she had before.
 - B It is the most popular type of panel.
 - C It is cheaper than the other panels.
 - D It is the best panel for her family's needs.

- 7 Listen again and complete the conversation.

Electrician: We need to decide what kind of 1 _____ you need for your main service panel.

Homeowner: Okay. What are my options?

Electrician: Well, you have a couple of choices. For a 2 _____, we usually install a 100-amp electrical panel, but there's also a 150-amp available.

Homeowner: I definitely want 3 _____. Is 150-amp the highest?

Electrician: There is a 200-amp, but it's probably 4 _____. Also, it'll be a little more expensive.

Homeowner: That's fine. My family uses a lot of 5 _____. In our old house, the main breaker kept cutting off our power because we were using too much.

Electrician: Okay, Ms. Larson, 200-amp it is. I'll 6 _____ and give you an estimate this afternoon.

Speaking

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

USE LANGUAGE SUCH AS:

We need to decide ...
I definitely want ...
There is ... but it's probably ...

Student A: You are an electrician. Talk to Student B about:

- new service panel options
- available capacity
- his or her decision and reason(s)

Student B: You are a homeowner. Talk to Student A about new service panel options.

Writing

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

WORK ORDER

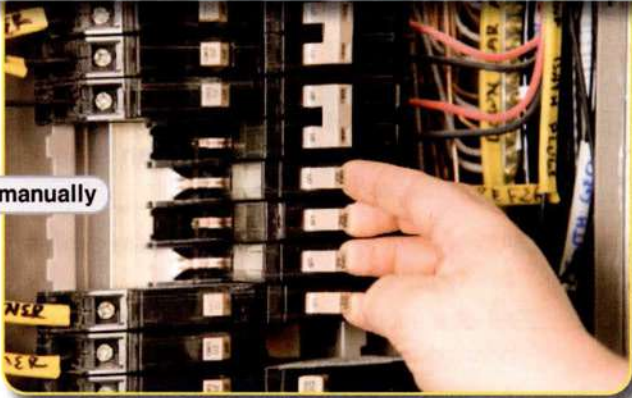
Customer: Ms. Larson

Product to Install: _____

Customer's Preference: _____

Reason for Preference: _____

manually



HOME

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Do it Yourself Do it Right

DO IT!

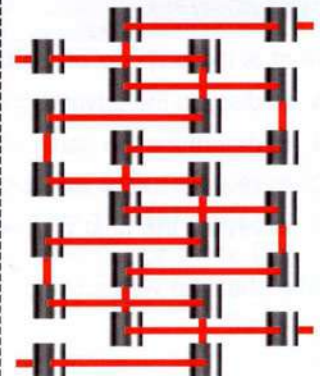
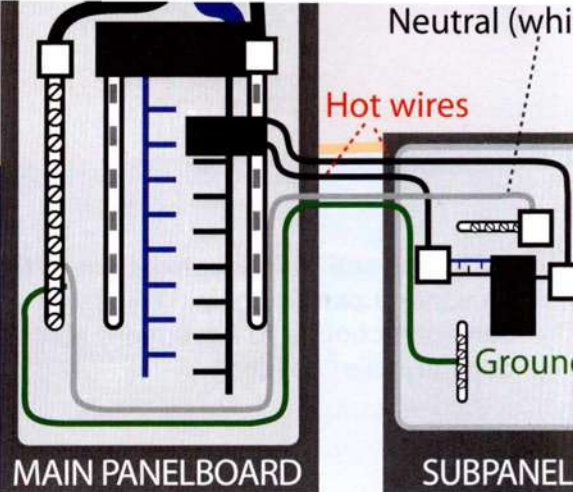
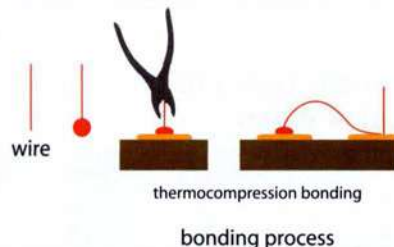
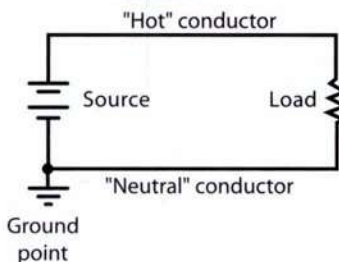
www.do-it-yourself.com

Home Installations > Electrical > Subpanel Overview

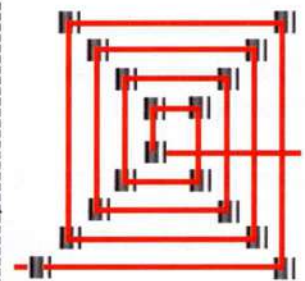
You should install a **subpanel** when you need electricity in a shed or other **remote** unit away from the electrical meter. While these panels are **secondary**, they require the same **safety precautions** as a main panel.

The subpanel needs the same basic **components** as a main panel, but is wired a little differently. Do not **bond** the **neutral return conductor** to the **grounding conductor**. This ensures that spent currents traveling back to the panel do not get carried through the grounding conductor and cause a **short circuit**. Also to avoid **malfunctions**, the **hot conductor** must be **continuous**.

When all the conductors are properly wired, you will install a **feeder cable** to bring electricity from the main panel. You can also install a dedicated main breaker for the subpanel. This isn't necessary though, since its overcurrent protection is in the main panel.



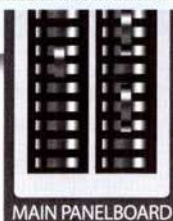
bond



Get ready!

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

- What are some reasons to install a secondary electrical panel?
- What are some elements of a secondary electrical panel?



Vocabulary

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

- | | |
|------------------------------|------------------|
| 1 — bond | 4 — feeder cable |
| 2 — subpanel | 5 — grounding |
| 3 — neutral return conductor | |

- A a wire that carries spent electrical current
 B a secondary panel that delivers electricity to a particular area
 C a wire that delivers electricity to a panel
 D a wire that maintains connection with the earth
 E to fasten two parts together

Reading

2 Read the DIY web article on subpanels. Then, mark the following statements as true (T) or false (F).

- A subpanel and main panel require similar safety measures.
- All of a subpanel's conductors should be bonded together.
- A subpanel must have its own main breaker.

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

Word Bank

short circuit remote hot conductor
secondary continuous

- The light receives electricity from the _____.
- The conductors must have _____ connections to maintain electrical flow.
- A _____ panel is called a subpanel.
- A disrupted electrical connection causes a _____.
- Jim installed a subpanel in the _____ shed behind the house.

- 5 Listen and read the DIY web article on subpanels again. Where does a subpanel get its electricity?

Listening

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

- What is the purpose of the conversation?
A to decide whether to install a main breaker
B to correct an installation error
C to discuss why a part was not installed
D to find out the homeowner's preferences
- Which part does NOT need to be installed?
A subpanel C main breaker
B main panel D cutoff panel

- 7 Listen again and complete the conversation.

Electrician 2: Let me see ... It looks fine to me. You did a 1 _____!

Electrician 1: But when we wired the main panel yesterday, we installed a 2 _____. Don't we have to do the same thing here?

Electrician 2: No, but that's a good question. A main breaker is 3 _____ for a subpanel. In this case, the homeowner didn't need one.

Electrician 1: But isn't that unsafe? What if there's an 4 _____?

Electrician 2: Remember, 5 _____ gets its electricity from the main panel.

Electrician 1: Oh, so if the power is 6 _____ at the main panel, it will be cut off here, too.

Speaking

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

USE LANGUAGE SUCH AS:

Can you take a look ...

Don't we have to ...

Remember, the ... gets its ...

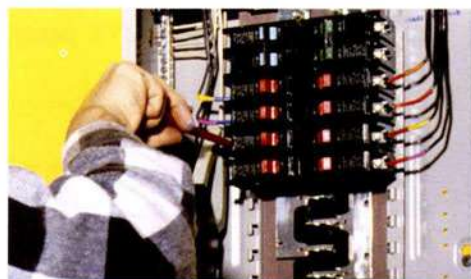
Student A: You are an electrician. Talk to Student B about:

- installing a subpanel
- requirements for subpanels
- what happens during electrical surges

Student B: You are an electrician. Talk to Student A about installing a subpanel.

Writing

- 9 Use the conversation from Task 8 to complete the electrician's notes about subpanels.



Electrician's Notes

Subpanels

When installing a subpanel, it is NOT necessary to install a ...

In case of a power surge, ...

Get ready!

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

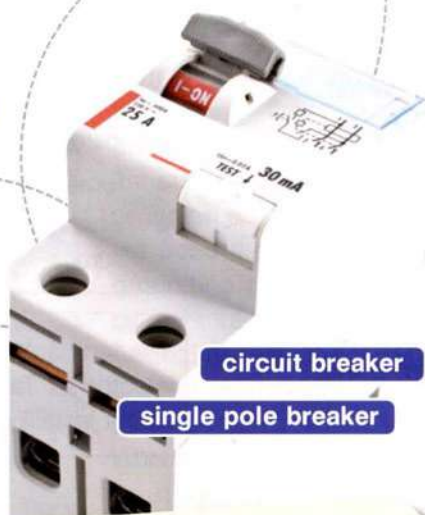
- 1 Why are fuses and circuit breakers important?
- 2 What are some different types of fuses?



cartridge fuse



plug fuse



circuit breaker

single pole breaker

ZYX Electrical Supply

Electrical **overload** can result from various factors, such as a short circuit from a **ground fault**. Your **fuses** or **circuit breakers** protect your system from these excessive currents. If you need a new fuse or circuit breaker for your ZYX panel, use our handy replacement guide.

Fuses

ZYX no longer makes panels with fuses, but we carry replacement fuses for our older models. If your fuse is encased in a tube with metal end caps, check out our **cartridge fuses**. If you can unscrew the fuse from its socket, you need a **plug fuse**. All **blown fuses** must be replaced since they cannot be reused.

Circuit Breakers

Newer ZYX panels have circuit breakers instead of fuses. Unlike fuses, circuit breakers do not need **replacement** every time they are **tripped**. But broken or worn out breakers occasionally require replacement. Our breaker diagrams will help you determine if you need a **single pole** or **double pole breaker**.

Reading

2 Read the manufacturer's guide on fuses and circuit breakers. Then, complete the table using information from the guide.

Part	When to replace or not to replace
Fuse	_____
Circuit Breaker	_____

Vocabulary

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

- 1 An electrical surge might trigger the circuit breaker. _ r i _
- 2 Make sure to get a new type of fuse that screws into a socket. _ l _ g _ _ _ e
- 3 After the power went out, I discovered a fuse with a melted metal strip.
b _ _ w _ f _ _ _
- 4 A breaker connected to two hot bus bars supplies 240-volt power to a circuit.
_ o u _ _ e _ o l _ b _ _ a k _ _

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

1 **circuit breaker / cartridge fuse**

- A A _____ is usually made out of glass and metal.
- B You don't need to replace a _____ every time there is a power surge.

2 **ground fault / single pole breaker**

- A The _____ can only handle 120-volts.
- B The short circuit was caused by a _____.

3 **overload / fuse**

- A The power went out because of an electrical _____.
- B You need to replace the _____ as soon as it is blown.

- 5 Listen and read the manufacture's guide on fuses and circuit breakers again. Why would someone prefer to use circuit breakers instead of fuses?

Listening

- 6 Listen to a conversation between a company representative and a customer. Mark the following statements as true (T) or false (F).
- ___ The man needs to replace a circuit breaker.
 - ___ Parts are no longer available for the man's older panel.
 - ___ The woman does not think the man needs a replacement.

- 7 Listen again and complete the conversation.

Representative: Thanks for calling ZYX. How
1 _____
_____?

Customer: Hello. I think I need to order a
2 _____ for my
electrical panel.

Representative: I can certainly help you with that.
3 _____ is your
panel?

Customer: Let's see ... It's number 717-TF.

Representative: Okay ... That's a 4 _____
_____, so it shouldn't have
fuses. Are you sure you don't
need a circuit breaker?

Customer: What's the difference?

Representative: A fuse has a metal strip that
melts and 5 _____
_____. Is that what you have?

Customer: Not really. It looks like a little
6 _____ that flips
back and forth.

Speaking

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

USE LANGUAGE SUCH AS:

I need to order ...
That's a(n) ... so it shouldn't have ...
It looks like ...

Student A: You are a company representative. Talk to Student B about:

- a replacement part
- the type of part needed
- what is wrong with the part

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

Writing

- 9 Use the conversation from Task 8 to fill out the representative's call record.

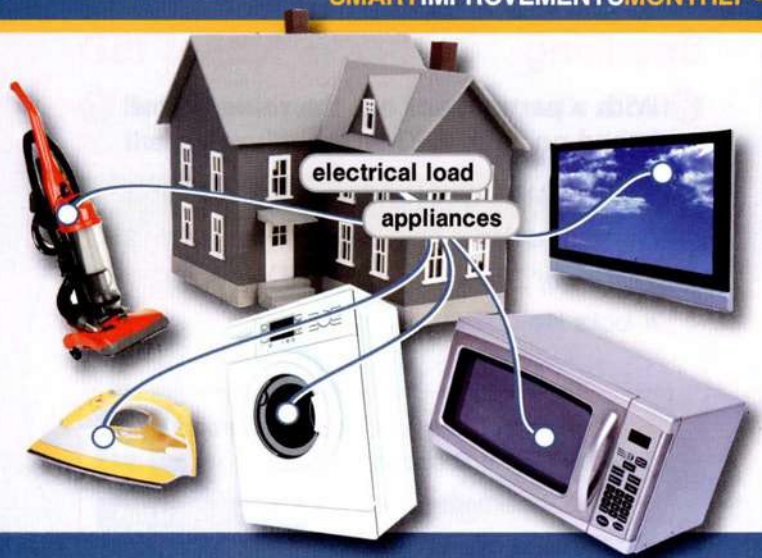
Customer: **Charles Johnson**

Reason for Call: _____

New Part Ordered? Y / N

If Yes, why was a new part needed? _____





A HEALTHY BALANCE



Installing your own electrical system can be tricky. While circuit breakers stop overload from harming your system, it is best to avoid overload in the first place. To maintain **stability**, you must **balance** your **electrical load**. This will prevent too much electricity from flowing through a single circuit at one time. First, you should **analyze** your electrical **consumption**. Are you using more electricity on one side of your main panel than the other? To check this, add up how much power each side **draws**. If you don't know how much electricity a household **appliance** uses, consult the **owner's manual**.

If one side's **amperage** is more than ten percent greater than the other, balancing is required. To achieve **parity**, you must **transfer** some of the load to the **corresponding** breaker on the lower side. You may need a screwdriver to remove the breakers, but most will simply **snap** back into place.



Get ready!

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

- 1 What happens when too many appliances draw power from the same source?
- 2 How does balancing a load improve an electrical system?

Reading

2 Read the DIY magazine article on balancing a load. Then, complete the table using information from the article.

Step	Description
Calculating Total Amperage	_____
Determining if Balance Needed	_____
Balancing the Load	_____

Vocabulary

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

- | | |
|--------------------|---------------------|
| 1 — parity | 5 — appliance |
| 2 — balance | 6 — corresponding |
| 3 — amperage | 7 — electrical load |
| 4 — owner's manual | |

- A an electric machine used in a household
 B related or connected to something
 C total power drawn by an electrical panel
 D a condition of being equal
 E to make sides equal
 F measurement of electrical current
 G a booklet including product information

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

1 draw / snap

- A The two sides of the panel _____ the same amount of power.
B The circuit breaker should _____ right into place.

2 transfer / analyze

- A The electrician is coming to _____ the problem with the service panel.
B We have to _____ some of the breakers to avoid another power outage.

3 stability / consumption

- A The family's power _____ has increased in recent months.
B To maintain _____, you should balance the load.

5 Listen and read the DIY magazine article on balancing a load again. How does an electrician determine if an electrical load needs balancing?

Listening

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

- 1 ☐ The dishwasher needs to be disconnected from the panel.
- 2 ☐ The woman believes that the electrical load needs balancing.
- 3 ☐ Breakers may need to be transferred from the high side to the low side.

7 Listen again and complete the conversation.

Electrician 1: First, you'll need to find out the amperage of all the appliances and fixtures. Do you have the 1 _____?

Electrician 2: Yes, they're right here.

Electrician 1: Good. Next, you're going to 2 _____ on each side of the main panel.

Electrician 2: Okay. So 3 _____ tell us?

Electrician 1: Well, the totals on each side should 4 _____, at least roughly.

Electrician 2: So I might need to transfer some of the breakers from the high side 5 _____?

Electrician 1: 6 _____. Try that and then run the dishwasher again.

Speaking

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

USE LANGUAGE SUCH AS:

*As soon as I ... then the ...
First, you need to find out ...
So I might need to ...*

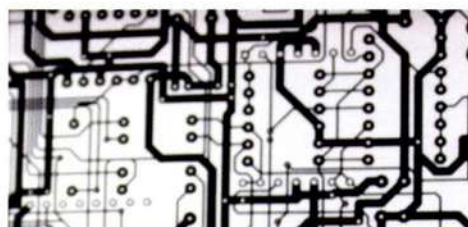
Student A: You are an electrician. Talk to Student B about:

- what is causing a power outage
- calculating amperage
- balancing an electrical load

Student B: You are an electrician. Talk to Student A about balancing an electrical load.

Writing

9 Use the conversation from Task 8 to complete the instructions for balancing a load.



Instructions for Balancing a load

Use the appliance owner's manuals to calculate ...

Compare the amperage of each side to determine ...

Transfer circuit breakers to ...



Learning to be an Electrician

Receptacle Boxes

Receptacle boxes are containers that hold electric wire connections. They vary in shape, size, material make-up, and function. Box choices include **outlet boxes**, **pancake boxes**, **cut-in boxes**, and others. Electricians choose boxes based on the installation they are doing. For example, some electricians use **handy boxes** for temporary installations. But handy boxes are unreliable for long-term usage. **Integral nail boxes**, or something similar, work better for permanent installations.

Size and material also influence which receptacle box electricians use. The box needs to have the right **volume** to be safe. A **shallow** box can overcrowd the wires. **Overcrowded** wires can easily **short out**. The box needs to be **deep** enough to comfortably hold all the wires. The box's material make-up also affects its safety. For example, an outside box must be **weatherproof**. An electrician must always check this when **mounting** a box outside.

Get ready!

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

- 1 What are some different kinds of receptacle boxes?
- 2 What should electricians try to avoid in receptacle boxes?

Reading

2 Read the textbook excerpt about receptacle boxes. Then, choose the correct answers.

- 1 What is the main idea of the excerpt?
 - A to explain the different kinds of receptacle boxes
 - B to discuss why volume is important
 - C to compare handy boxes and outlet boxes
 - D to describe how to install a receptacle box
- 2 What can you infer about installing receptacle boxes outdoors?
 - A They are too shallow to comfortably hold a lot of wires.
 - B They are more difficult to install than indoor installations.
 - C They can be unsafe if they aren't protected from the weather.
 - D They work best when used for temporary purposes.
- 3 Why do electricians use handy boxes?
 - A to mount a temporary installation
 - B to make sure outdoor wires are protected
 - C to keep wires from getting overcrowded
 - D to mount a permanent installation

Vocabulary

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

- | | |
|-----------------|-----------------------|
| 1 — pancake box | 4 — overcrowded |
| 2 — handy box | 5 — volume |
| 3 — deep | 6 — integral nail box |

- A a receptacle box that already has nail holes drilled into it
- B describing the space from the front of something to the back of it
- C a metal box sometimes used as a substitute receptacle box
- D containing too many items
- E a thin, round receptacle box
- F the amount of space inside something measured in cubic units

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

1 short / mount

- A If there is a _____, someone could be shocked.
B She needed tools to _____ the receptacle box.

2 cut-in box / weatherproof box

- A A _____ protects wires from rain and heat.
B A _____ was used in the wall in the hallway.

3 outlet box / shallow

- A They wanted another _____ installed in their home.
B If a receptacle box is too _____, it can be unsafe.

5 Listen and read the textbook excerpt about receptacle boxes again. How do electricians choose the right receptacle box?

Listening

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

- 1 ___ The teacher is explaining how to insulate wires.
2 ___ The teacher thinks the handy box is too shallow.
3 ___ The student is learning how to install a receptacle box.

7 Listen again and complete the conversation.

- Teacher:** Okay, today you're going to install a 1 _____ into a wall.
Student: So, first I need to figure out what kind of box to use. A 2 _____ would work.
Teacher: No. You'll want to use a box that is 3 _____.
Student: Okay. So what you're saying is that I need a different box. Hmm ... what about a cut-in box?
Teacher: Right. A cut-in box is 4 _____. And why is that?
Student: Because cut-in boxes work well in walls that are 5 _____.
Teacher: Good. Now, what's the first thing you need to check?
Student: 6 _____ of the cut-in box. That way, the wires aren't overcrowded.
Teacher: Excellent. What's the second thing you need to check?
Student: That the wires are insulated properly

Speaking

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

USE LANGUAGE SUCH AS:

*I need to figure out ...
You'll want to ...
... is your best option*

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

- what kind of receptacle box to use
- steps to install a receptacle box
- how to make sure the installation is safe

Student B: You are a student.
Talk to Student A about how to install a receptacle box.

Writing

9 Use the conversation from Task 8 and the textbook excerpt to complete the quiz.

Quiz

Receptacle Box

What is the best kind of box to use in a wall that is already built? (10 points)

What is the first thing to check before you install the box? (10 points)

What is the second thing you need to check before you install the box? (10 points)

Why? (5 points)

HOME ABOUT US SERVICES CONTACT

grounding plug

single outlet

grounding slot

www.homehelp.com

HomeHelp Forums

Q: I have a dead **outlet** in my kitchen. The problem started when I **hooked up** my washing machine. The **plug** has a **grounding pin**, but the outlet does not have a **grounding slot**. I also wanted to plug in a lamp, but the outlet is only a **single outlet**. I used a **cheater plug** to make a **duplex outlet** that takes a grounding pin. What went wrong?

A: Check your service panel for tripped breakers. The problem was likely caused by a short circuit. Since the grounding pin was only connected to the cheater plug, you had limited protection against electrical surges. Consider having an electrician install an outlet with a grounding slot. If the washing machine has an **immediate turn plug**, ensure the new outlet is not installed upside down.

In general, always make sure outlets maintain proper **polarity**. A problem with the **narrow slot** might prevent electricity from getting through to a device. A problem with the **wide slot** could cause the device not to work. **Outlet caps** keep outlets clean when not in use.

Get ready!

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

- In your country, what kinds of outlets are most common?
- What is a danger of using a damaged outlet?

Reading

2 Read the web forum about a problem with a receptacle. Then, choose the correct answers.

- What is the main point in the web forum?
 - suggesting ways to avoid dead outlets
 - describing different types of receptacles
 - giving instructions for installing a plug
 - explaining the functions of plugs and outlets
- Which is NOT a recommendation made on the web page?
 - Use outlet caps for unused outlets.
 - Avoid using immediate turn plugs.
 - Install an outlet with a grounding slot.
 - Check for tripped circuit breakers.
- Which part was not properly connected?

A immediate turn plug	C grounding pin
B grounding slot	D cheater plug

Vocabulary

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

- | | |
|-------------------|-------------------------|
| 1 — plug | 4 — grounding pin |
| 2 — narrow slot | 5 — grounding slot |
| 3 — single outlet | 6 — immediate turn plug |

- a prong on some plugs that prevents surges
- a part that provides a hot current to a plug
- a part with two or more prongs
- a plug with a cord that lies against a wall
- one plug receptacle
- a receptacle that receives a grounding pin

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

word BANK

duplex outlet cheater plug
wide slot outlet cap
outlet polarity

- You need a(n) _____ to use a three-pronged plug with a two-slot outlet.
- Without a(n) _____, dirt might get into the outlet slots.
- I need a(n) _____ to hook up both the toaster and the coffee maker.
- The _____ is connected to a neutral wire.
- Hot and neutral slots are both needed to maintain _____.
- The surge occurred when one _____ received an excessive electrical load.

- 5 Listen and read the web forum about a problem with a receptacle again. What should be considered when installing an outlet for an immediate turn plug?

Listening

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

- ___ The woman is concerned because there was severe damage to the electrical system.
- ___ The woman will install a new immediate turn plug.
- ___ The outlet's grounding slot should be towards the bottom.

- 7 Listen again and complete the conversation.

Electrician: Your refrigerator has an 1 _____, and it's plugged in upside down.

Homeowner: Is that dangerous?

Electrician: It can be. You see, the 2 _____ pulls down on the plug and dislodges the grounding pin.

Homeowner: I'm sorry, I don't know much about this stuff. What 3 _____?

Electrician: It means you have 4 _____ against surges and electrical shock.

Homeowner: Can you 5 _____?

Electrician: Don't worry, I'll take care of it. I just need to reinstall the outlet with the grounding slot 6 _____.

Speaking

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

USE LANGUAGE SUCH AS:

It means you have ... against ...
I just need to reinstall ...

Student A: You are an electrician. Talk to Student B about:

- a problem with a plug
- the cause of the problem
- how to fix the problem

Student B: You are a homeowner. Talk to Student A about a problem with a plug.

Writing

- 9 Use the conversation from Task 8 to fill out the electrician's work summary.

Work Summary

Customer: **Mr. Owens**

Problem: _____

Cause of Problem: _____

Describe Solution: _____

HOME

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www.do-it-yourself.com

Do It Yourself Do It Right

Home Installations > Electrical > Switch Boxes

Different switch box sizes serve different purposes. For a typical room with one light, a **single gang box** will do. This is the easiest box to install in a narrow space beside a door. To **control** two switches from the same place, use a **two gang box**. A room with a light and a ceiling fan might require two switches. For more switches, **three gang boxes** and **four gang boxes** are available. But make sure you have enough room for larger boxes before attempting installation. Large boxes may also require additional **brackets** to ensure they are mounted securely.

Your box should be positioned so that the **coverplate** is **flush** with the wall. If this is not possible, use a **box extender** to seal the **wall cavity**. This safety measure prevents flammable materials from coming in contact with the electricity.

We recommend using plastic boxes to reduce the risk of electrical malfunction. But if you must use a metal box, always ground it with a metal **grounding screw**.

Get ready!

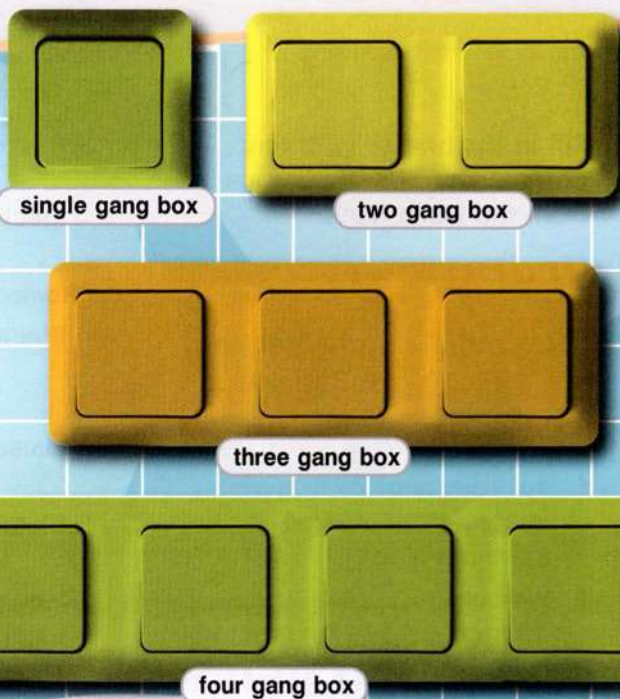
1 Before you read the passage, talk about these questions.

- 1 What are some different types of switch boxes?
- 2 What situations might require different switch boxes?

Reading

2 Read the DIY webpage on switch boxes. Then, mark the following statements as true (T) or false (F).

- 1 ___ A room with a light and a ceiling fan most likely needs a single gang box.
- 2 ___ A grounding screw ensures the wall cavity is sealed.
- 3 ___ A coverplate should be flush with the wall as a safety measure.



Vocabulary

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

- | | |
|----------------------|-----------------------|
| 1 ___ flush | 4 ___ bracket |
| 2 ___ control | 5 ___ single gang box |
| 3 ___ three gang box | |

- A a box that provides power to one switch
 B to have power over something
 C an attachment that secures to a wall
 D having a surface level with another surface
 E a box that provides power to three switches

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

1 coverplate / wall cavity

- A The electrician installed a box inside the _____.
- B A properly fitted _____ prevents fire from breaching a wall.

2 four gang box / two gang box

- A A _____ can accommodate several appliances or fixtures.
- B For a room with a light and a ceiling fan, a _____ is appropriate.

3 box extender / grounding screw

- A Use a _____ if the switch is not flush with the wall.
- B Use a _____ if the switch box is made out of metal.

- 5 Listen and read the DIY webpage on switch boxes again. Why might someone need a box for multiple switches?

Listening

- 6 Listen to a conversation between a store clerk and a homeowner. Choose the correct answers.

- 1 What is the purpose of the conversation?
A to determine if a box extender is needed
B to compare different types of switches
C to find the right switch box for a project
D to learn how to install a switch box
- 2 What will the man likely do next?
A charge the woman for the purchase
B find an appropriate switch box
C show the woman a coverplate
D recommend a good box extender

- 7 Listen again and complete the conversation.

- Homeowner:** I'm looking for a 1 _____.
_____. I'm not sure which one to get.
- Store clerk:** Well, let's 2 _____
_____ for you. Where are you putting the box?
- Homeowner:** I need it for the switches next to my 3 _____.
- Store clerk:** And how many switches do you need to control?
- Homeowner:** Let's see ... There's the 4 _____
_____, and another light for the entryway inside. Oh, and the ceiling fan in the entryway.
- Store clerk:** It sounds like you need a 5 _____
_____. Do you need anything else?
- Homeowner:** I'm not sure. Do you have 6 _____?

Speaking

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

USE LANGUAGE SUCH AS:

Where are you putting ...
There's a light ... and another light ...
Let me show you ...

Student A: You are a store clerk. Talk to Student B about:

- the switch box he or she needs
- where the switch box will be installed
- other products needed

Student B: You are a homeowner. Talk to Student A about the switch box you need.

Writing

- 9 Use the conversation from Task 8 to fill out the clerk's product recommendation.

LEON'S Electrical Supply

Product Type: **Switch box**

Product Recommended and Why: _____

Additional Products Needed: _____



Get ready!

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

- 1 What are some types of switches?
- 2 What is a reason for installing a dimmer switch?



NewGuy: I'm wiring my own switches for the first time. I know about **single pole switches**. I know about **three-way switches** and **four-way switches** too, but each location only needs one switch. Does anyone have any other suggestions?

HandyGal: You could also use a **toggle switch**.

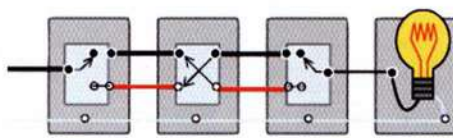
ElectricalGuy: You could use a **timer switch** if you need lights to go on and off at certain times. Or maybe a **dimmer switch** would suit your needs if you need varying levels of brightness.

WiredUp: It depends on the type of building you're wiring. A **residential grade switch** is good for a home. Use a **commercial grade switch** for bigger buildings.

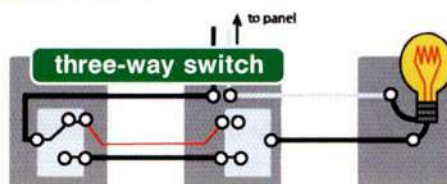
ElectricalGuy: I installed a **keyed switch** for extra security. It was easier than I thought it would be.

HandyGal: I tried installing a **pilot light switch** last month. I had trouble with an **open circuit** though.

HandyGal: A **double pole switch** is an option for higher-voltage fixtures.



four-way switch



Reading

2 Read the web forum on switches. Then, choose the correct answers.

- 1 What is the purpose of the web page?
 - A to suggest different types of switches
 - B to explain why to use one particular switch
 - C to compare three- and four-way switches
 - D to describe installation methods for several switches
- 2 Which of the following is NOT suggested by members of the forum?
 - A toggle switch
 - C dimmer switch
 - B double pole switch
 - D four-way switch
- 3 What advice does ElectricalGuy give?
 - A use a dimmer switch to control brightness
 - B avoid an open circuit whenever possible
 - C install a commercial grade switch
 - D get a switch that controls multiple locations

Vocabulary

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

- 1 — timer switch
 - 2 — toggle switch
 - 3 — four-way switch
 - 4 — pilot light switch
 - 5 — three-way switch
 - 6 — single pole switch
 - 7 — double pole switch
 - 8 — residential grade switch
- A a switch used mostly in homes
 - B a switch that controls two circuits
 - C a switch that allows control at two locations
 - D a switch that controls one circuit
 - E a switch with a light that indicates it is on
 - F a switch that goes on and off at certain times
 - G a switch with an up-and-down lever
 - H a switch that allows control at more than two locations

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

1 open circuit / commercial grade switch

A All the wires must be properly connected to avoid a(n) _____.

B We installed a new _____ on the factory's main floor.

2 dimmer switch / keyed switch

A A _____ is useful in areas that need extra security.

B I want to turn down the brightness, but we don't have a _____.

5 Listen and read the web forum on switches again. Why might someone use a three-way switch?

Listening

6 Listen to a conversation between a contractor and an electrician. Mark the following statements as true (T) or false (F).

- 1 ___ The man and woman disagree about using a single pole switch.
- 2 ___ The light needs to be controlled from two places.
- 3 ___ The man plans to install a three-way switch.

7 Listen again and complete the conversation.

Electrician: The other rooms have 1 _____. I don't think that's a good choice for this room.

Contractor: 2 _____. So what else are you thinking of using?

Electrician: Well, the room has 3 _____.

Contractor: People will go 4 _____ of the room using both doors.

Electrician: Exactly. A switch at 5 _____ seems like a good idea.

Contractor: I think that would be the best thing to do.

Electrician: I'm sure a 6 _____ - _____ would be a good choice.

Speaking

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

USE LANGUAGE SUCH AS:

This room has ...

A switch at ... seems like ...

A ... would be a good choice.

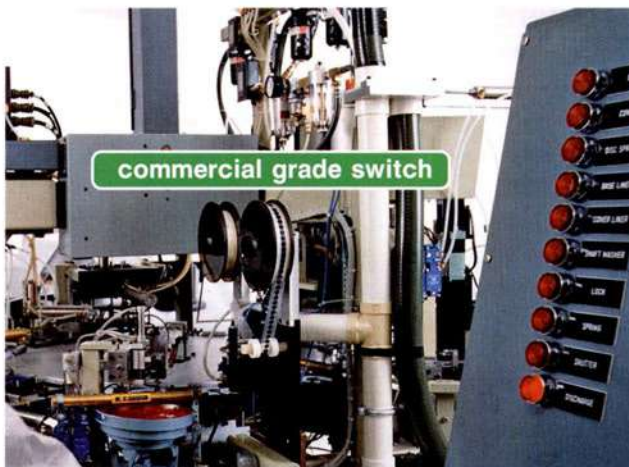
Student A: You are a contractor. Talk to Student B about:

- installing a switch
- the features of a particular room
- the type of switch needed

Student B: You are an electrician. Talk to Student A about installing a switch.

Writing

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



Type of installation

Light Switch

Describe Area of Installation: _____

Product Needed: _____

WEM

Wilton Electrical Manufacturers



clamp

ground rod

Wilton Electrical Manufacturers specializes in protecting your property from lightning strikes. We have a wide range of products that keep you and your possessions safe. We also offer free installation of our **earth grounding systems**. Our professional electricians are experts at **grounding** electrical systems. A grounding system protects your home from **fault currents**, **stray voltage** and **ground faults**. Currently, we are running a special on our grounding system packages. Each package includes **equipment grounding conductors**, **ground rods**, and **grounding electrode conductors**. Additional equipment such as **surge arresters** and **clamps** are also included.

Call us at 1-800-345-7298 today to schedule a free **estimate**. One of our electricians will come out to your property. He or she will determine what size kit you need. The electrician will also explain how a grounding system works. If you have any questions, he or she will answer them.

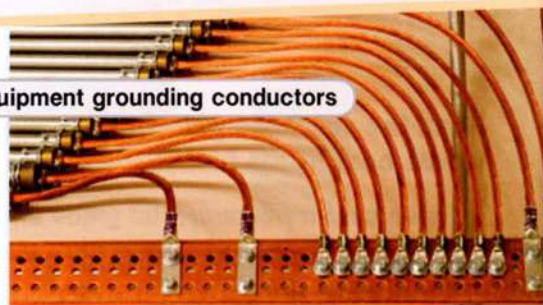
Get ready!

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

- 1 What are some parts of a grounding system?
- 2 What kinds of businesses in your area offer free estimates? Why do you think so many businesses offer them?



equipment grounding conductors



Reading

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

- 1 ☐ The company charges a fee for estimates.
- 2 ☐ A grounding system protects homes from lightning strikes.
- 3 ☐ Surge arresters are used to complete a grounding system.

Vocabulary

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

- | | |
|--|--|
| 1 ☐ fault current | 4 ☐ grounding electrode conductor |
| 2 ☐ ground rod | 5 ☐ ground fault |
| 3 ☐ equipment grounding conductor | 6 ☐ grounding |

- A the flow of electricity in a ground line
 B an irregular electrical current
 C connects part of a system of electricity to other conductors
 D a conductor joining a piece of metal to a grounding electrode conductor
 E a pole that is put in the earth so electricity flows into it
 F linking a circuit to the earth
 G the flow of electricity in a ground line

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

word BANK

clamp earth grounding system
 estimate stray voltage surge arrester

- 1 Coming into contact with _____ could cause serious injury.
- 2 Businesses use a(n) _____ to measure the electrical capability of the ground against conductors.
- 3 A(n) _____ protects electrical systems from lightning strikes.
- 4 The electrician wrote a(n) _____ for the customer.
- 5 He used a(n) _____ to put the wires together.

- 5 Listen and read the advertisement for earth grounding systems again. Why is it important to install an earth grounding system?

Listening

- 6 Listen to a conversation between a customer service rep and a customer. Choose the correct answers.
- What is the purpose of the conversation?
 - A to learn what is covered under a warranty
 - B to complain about a company's services
 - C to discuss the price of an installation
 - D to find out how to install a grounding system
 - Which item is NOT free of charge?
 - A a warranty C installation
 - B the package D an estimate
- 7 Listen again and complete the conversation.

Customer: I just saw your advertisement for 1 _____. I was wondering how much a system costs.

Cust Serv Rep: Well, we have 2 _____. That's why we offer a free estimate. So one of our electricians can come out to your property and see which package will work best for you.

Customer: What is the 3 _____ for the packages?

Cust Serv Rep: Would the system be for a 4 _____ property?

Customer: Oh, residential.

Cust Serv Rep: Let's see ... residential packages 5 _____ \$400 to \$800.

Customer: And those prices include installation, right?

Cust Serv Rep: Yes, ma'am.

Customer: Is there any 6 _____ with those prices, or is at additional cost?

Speaking

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

USE LANGUAGE SUCH AS:

I was wondering ...
What is the price range for ...
And those prices include ... right?

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

- the different packages offered for grounding systems
- a price range for the package
- what is included in the price

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

Writing

- 9 Use the conversation from Task 8 to complete the advertisement.



Wilton Electrical Manufacturers

Do you need

to?

Then call ... today!

We offer ... so call today so ...

Our prices include ...



When installing a grounding system, keep the basic components in mind. Consider the **soil condition** where the system will be installed. You will have to create a **ditch** to install the system. The condition of the soil will determine how you proceed with this step.

Consider the types of materials you will use for the installation. A **ground wire** is a typical part of the system. Also, **bonding wire** and a **footer** are important elements. A **panel bond** is necessary to connect the grounding system to the electrical panel.

You must be aware of **resistance** between terminals. The continuous current of electricity must also be kept in mind. You should know the current level that will **drive** through a wire.

Remember to avoid interference by keeping certain wires **parallel** to each other. Also, certain components must not be placed within its **sphere of influence**.

Get ready!

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

- 1 What is the importance of ground wires?
- 2 What are some safety considerations when installing grounding systems?

Reading

2 Read the pamphlet on installing a grounding system. Then, mark the following statements as true (T) or false (F).

- 1 ☐ Ground installation is unnecessary with the right soil conditions.
- 2 ☐ It is important to know a wire's expected level of current.
- 3 ☐ Wires should never be installed parallel to each other.

Vocabulary

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

- 1 The electrician measured the amount of current that moves by force through the wire.
d _ _ v _ s
- 2 An electrical system is not stable without a neutral wire connected to the earth.
_ r _ u _ d _ i r _
- 3 The wires should be running in the same direction but not crossing to avoid short circuits.
_ a _ _ l l _ l
- 4 We need to replace the part that connects the service panel to the grounding system.
p _ _ e l _ o n _

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

1 ditch / footer

- A We must dig a _____ to install the grounding system.
- B This _____ should be connected to the grounding system with rebar.

2 sphere of influence / bonding wire

- A The short circuit occurred because the _____ was not installed correctly.
- B Make sure this ground system is outside the _____ of the other system.

3 soil condition / resistance

- A Do you know how strong the _____ of this electrical terminal is?
- B Check the _____ before you start digging.

5 Listen and read the pamphlet on installing a grounding system again. How does soil condition affect grounding installation?

Listening

6 Listen to a conversation between two electricians. Check (✓) the items that need to be installed.

- 1 ☐ ground wire 3 ☐ bonding wire
- 2 ☐ footer 4 ☐ panel bond

7 Listen again and complete the conversation.

Electrician 1: Did you check the 1 _____ in the installation area?

Electrician 2: I did. The soil isn't full of rocks and it's not dry either. It's wet, but 2 _____.

Electrician 1: Do you think we can 3 _____ without a problem?

Electrician 2: I do. It's a 4 _____ for the installation.

Electrician 1: Have we got 5 _____ to get started?

Electrician 2: I think so. We've got the ground wire and the 6 _____.

Speaking

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

USE LANGUAGE SUCH AS:

Did you check ...

We've got the ... and the ...

What about the ...

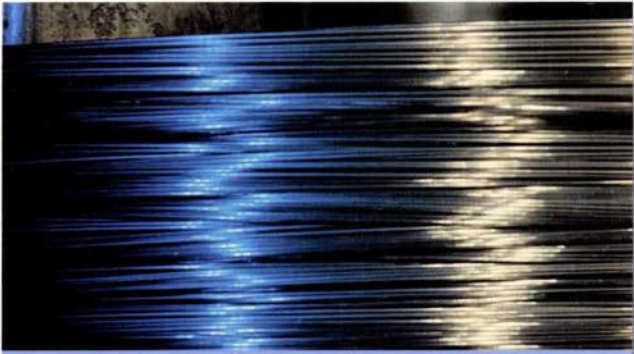
Student A: You are an electrician. Talk to Student B about:

- a grounding system installation
- soil condition
- parts needed for installation

Student B: You are an electrician. Talk to Student A about a grounding system installation.

Writing

9 Use the conversation from Task 8 to fill out the electrician's work report.



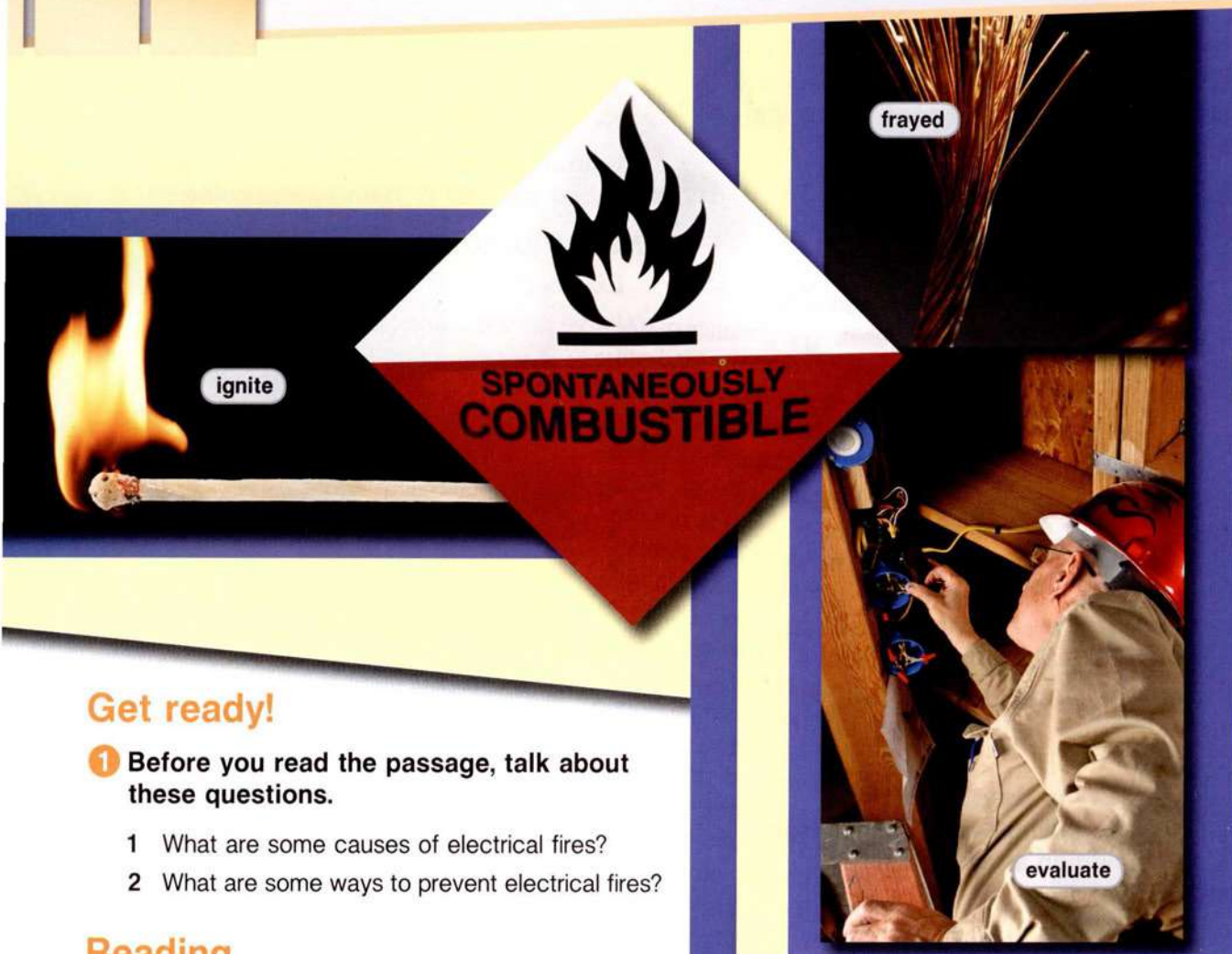
Riley Electrical

Work Report

Type of Installation: _____

Describe Soil Condition: _____

Parts to be Installed: _____



Get ready!

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

- 1 What are some causes of electrical fires?
- 2 What are some ways to prevent electrical fires?

Reading

② Read the government fact sheet on electrical fires. Then, mark the following statements as true (T) or false (F).

- 1 ☐ Electrical fires can be caused by faulty wiring.
- 2 ☐ Replacing light bulbs that flicker is not necessary.
- 3 ☐ Electrical fires are more frequent during summer months.

Vocabulary

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

- | | |
|---|-------------------------------------|
| 1 ☐ fixed wiring | 4 ☐ evaluate |
| 2 ☐ combustibles | 5 ☐ ignite |
| 3 ☐ faulty | |

- A not working properly
- B wiring secured to a wall
- C to set fire to something
- D objects that can quickly catch on fire
- E to decide on an object's usefulness

Thousands of **electrical fires** happen every year. Last year alone, there were around 28,000 electrical fires. These fires caused about one billion dollars in damages. These fires are caused by different things:

- 1 **Faulty** wiring causes electrical fires.
- 2 **Frayed** wires often **ignite** other objects.
- 3 Sometimes people place **combustibles** too close to electrical appliances. This also causes fires.

However, electrical fires can be prevented. As an electrician, you must take appropriate **precautions**. In every building:

- 1 Proper **maintenance** for wiring is important. Always **evaluate** all wires. Make sure they are not frayed or damaged.
- 2 If possible, install **fixed wiring**. Make sure wiring is in areas where it will not **overheat**.
- 3 Replace any light bulbs that **flicker**.

The winter months are the most dangerous for electrical fires. People are indoors more, which means an increase in electrical use. People use their heaters, lights and appliances more during the winter season.

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

1 maintenance / electrical fires

- A _____ are caused by faulty wiring.
B It is important for wires to have proper _____.

2 overheat / flicker

- A Do not place wiring in an area where it can _____.
B Bulbs that _____ should be replaced immediately.

3 combustibles / fixed wiring

- A Whenever possible, it is best to install _____.
B People sometimes place _____ too close to appliances.

5 Listen and read the government fact sheet on electrical fires again. What are the most common causes of electrical fires?

Listening

6 Listen to a conversation between an electrician and an inspector. Choose the correct answers.

- 1 What is the purpose of the conversation?
A to determine what bulbs need replacing
B to check for combustibles
C to do a safety inspection of the building
D to replace any frayed wires
- 2 What will the electrician likely do next?
A remove all combustibles from the building
B contact the previous owner of the building
C make the changes that the inspector wants
D replace every light bulb in the building

7 Listen again and complete the conversation.

Electrician: Hello, Inspector Cane. I'm ready to get started.
Inspector: Great. Let's begin in the boiler room. I already saw some 1 _____ there.
Electrician: That's 2 _____. We'll fix it right away.
Inspector: Wonderful. It also looks like some 3 _____.
Electrician: 4 _____. The apartment building needs to 5 _____.
Inspector: Do you see 6 _____ here?

Speaking

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

USE LANGUAGE SUCH AS:

Let's begin in ...
Can you install ...
Do you see ...

Student A: You are an electrician. Talk to Student B about the changes you will make to a room in a building.

Student B: You are an inspector. Talk to Student A about:

- the bulbs that need changing
- installing fixed wiring
- fixing frayed wires

Writing

9 Use the conversation from Task 8 to fill out the changes recommended by the inspector.

Inspector's recommendations

Building Inspection Summary

Room Inspected: _____

Inspector Recommendations:

- 1 _____
- 2 _____
- 3 _____



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Electrical safety is an important part of fire **prevention**. Unused outlets within reach of small children need to have **safety covers**. These prevent kids from putting fingers or objects in the outlets. Areas with lots of **traffic** need extra attention. **Flammable** items near wires increase the risk. Be sure that any wires are **securely** out of the way. Do not nail or staple them to the wall or **baseboard**. Also, do not use three-prong **adapters** to plug appliances into two-prong plugs. Look for **temporary** repairs that previous residents may have done. Sometimes people use **zip cord** to replace wire. Cheap repairs like this can lead to fires. A heavier wire is required for a safe, **permanent** repair. Also check for **worn out** wires or electrical devices. Breaker boxes also need checking regularly. In the event of an electrical short or overcurrent, a breaker should trip and cut off the power supply. If it fails to do so, it could get overheated and cause a fire. A professional electrician will find anything that is likely to **fail**. And he or she will replace it with the correct equipment.

adapter



Get ready!

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

- 1 What are some ways to practice electrical safety?
- 2 What types of electrical hazards can occur at home?

Reading

2 Read the website article on electrical safety. Then, mark the following statements as true (T) or false (F).

- 1 ☐ Wires can be nailed or stapled to a baseboard.
- 2 ☐ Placing flammable items near wires increases the risk of fire.
- 3 ☐ Replacing wires with zip cord is not dangerous.

Vocabulary

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

- | | |
|--------------------------------------|-------------------------------------|
| 1 ☐ flammable | 4 ☐ zip cord |
| 2 ☐ temporary | 5 ☐ fail |
| 3 ☐ permanent | |

- A works over a long period of time
 B will burst into flames when heated
 C to not work correctly
 D for a short period of time
 E two attached wires that can be pulled apart

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

1 **securely / worn out**

- A _____ wires should be replaced.
 B The outlet cover was _____ fastened to the wall.

2 **baseboard / safety covers**

- A Protect children by covering unused outlets with _____.
 B Wires should not be nailed to the _____ or wall.

3 **traffic / adapters**

- A Extra attention should be given to an area with a lot of _____.
 B Using the wrong kind of _____ can be dangerous.

- 5 Listen and read the website article on electrical safety again. What are some ways to decrease the risk of an electrical fire?

Listening

- 6 Listen to a conversation between an electrician and an owner. Choose the correct answers.

- 1 What is the purpose of the conversation?
- A to look for loose wires
 - B to locate and remove all fire hazards
 - C to test the breaker box
 - D to carry out a full electrical inspection
- 2 What will the owner likely do next?
- A install fire extinguishers
 - B take the electrician's advice
 - C hire another electrician
 - D make temporary repairs to the wiring

- 7 Listen again and complete the conversation.

Electrician: You know, 1 _____ like this often have many fire hazards.

Owner: Yes, I've noticed a few 2 _____ in the lobby.

Electrician: That's bad news. There are inflammable curtains nearby. I'll 3 _____ on that first thing after the inspection.

Owner: Do you see any problems?

Electrician: It looks like somebody made a 4 _____ with zip cord here. This could lead to trouble.

Owner: What's wrong with that?

Electrician: If you plug something into this outlet, it might start a fire.

Owner: Oh, that would be bad. What else do we need to look at?

Electrician: Let's see the 5 _____. I'll need to test each breaker.

Owner: What happens if they don't work?

Electrician: A breaker that 6 _____ will get very hot. It may start a fire.

Speaking

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

USE LANGUAGE SUCH AS:

I've noticed some ...
Can you install ...
I'll need to ...

Student A: You are an electrician. Talk to Student B about:

- removing flammable objects near exposed wires
- the problem with zip cords
- why a failed breaker is a hazard

Student B: You are an owner. Talk to Student A about the changes you will make to the building.

Writing

- 9 Use the conversation from Task 8 to fill out the suggestions given by the electrician.

Potential Hazards

1 _____

2 _____

3 _____

Glossary

accommodate [V-T-U4] If something can **accommodate** something else, it has enough capacity.

adapter [N-COUNT-U15] An **adapter** is a device that allows devices with different types of connectors to be linked together.

aerial service [N-COUNT-U3] An **aerial service** refers to a service entrance that is installed outside a building.

amperage [N-UNCOUNT-U7] **Amperage** is the measurement of electrical current, expressed in amperes or amps.

analyze [V-T-U7] To **analyze** something is to carefully examine the nature of something.

appliance [N-COUNT-U7] An **appliance** is an electric machine that is used for a particular household purpose.

balance [V-T-U7] To **balance** something is to make each side of something equal.

baseboard [N-COUNT-U15] A **baseboard** covers the gap between the wall and the floor.

blade connector [N-COUNT-U1] A **blade connector** is a single wire connection in which a blade is inserted into the blade's holder.

blown fuse [N-COUNT-U6] A **blown fuse** is a fuse in which the metal strip has melted to stop the flow of electricity. A blown fuse cannot be reused and must be replaced to restore the current.

bond [V-T-U5] To **bond** something is to fasten two or more parts together.

bonding wire [N-COUNT-U13] A **bonding wire** is a wire connected to the ground system. It is used to help form an electrically conductive path that allows an electrical current to flow uninterrupted.

box extender [N-COUNT-U10] A **box extender** is a part that fits around a switch if the switch is not flush with the wall.

bracket [N-COUNT-U10] A **bracket** is an attachment that is used to secure something to a wall.

branch circuit [N-COUNT-U4] A **branch circuit** is a part of an electrical system that carries electricity from the main service panel to a particular area or fixture.

breaker box [N-COUNT-U14] A **breaker box** is an electrical box that distributes electricity through a house or building after passing through protective circuit breakers within the box.

building code [N-COUNT-U2] A **building code** is a set of rules used for the structural safety of buildings.

buried service [N-COUNT-U3] A **buried service** refers to a service entrance that is installed underground.

capacity [N-UNCOUNT-U4] **Capacity** is the maximum amount of electricity that can flow through an appliance.

cartridge fuse [N-COUNT-U6] A **cartridge fuse** is a fuse encased in a cylinder with metal caps on each end.

cheater plug [N-COUNT-U9] A **cheater plug** is an adapter that connects a plug with a grounding pin to an outlet without a grounding slot.

circuit breaker [N-COUNT-U6] A **circuit breaker** is a switch that is tripped to stop electrical flow when it detects an excessive current.

clamp [N-COUNT-U12] A **clamp** is a tool used to grasp two wires in order to conduct electricity through them.

clamp connector [N-COUNT-U1] A **clamp connector** uses a V-shaped ring to attach a connector to a cable.

clearance [N-UNCOUNT-U3] **Clearance** is the required distance that must be maintained between a building and a utility.

combustible [N-COUNT-U14] A **combustible** is an object that can catch on fire easily.

commercial grade switch [N-COUNT-U11] A **commercial grade switch** is a heavy duty switch. It is used in large buildings and is higher in price.

component [N-COUNT-U5] A **component** is a small part of an electrical appliance.

conduit [N-COUNT-U2] A **conduit** is a tube put around electrical wiring for protection and routing.

connector [N-COUNT-U1] A **connector** is something that links two pieces of electrical equipment.

consumption [N-UNCOUNT-U7] **Consumption** is the amount of something used.

continuous [ADJ-U5] If something is **continuous**, it exists without stopping or being broken.

control [V-T-U10] To **control** something is to have power over the action or occurrence of something.

corresponding [ADJ-U7] If something is **corresponding**, it is related to or connected to something else.

coverplate [N-COUNT-U10] A **coverplate** is a flat piece that fits around a switch to cover the wall cavity and switch box.

cut off [V PHRASE-T-U4] To **cut off** something is to stop or take away something abruptly.

cut-in box [N-COUNT-U8] A **cut-in box** is a receptacle box that is used in a wall that has already been built.

deep [ADJ-U8] **Deep** describes the space of something from the front of it to the back of it.

dimmer switch [N-COUNT-U11] A **dimmer switch** allows for more control over a light setting. It changes the brightness of a light instead of simply turning it off or on.

ditch [N-COUNT-U13] A **ditch** is a narrow trench that is made in the ground through digging.

double pole breaker [N-COUNT-U6] A **double pole breaker** is a circuit breaker that is connected to two hot bus bars and supplies 240-volt power to a circuit.

double pole switch [N-COUNT-U11] A **double pole switch** is used to turn two independent circuits on or off at the same time.

draw [V-T-U7] To **draw** something is to bring something towards something else.

drip loop [N-COUNT-U3] A **drip loop** is a loop formed by incoming electrical wires that connect to a customer's building.

drive [V-I-U13] To **drive** is to cause movement through some sort of force.

duplex outlet [N-COUNT-U9] A **duplex outlet** is an outlet that can receive two plug receptacles.

earth grounding system [N-COUNT-U12] An **earth grounding system** is an electrical system that measures the electrical capability of conductors against the electrical capability of the ground.

electrical fire [N-COUNT-U14] An **electrical fire** is a fire that starts from an electrical source.

electrical load [N-COUNT-U7] An **electrical load** is the total amount of power, or amperage, being drawn by an electrical panel.

electrical metallic tubing [N-UNCOUNT-U2] **Electrical metallic tubing** is a type of conduit tubing made of coated steel or aluminum.

equipment grounding conductor [N-COUNT-U12] An **equipment grounding conductor** is a conductor joining a piece of metal that does not conduct electricity to a grounding electrode conductor.

estimate [N-COUNT-U12] An **estimate** is a statement that tells someone how much money will be charged for someone else to do a certain amount of work.

evaluate [V-T-U14] To **evaluate** is to assess the state, usefulness or value of something.

fail [V-I-U15] To **fail** is for a device to not operate or not operate properly.

fault current [N-COUNT-U12] A **fault current** is an electrical current that is irregular in any way. For example, it may become disrupted at one point.

faulty [ADJ-U14] If an object or machine is **faulty**, it is not working properly.

feeder cable [N-COUNT-U5] A **feeder cable** is a wire that delivers electricity to a panel.

fixed wiring [N-UNCOUNT-U14] **Fixed wiring** is wiring that is fastened or connected to a wall or another object so that it will not move.

flammable [ADJ-U15] If something is **flammable**, it will burst into flames when it gets very hot.

flexible [ADJ-U2] If a conduit is **flexible**, it can be bent in different directions.

flicker [V-I-U14] To **flicker** is to shine in a shaky way, or to change in brilliance.

flush [ADJ-U10] If something is **flush**, its surface is level with the surface of something else.

footer [N-COUNT-U13] A **footer** is connected to the grounding system using rebar. It is a low-resistance ground.

four gang box [N-COUNT-U10] A **four gang box** is an electrical box installed in a wall that delivers power to four switches.

four-way switch [N-COUNT-U11] A **four-way switch** allows a circuit to be controlled at three or more different locations.

Glossary

frayed [ADJ-U14] If an object is **frayed**, the end or edge of it is tattered or damaged so that the inside of the object is uncovered.

function [N-COUNT-U4] A **function** is a purpose or intended use for something.

fuse [N-COUNT-U6] A **fuse** is a device with a small metal strip that melts and stops electrical flow when an excessive current passes through it.

gadget [N-COUNT-U4] A **gadget** is a small electronic or electrical device.

ground [V-T-U12] To **ground** is to link a circuit to the earth.

ground fault [N-COUNT-U12] A **ground fault** is the flow of electricity in a ground line because the electrical system has been damaged by a thunderstorm or something else.

ground fault [N-COUNT-U6] A **ground fault** is an electrical malfunction in which a current gets into a ground conductor and often causes a short circuit.

ground rod [N-COUNT-U12] A **ground rod** is a pole that is put in the earth so that electricity will flow there.

ground wire [N-COUNT-U13] A **ground wire** is grounded and completes a circuit if a neutral wire fails.

grounded [ADJ-U2] If a conduit is **grounded**, it is connected with the ground.

grounding conductor [N-COUNT-U5] A **grounding conductor** is a wire that keeps an electrical current stable by maintaining an electrical connection with the earth.

grounding electrode conductor [N-COUNT-U12] A **grounding electrode conductor** joins part of a system of electricity to other conductors, or electrodes.

grounding pin [N-COUNT-U9] A **grounding pin** is a prong on some plugs that prevents electrical surges by maintaining a connection with the earth through a neutral wire.

grounding screw [N-COUNT-U10] A **grounding screw** is a metal piece that grounds a metal coverplate.

grounding slot [N-COUNT-U9] A **grounding slot** is a receptacle on some outlets that receives the grounding pin.

handy box [N-COUNT-U8] A **handy box** is a metal box that is sometimes used as a substitute receptacle box.

hook up [V PHRASE-U9] To **hook up** something is to install it.

hot bus [N-COUNT-U4] A **hot bus** is the part of an electrical system that receives electricity from an electrical meter and delivers it to the service panel.

hot conductor [N-COUNT-U5] A **hot conductor** is a wire that carries electricity to a fixture or appliance.

ignite [V-T-U14] To **ignite** something is to set it on fire.

immediate turn plug [N-COUNT-U9] An **immediate turn plug** is a plug with an electrical cord that lies against a wall instead of sticking straight out from the wall. It should be plugged in so that the cord hangs.

installation [N-COUNT-U2] An **installation** is the act of fitting an electrical appliance for use.

insulation displacement connector [N-COUNT-U1] An **insulation displacement connector** allows for a wire to not be stripped before connecting.

integral nail box [N-COUNT-U8] An **integral nail box** is a lower-priced receptacle box that already has nail holes drilled into it.

keyed switch [N-COUNT-U11] A **keyed switch** is an on/off switch that is controlled with a removable key.

main service panel [N-COUNT-U4] A **main service panel** is the part of an electrical system that controls the distribution of power to a particular house or building.

main switch [N-COUNT-U4] A **main switch** is the part of a service panel that can cut off electricity to an entire house or building.

maintenance [N-UNCOUNT-U14] **Maintenance** is the care and protecting of an object in order to keep it working in good condition.

malfunction [N-COUNT-U5] A **malfunction** is when an electrical appliance does not work properly.

manually [ADV-U4] If something is done **manually**, it is controlled by a person directly.

moisture tight fitting [N-COUNT-U2] A **moisture tight fitting** is a conduit made specifically to keep water out.

mount [V-T-U8] To **mount** an object is to attach it to another object.

narrow slot [N-COUNT-U9] A **narrow slot** is the smaller of the two rectangular slots in an electrical outlet. It connects to the prong that delivers a hot electrical current to the plug.

neutral bus [N-COUNT-U4] A **neutral bus** is the part of an electrical system that carries a current back to the service panel after the power has been spent.

neutral return conductor [N-COUNT-U5] A **neutral return conductor** is a wire that carries spent electrical current back to the electrical panel or subpanel.

non-corrosive [ADJ-U2] If a conduit is **non-corrosive**, it cannot be damaged by chemicals.

non-metallic tubing [N-UNCOUNT-U2] **Non-metallic tubing** is a type of conduit tubing made of plastic.

offset connector [N-COUNT-U1] An **offset connector** is used to change the direction of a wire entering an electrical box.

open circuit [N-COUNT-U11] An **open circuit** is one with a missing connection (meaning no current flows).

outlet [N-COUNT-U9] An **outlet** is a device installed in a wall that carries electricity to devices that are plugged into it.

outlet box [N-COUNT-U8] An **outlet box** is a container that holds the plug-in for electrical connections.

outlet cap [N-COUNT-U9] An **outlet cap** is a plastic cover that prevents unwanted materials from entering the openings of an unused outlet.

overcrowded [ADJ-U8] If something is **overcrowded**, it contains too many people or objects.

overcurrent [N-UNCOUNT-U4] **Overcurrent** is a surge of power that occurs when an electrical current exceeds a circuit's amperage capacity.

overheat [V-I-U14] If something **overheats** it, becomes too hot.

overload [N-COUNT-U6] **Overload** occurs when an electrical current is too high for a particular electrical system.

owner's manual [N-COUNT-U7] An **owner's manual** is a booklet that provides manufacturer details and instructions for using a particular product.

pancake box [N-COUNT-U8] A **pancake box** is a thin, round receptacle box.

panel bond [N-COUNT-U13] A **panel bond** is a wire that connects the panel to the grounding system.

parallel [ADJ-U13] If two things are **parallel**, they run in the same direction but do not cross paths.

parity [N-UNCOUNT-U7] **Parity** is the condition of being equal or balanced.

permanent [ADJ-U15] If something is **permanent**, it is meant to stay in place and work over a long period of time.

pilot light switch [N-COUNT-U11] A **pilot light switch** has a small light built in. The light indicates that the switch is turned on.

plug [N-COUNT-U9] A **plug** is a part with two or more prongs that connects an electrical cord to an outlet.

plug and socket connector [N-COUNT-U1] A **plug and socket connector** has one plug with prongs that is inserted into the openings of a receptor plug.

plug fuse [N-COUNT-U6] A **plug fuse** is a fuse with a threaded end that screws into a socket.

polarity [N-UNCOUNT-U9] **Polarity** is the state of having positive and negative electrical charges.

post connector [N-COUNT-U1] A **post connector** is a connector used to attach a single wire to a piece of equipment.

precaution [N-COUNT-U14] A **precaution** is a safety measure that workers take in order to avoid a hazardous situation.

prevention [N-UNCOUNT-U15] **Prevention** is the act of stopping something from happening.

protection [N-UNCOUNT-U2] **Protection** is the ability of a conduit to keep out certain dangers, such as a fire.

replacement [N-COUNT-U6] A **replacement** is when a broken thing is changed for a new one.

remote [ADJ-U5] If something is **remote**, it is set apart from something else that it is connected to.

Glossary

- residential grade switch** [N-COUNT-U11] A **residential grade switch** is a light duty switch. It is used in homes and is cheaper in price.
- resistance** [N-UNCOUNT-U13] **Resistance** is the amount of voltage applied on two resistor terminals compared to the current that circulates between them.
- right-of-way** [N-COUNT-U3] A **right-of-way** is a strip of land that is used by a utility company to construct and operate transmission lines.
- ring terminal** [N-COUNT-U1] A **ring terminal** is a single wire connection in which a screw or bolt is inserted to make electrical contact.
- route** [N-COUNT-U2] A **route** is the specified course that a conduit goes along.
- safety cover** [N-COUNT-U15] A **safety cover** is a plastic plug that goes into an unused electrical outlet to prevent children from injuring themselves.
- safeguard** [V-T-U4] If something **safeguards** something else, it protects it.
- safety precaution** [N PHRASE-U5] A **safety precaution** is something done to prevent something dangerous from happening.
- secondary** [ADJ-U5] If something is **secondary**, it serves a lesser purpose than something else.
- securely** [ADV-U15] If you fasten something **securely**, it is tied down or attached so it will not move easily or by accident.
- service cable** [N-COUNT-U3] A **service cable** is a wire that provides a customer's property with electricity. It can be buried or aerial.
- service drop** [N-COUNT-U3] A **service drop** is the electrical line that runs from a buried service or an aerial service to a customer's building.
- service entrance (SE)** [N-COUNT-U3] A **service entrance (SE)** is the place where electricity enters a building.
- service lateral** [N-COUNT-U3] A **service lateral** is a power supply that is located underground.
- shallow** [ADJ-U8] If a box is **shallow**, it does not have much space for wires.
- short** [V-I-U8] To **short** is to create an electrical connection that was not meant to happen.
- short circuit** [N-COUNT-U5] A **short circuit** is an electrical failure caused by improper or damaged electrical connections.
- single gang box** [N-COUNT-U10] A **single gang box** is an electrical box installed in a wall that delivers power to one switch.
- single outlet** [N-COUNT-U9] A **single outlet** is an outlet that can receive one plug receptacle.
- single pole breaker** [N-COUNT-U6] A **single pole breaker** is a circuit breaker that is connected to one hot bus bar and supplies 120-volt power to a circuit.
- single pole switch** [N-COUNT-U11] A **single pole switch** is a basic on/off switch. It allows only one contact to open at a given time.
- snap** [V-I-U7] To **snap** is to fit quickly and snugly into a particular place, often causing a clicking noise.
- soil condition** [N PHRASE-U13] **Soil condition** refers to the texture of the soil, such as dry, rocky, or wet.
- solderless connector** [N-COUNT-U1] A **solderless connector** connects wires by using mechanical pressure instead of solder.
- spade terminal** [N-COUNT-U1] A **spade terminal** is the same as a ring terminal except that the metal part doesn't make a full ring.
- sphere of influence** [N PHRASE-U13] A **sphere of influence** is an electrical current that flows from the ground rod and into the soil that surrounds it. The current moves away from the ground rod in waves.
- split bolt connector** [N-COUNT-U1] A **split bolt connector** is used for taps and splices in building wiring.
- stability** [N-UNCOUNT-U7] **Stability** is the condition of being not easily changed or disrupted.
- stray voltage** [N-UNCOUNT-U12] **Stray voltage** is electrical energy flowing through something that it should not be flowing through, such as a lamp post.

subpanel [N-COUNT-U5] A **subpanel** is the part of an electrical system that controls the delivery of power from the main service panel to all or part of a house or building.

surge arrester [N-COUNT-U12] A **surge arrester** is a piece of equipment which saves electrical systems from being negatively affected by lightning.

temporary [ADJ-U15] If something is **temporary**, it is meant to last or be used for a short period of time.

terminal block connector [N-COUNT-U1] A **terminal block connector** is used to connect individual electrical wires.

three gang box [N-COUNT-U10] A **three gang box** is an electrical box installed in a wall that delivers power to three switches.

three-way switch [N-COUNT-U11] A **three-way switch** is used for circuits with two different locations.

timer switch [N-COUNT-U11] A **timer switch** is a switch that is set to turn on or off at a desired time.

toggle switch [N-COUNT-U11] A **toggle switch** is an electrical switch with a lever. The lever moves up and down to control the switch.

traffic [N-UNCOUNT-U15] **Traffic** is the movement of people or objects through an area.

transfer [V-T-U7] To **transfer** something is to move or redirect something.

trip [V-T-U6] To **trip** something is to trigger or release a switch to set something into operative mode.

two gang box [N-COUNT-U10] A **two gang box** is an electrical box installed in a wall that delivers power to two switches.

utility pole [N-COUNT-U3] A **utility pole** is a large pole that is used to support overhead wires such as power lines and telephone wires.

utility transformer [N-COUNT-U3] A **utility transformer** is a device that changes electricity from high to low voltage.

volume [N-UNCOUNT-U8] **Volume** is the amount of space inside something measured in cubic units.

wall cavity [N-COUNT-U10] A **wall cavity** is an opening in a wall where a fixture, such as a switch box, is mounted.

weatherproof [ADJ-U8] If something is **weatherproof**, it can endure any kind of weather.

wide slot [N-COUNT-U9] A **wide slot** is the larger of the two rectangular slots in an electrical outlet. It connects to the neutral prong that receives a spent electrical current from the plug.

worn out [ADJ PHRASE-U15] When something is **worn out**, it has outlived its optimal usefulness or durability and should be replaced.

zip cord [N-UNCOUNT-U15] **Zip cord** is a set of two or more attached insulated wires that may be separated by pulling them apart. It is usually used for household appliances.



Electrician

Career Paths: Electrician is a new educational resource for electrical professionals who want to improve their English communication in a work environment. Incorporating career-specific vocabulary and contexts, each unit offers step-by-step instruction that immerses students in the four key language components: reading, listening, speaking, and writing. **Career Paths: Electrician** addresses topics including electrical concepts, types of wires, electrical service entrances, installing appliances, and wire codes.

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