

## Lesson A4–4

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# Identifying Electrical Tools and Equipment

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**Unit A.** Mechanical Systems and Technology

**Problem Area 4.** Electrical Systems

**Lesson 4.** Identifying Electrical Tools and Equipment

### **New Mexico Content Standard:**

**Pathway Strand:** Power, Structural and Technical Systems

**Standard:** X: Use available power source to plan and apply control systems.

**Benchmark:** X-B: Reference electrical drawings to design, install, and troubleshoot control systems.

**Performance Standard:** 1. Develop and read schematic drawings for a control system. 2. Identify and describe uses of various components of control systems; (i.e., transistors, relays, HVAC, logic controllers). 3. Discuss the importance of maintenance schedules. 4. Identify system performance problems and apply troubleshooting techniques.

**Student Learning Objectives.** Instruction in this lesson should result in students achieving the following objectives:

1. Identify and explain the use of service-entrance equipment and conduit.
2. Describe advantages and disadvantages of circuit breakers and fuses.
3. Identify and explain the use of outlet and device boxes.
4. Identify and explain the use of lampholders, switches, and controls.
5. Identify and explain the use of receptacles, wall plates, and box covers.
6. Identify and explain the use of miscellaneous equipment.
7. Identify and explain the use of various electrical tools.

**List of Resources.** The following resources may be useful in teaching this lesson:

**Recommended Resources.** One of the following resources should be selected to accompany the lesson:

Books That Work. *Get Wired*. Computer program for use with Windows.

Burke, Stanley R., and T.J. Wakeman. *Modern Agricultural Mechanics*. Danville, Illinois: Interstate Publishers, Inc., 1992. (Textbook, Chapter 18)

Johnson, Donald M., et al. *Mechanical Technology in Agriculture*. Danville, Illinois: Interstate Publishers, Inc., 1998. (Textbook, Chapter 5)

Phipps, Lloyd J., et al. *Introduction to Agricultural Mechanics*, Second Edition. Upper Saddle River, New Jersey: Prentice Hall Interstate, 2004. (Textbook, Chapter 17)

VAS U3061. *Selecting Equipment for Electrical Installations*. Urbana, Illinois: Vocational Agriculture Service.

**Other Resources.** The following resources will be useful to students and teachers:

Cauldwell, Rex. *Wiring A House*. Newtown, Connecticut: The Taunton Press, 1996.

Colvin, Thomas S. *Electrical Wiring*. Winterville, Georgia: American Association for Vocational Instructional Materials, 1993. (Textbook and Workbook)

McKenzie, Bruce A., and Gerald L. Zachariah. *Understanding and Using Electricity*. Danville, Illinois: Interstate Publishers, Inc., 1982. (Textbook, Unit 3)

Mullin, Ray C. *Electrical Wiring Residential*. Albany, New York: Delmar Publishers, 1996.

Phipps, Lloyd J., and Carl L. Reynolds. *Mechanics in Agriculture*. Danville, Illinois: Interstate Publishers, Inc., 1992. (Textbook and Workbook, Chapter 38)

Richter, H.P., and W. Creighton Schwan. *Wiring Simplified*. Minneapolis, Minnesota; Somerset, Wisconsin: Park Publishing, Inc., 1996.

Surbrook, Truman C., and Ray C. Mullin. *Agricultural Electrification*. Cincinnati, Ohio: South-Western Publishing Co., 1985. (Textbook, Unit 9)

VAS U3016a. *Electrical Wiring Procedures*. Urbana, Illinois: Vocational Agriculture Service.

## List of Equipment, Tools, Supplies, and Facilities

Writing surface

Overhead projector

Transparencies from attached masters  
Copies of student lab sheets  
Examples of as many of the devices and tools listed in “terms” section as possible  
Electrical Wiring Kit, available from IAVAT

**Terms.** The following terms are presented in this lesson (shown in bold italics):

240-volt receptacles  
Blank covers  
Box hangers  
Cable connectors  
Cable ripper  
Combination switch and receptacle  
Connectors  
Couplings  
Duplex receptacles  
Entrance cap or heads  
Entrance elbow  
Extension rings  
Fish tape and reel  
Flexible metallic conduit  
Flexible nonmetallic liquid tight tubing  
Flush-mounted device boxes  
Four-way switches (DPDT)  
Fused-receptacle  
Ground rods and clamps  
Grounding screws, clips, and pigtails  
Humidistats  
Keyless lampholders  
Knockout seals  
Lineman’s pliers  
Long-nose pliers  
Metallic octagon boxes  
Metallic square boxes  
Multi-purpose tool  
Nonmetallic boxes  
Pull-chain lampholders  
Rigid metallic conduit  
Rigid nonmetallic conduit  
Screwdrivers  
Service entrance panel (SEP)  
Single-pole switches (SPST)  
Solderless connectors

Split-bolt connectors  
Straps or staples  
Surface-mounted device boxes (handy boxes)  
Test light  
Thermostats  
Thinwall conduit (EMT)  
Three-way switches (SPDT)  
Wall plates

**Interest Approach.** Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

*Bring to class several items of electrical equipment and tools that are discussed in the text of this lesson plan. Hopefully, they will be many of the same tools and equipment that students will be using to conduct various lab activities to learn electrical wiring procedures. Call on individual students to identify the name and describe the use of each electrical device and tool that you have chosen. Students will recognize many of the devices and equipment, but may not know the proper name or even the proper use of the item. Impress upon the student that if they need a particular device or tool and go to the local hardware store or lumberyard to purchase them, they will need to know the proper name in order to have the salesperson help them.*

## Summary of Content and Teaching Strategies

**Objective 1:** Identify and explain the use of service-entrance equipment and conduit.

**Anticipated Problem:** How are service-entrance equipment and conduit identified and what are their uses?

- I. Service-entrance equipment is used in servicing electrical work in homes or buildings through the circuit breaker box or fuse box. Conduit is used primarily in commercial agricultural buildings as well as in regular commercial or public buildings as opposed to typical agricultural buildings or homes. Generally, conduit is used when protection from mechanical damage is important.
  - A. **Entrance caps** or **heads** are used to protect the exposed end of the conduit or entrance cable that brings the electrical service into the building or home. Its primary purpose is to keep water from entering the conduit or cable sheath and short circuiting the wires. They are found in three common types including: flange-type, conduit type, and service cable type.
  - B. An **entrance elbow** is used where conduit or cable enters a building. It has a removable cover to aid in installing the wires.

- C. A **service entrance panel (SEP)** is used to control all electricity in the building. It should be located in a dry location and on an interior wall to avoid temperature extremes that would encourage condensation and corrosion. An SEP may be either a fuse-type or circuit-breaker type. In either case, there will be a main fuse or main breaker to disconnect power to all circuits. The SEP will also contain individual fuses or breakers for each branch circuit in the building. Fuses can be found in a cartridge type or plug type. Plug fuses are available in three types:
1. standard plug fuse which has an internal fusible link
  2. time-delay fuse which is designed to stand a temporary overload that may exist if an electric motor is starting
  3. nontamperable fuse which has a different size base which requires a special adapter that is screwed into the standard fuse socket

Circuit breakers operate on the principle that some metals expand more than others when heated equally. The breaker has two contacts that are held together by a bimetal latch. If current flow through the breaker is greater than its rating, the bimetal strip heats and bends causing the contact points to open. When the breaker has cooled sufficiently, the breaker may be reset by moving the toggle to the “off” position and then again to “on.”

- D. **Rigid metallic conduit** resembles galvanized water pipe, except that it is softer and easier to bend. It is available in the same trade sizes as water pipe from ½ inch up. It is fastened to boxes by means of locknuts and bushings.
- E. **Rigid nonmetallic conduit** is similar to metallic except that it is made of plastic. Special plastic fittings are often cemented together.
- F. **Thinwall conduit**, sometimes referred to as EMT is not threaded but is coupled together with special pressure-type fittings. **Couplings** are used to join two pieces of thinwall conduit while **connectors** are used to join the conduit to boxes. Thinwall conduit is available in the same inside diameters as rigid conduit except that it is not generally made larger than 2-inch. Thinwall conduit is often preferred in indoor applications while rigid conduit may be preferred in outdoor applications.
- G. **Flexible nonmetallic liquid tight tubing** may replace EMT in many agricultural applications. Concentric corrugations are used to give high strength and flexibility. It is particularly useful in damp locations where metallic conduit would corrode.
- H. **Flexible metallic conduit** is often used to protect conductors leading to motors where vibration prevents the use of EMT or rigid conduit.

*A variety of techniques can be used to help students master this objective. If possible, bring to class an example of each item discussed in notes. Show students an example of each item and discuss how and where it might be used. Another approach would be to arrange a field trip to the local electrical supply center, hardware store, or lumber yard and ask a salesperson to discuss the various items with the students. Otherwise, use the notes above and VAS U3061 to discuss the use of service entrance equipment. There are many other text sources that also show pictures of electrical equipment and explain its use.*

Choose resources that are available in your program. Use TM: A4–4A as a guide to discussing the various items.

**Objective 2:** Describe advantages and disadvantages of circuit breakers and fuses.

**Anticipated Problem:** What are the advantages of using circuit breakers and fuses?

- II. Circuit breakers and fuses offer over-current protection to individual branch circuits in agricultural buildings or homes. Each device has several advantages or disadvantages depending on their use or application.
  - A. There are no moving parts in fuses.
  - B. Fuses are faster. The time required to open a fused circuit when a short circuit occurs is usually less than for any other protective device.
  - C. Fuses are more reliable. A given cross section of metal will always melt at a given temperature where a circuit breaker may not trip due to corrosion or sticking.
  - D. Fuses are not affected by age or use, while circuit breakers may weaken and trip when they should not.
  - E. Fuses are not affected by lack of maintenance. Circuit breakers should be tripped periodically to keep them moving freely.
  - F. Fuses are economical because the initial cost of the equipment is less.
  - G. Circuit breakers may have a higher initial cost, but there is no cost involved in resetting the breakers as there is in replacing fuses.
  - H. When a fuse blows, one may be tempted to replace it with a larger amperage fuse which would not be as safe as a circuit breaker in this case.
  - I. Circuit breakers are more convenient to switch off when necessary and easier to switch back on after an interruption.

Ask students to identify reasons they might choose to use fuses instead of circuit breakers or circuit breakers instead of fuses. Use the notes above and TM: A4–4B to outline the advantages and disadvantages of each.

**Objective 3:** Identify and explain the use of outlet and device boxes.

**Anticipated Problem:** How do you identify outlet and device boxes and how are they used?

- III. Outlet and device boxes are generally used at every receptacle, switch, light, or junction point where wires are attached or spliced. Outlet boxes are usually octagonal or square. Device boxes may be flush mounted or surface mounted.
  - A. **Nonmetallic boxes** are used in damp or dusty agricultural buildings for all receptacles, switches, or junction boxes. Gasketed covers are necessary on nonmetallic electrical boxes to seal out dust, moisture, and corrosive gases.

- B. **Metallic octagon boxes** are usually made of galvanized steel and are normally 4 inches in diameter and 1 ½ inches deep, although other sizes are available. They are available with cable clamps, or with knockouts that may be removed for attaching cable or conduit connectors.
- C. **Metallic square boxes** are generally 4 inches across and 1 ½ inches deep. They are often used in place of octagon boxes when more wires are needed than would be permitted in an octagon box. They are available with or without cable clamps.
- D. **Extension rings** are available for both octagon and square boxes. Extension rings provide additional room when more wires are needed than are permitted in a single box.
- E. **Flush-mounted device boxes** are used in the home or in any finished building where you wish to conceal the wiring in the walls. Most common are the beveled corner device boxes with clamps for nonmetallic cable, and the square corner boxes with or without cable clamps. The sides are removable so that two or more boxes can be “ganged” together to provide for a series of switches or receptacles at one location.
- F. **Surface-mounted device boxes** or **handy boxes** are made for fastening to an exposed surface. They have rounded corners and are generally not equipped with cable clamps. They may be used for conduit or cable wiring.

Use one of the approaches in the teaching strategy outlined in Objective 1. Use TM: A4–4C and the notes above to discuss the various boxes.

**Objective 4:** Identify and explain the use of lampholders, switches, and controls.

**Anticipated Problem:** How do you identify lampholders, switches, and controls and how are they used?

- IV. Lampholders are used as a light fixture in many agricultural applications. They are wired the same as most different kinds of lights that are used in homes. Switches are used to turn the lights off and on. The type of switch used will depend on how many switches will control the same light(s).
  - A. **Keyless lampholders** are controlled by a separate switch or switches in the line. Common porcelain lampholders are made to fit on 4-inch octagon boxes.
  - B. **Pull-chain lampholders** have a built-in switch which is turned off and on at the lampholder with a string or chain.
  - C. **Single-pole switches (SPST)** are used to break the connection in a single hot wire. They have only two terminal screws and are used to control lights or receptacles from one location. They also have the words “on” and “off” on the toggle.
  - D. **Three-way switches (SPDT)** are used in pairs to control lights or receptacles from two different locations. They have three terminal screws. They have no words written on the toggle as they may be on or off in the up or down position depending on the position of the other switch.
  - E. **Four-way switches (DPDT)** are used in conjunction with a pair of three-way switches. They are useful when you want to control lights or receptacles from three or more differ-

ent locations. Four-way switches have four terminal screws on them and like the three-way switch, do not have on or off written on the toggle.

- F. **Thermostats** are controls used to control heating and cooling systems.
- G. **Humidistats** are used to control humidity levels.

*You may use one of the approaches in the teaching strategy outlined in Objective 1. It would be helpful to allow the students to actually look at the various devices so they can see the various terminals and how the device works. Use TM: A4–4D to outline the various devices as you discuss them.*

**Objective 5:** Identify and explain the use of receptacles, wall plates, and box covers.

**Anticipated Problem:** How do you identify receptacles, wall plates, and box covers and how are they used?

- V. Receptacles are used to access electricity by any device that has a plug-in and cord on it. They come in many different types. Wall plates and box covers are used to enclose the fronts of receptacles, switches, or boxes.
  - A. **Duplex receptacles** are double plug-in outlets, which may be installed in a variety of different types of boxes. Each duplex receptacle has two pair of terminal screws. Most receptacles have a “pry out” connection on the “hot” side which can be removed in case you wish to control each individual receptacle separately. Grounding-type receptacles have a green-colored terminal for attaching grounding wires. They also have the additional third slot for three-pronged plugs.
  - B. **240-volt receptacles** are installed for appliances requiring 240 volts. Different slot arrangements are used depending on the amperage rating of each.
  - C. A **combination switch and receptacle** is used when you have a convenience outlet in the same device box with a switch. They may be connected so that the outlet is always “hot” and the switch controls one or more lights in the room or building. They may also be connected so that the switch controls the outlet.
  - D. A **fused-receptacle** offers protection to the appliance plugged into it. The appliance is protected by a fuse contained in the receptacle.
  - E. **Wall plates** are used to cover switches, duplex receptacles, and any combination of switches and receptacles that may be single or ganged together in groups. They are available in plastic, metal, glass and other materials.
  - F. **Blank covers** are used on octagon, square, or handy boxes that are simply junction points. In other words, they are used when there is just wire and no device is mounted in a box.

*You may choose any of the approaches in the teaching strategy outlined in Objective 1 to teach this objective. Use the notes above and TM: A4–4E as you discuss each item and explain its use.*

**Objective 6:** Identify and explain the use of miscellaneous equipment.

**Anticipated Problem:** How do you identify miscellaneous equipment and how is it used?

- VI. In order to complete a wiring project, many other types of miscellaneous equipment are necessary.
- A. **Cable connectors** are used to fasten cables to boxes that do not have built-in cable clamps. They are connected by inserting them into a knockout opening and secured with a nut.
  - B. **Split-bolt connectors** are often used when splicing larger size conductors such as outdoor wires to entrance wires.
  - C. **Solderless connectors**, sometimes called “wire nuts”, are used to splice smaller conductors such as those in typical wiring applications. Most have an insulated cover, which twists onto a spliced wire. It holds the splice in place as well as insulating the splice. Different sizes are available depending on the size of conductor and number of conductors being used.
  - D. **Straps or staples** are used to fasten conduit and cable to the surfaces over which they run.
  - E. **Box hangers** are useful in mounting outlet boxes, particularly in new work.
  - F. **Knockout seals** are available to close unused openings where knockouts have been removed. They are used to keep mice, dirt, and trash away from the wires inside the box.
  - G. **Grounding screws, clips, and pigtails** are used to connect grounding conductors to boxes.
  - H. **Ground rods and clamps** are important in agricultural wiring. Ground rods are made of copper or copper covered steel and are driven deep into the ground to provide for grounding. Ground clamps are used to attach a ground wire to the ground rod.

*You may choose any of the approaches in the teaching strategy outlined in Objective 1 to teach this objective. Use the notes above and TM: A4–4F as you discuss each item and explain its use.*

**Objective 7:** Identify and explain the use of various electrical tools.

**Anticipated Problem:** How do you identify various electrical tools and how are they used?

- VII. A variety of tools are necessary to satisfactorily complete a wiring job.
- A. A **test light** is used to trace circuits, test fuses and lines.
  - B. A **multi-purpose tool** is used for cutting wire, stripping conductors, and attaching terminals to conductors.
  - C. **Lineman’s pliers** are used for cutting wires and gripping locknuts.
  - D. A **cable ripper** is used for stripping insulation back off of cable.
  - E. A **fish tape and reel** is used to fish wire through walls or conduit.

- F. **Long-nose pliers** may be used to cut wire as well as put loops on the ends of conductors so they can be attached to terminals.
- G. **Screwdrivers** are used to tighten screws and locknuts on cable connectors.

*Bring an example of each of the tools described above to class. Demonstrate the proper use and application of each of the tools. Allow students to use the tools to perform their function. To wrap up this entire lesson, it would be helpful to arrange a field trip to a new home construction site to see the electrical service and the various circuits installed in the home. If possible, have the electrician demonstrate how to use the various tools and devices that are there. Students should complete LS: A4–4A while at the site. If this is not possible, set up a lab in the classroom or shop displaying the various tools and equipment that you were able to acquire. Have students use LS: A4–4B to correctly identify and briefly explain the use of each tool or piece of equipment. As a wrap up for the entire lesson, have students use the “Get Wired” computer program and from the main menu, click on “Hardware Store.” Students will be able to view over 100 electrical devices and tools and read a description on how each is used and works.*

**Review/Summary.** Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used in determining which objectives need to be reviewed or taught from a different perspective. Questions at end of chapters in textbooks may also be used in the review/summary.

**Application.** Application can involve the following student activities using attached lab sheets:

Identify Various Electrical Devices and Tools Used During Electrical Installation at a New Home Site—LS: A4–4A

Identify and Describe the Use of Electrical Tools and Equipment—LS: A4–4B

**Evaluation.** Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as student performance on the application activities. A sample written test is attached.

## **Answers to Sample Test:**

### **Part One: Matching**

1=b, 2=h, 3=a, 4=i, 5=d, 6=f, 7=e, 8=j, 9=c, and 10=g

### **Part Two: Completion**

1=Three-way switches

2=Straps or staples

3=cable ripper

4=Entrance caps or heads

5=fused-receptacle

**Part Three: Short Answer**

1=any two, any order:

- a. no cost in resetting the breaker
- b. not likely to be tempted to replace with a higher amperage rating as you might be with a fuse
- c. more convenient to switch on after interruption

2=any two, any order:

- a. no moving parts to corrode and cause malfunction
- b. faster
- c. more reliable
- d. not affected by age or use
- e. not affected by lack of maintenance
- f. initial cost of equipment is lower

3=answers will vary depending on tools or equipment selected

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# Test

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## Lesson A4-4: Identifying Electrical Tools and Equipment

### Part One: Matching

*Instructions.* Match the term with the correct response. Write the letter of the term by the definition.

- |                           |                             |
|---------------------------|-----------------------------|
| a. nonmetallic boxes      | f. thinwall conduit         |
| b. pull-chain lampholders | g. duplex receptacles       |
| c. thermostats            | h. extension rings          |
| d. entrance elbow         | i. split-bolt connectors    |
| e. blank covers           | j. four-way switches (DPDT) |

- \_\_\_\_\_ 1. Lights that have a built-in switch that is turned off and on at the light.
- \_\_\_\_\_ 2. Used on octagon and square boxes to provide additional room for wires.
- \_\_\_\_\_ 3. Used in damp or dusty agricultural buildings for receptacles, switches, or junction boxes.
- \_\_\_\_\_ 4. Used to splice larger sized conductors such as outdoor wires to entrance wires.
- \_\_\_\_\_ 5. Used where conduit or cable enters a building.
- \_\_\_\_\_ 6. Sometimes called EMT, electrical metallic tubing.
- \_\_\_\_\_ 7. Used on octagon, square, or handy boxes when they are used as junction points and no device is mounted in the box.
- \_\_\_\_\_ 8. Used when it is necessary or desirable to control lights or receptacles from three or more locations.
- \_\_\_\_\_ 9. Used to control heating and cooling systems.
- \_\_\_\_\_ 10. Double plug-in outlets.

### Part Two: Completion

*Instructions.* Provide the word or words to complete the following statements.

1. \_\_\_\_\_ are always used in pairs and are used to control lights or receptacles from two locations.
2. \_\_\_\_\_ or \_\_\_\_\_ are used to fasten conduit or cable to the surfaces over which they run.

3. If you are needing to strip the insulation back from a piece cable so that you could wire the conductors in a box, the tool needed to perform this task would be a \_\_\_\_\_.
4. \_\_\_\_\_ or \_\_\_\_\_ are used to protect the exposed end of the conduit or entrance cable that brings the electrical service into the building or home.
5. A \_\_\_\_\_ may be used when it is necessary to protect an appliance with a fuse at the receptacle.

**Part Three: Short Answer**

*Instructions.* Provide information to answer the following questions.

1. What are two advantages of using a circuit breaker over a fuse?
  - a.
  - b.
2. What are two advantages of using a fuse over a circuit breaker?
  - a.
  - b.
3. Correctly identify the following tools and electrical devices:
  - a.
  - b.
  - c.
  - d.
  - e.
  - f.
  - g.
  - h.
  - i.
  - j.

# **SERVICE ENTRANCE EQUIPMENT**

- 1. Entrance caps or heads**
- 2. Entrance elbow**
- 3. Service entrance panel (SEP)**
- 4. Rigid metallic conduit**
- 5. Rigid nonmetallic conduit**
- 6. Thinwall conduit (EMT)**
- 7. Couplings**
- 8. Connectors**
- 9. Flexible nonmetallic liquid tight tubing**
- 10. Flexible metallic conduit**

# **ADVANTAGES AND DISADVANTAGES OF CIRCUIT BREAKERS AND FUSES**

- 1. Fuses have no moving parts to corrode and cause malfunction.**
- 2. Fuses are faster.**
- 3. Fuses are more reliable.**
- 4. Fuses are not affected by age or use.**
- 5. Fuses are not affected by lack of maintenance.**
- 6. Initial cost of fuse equipment is lower.**
- 7. There is no cost in resetting a circuit breaker.**
- 8. Temptation to replace a breaker with a breaker of higher amperage.**
- 9. Circuit breakers are more convenient to switch on after interruption.**

# **OUTLET AND DEVICE BOXES**

- 1. Nonmetallic boxes**
- 2. Metallic octagon boxes**
- 3. Metallic square boxes**
- 4. Extension rings**
- 5. Flush-mounted device boxes**
- 6. Surface-mounted device boxes  
(handy boxes)**

# **LAMP HOLDERS, SWITCHES, & CONTROLS**

- 1. Keyless lampholders**
- 2. Pull-chain lampholders**
- 3. Single-pole switches (SPST)**
- 4. Three-way switches (SPDT)**
- 5. Four-way switches (DPDT)**
- 6. Thermostats**
- 7. Humidistats**

# **RECEPTACLES, WALL PLATES AND BOX COVERS**

- 1. Duplex receptacles**
- 2. 240-volt receptacles**
- 3. Combination single-pole switch  
and receptacle**
- 4. Fused-receptacle**
- 5. Wall plates**
- 6. Blank covers**

# MISCELLANEOUS EQUIPMENT

1. **Cable connectors**
2. **Split-bolt connectors**
3. **Solderless connectors**
4. **Straps or staples**
5. **Box hangers**
6. **Knockout seals**
7. **Grounding screws, clips, and pigtails**
8. **Ground rods and clamps**

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## Lab Sheet

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### Identify Various Electrical Devices and Tools Used During Electrical Installation at a New Home Site

**Purpose:** Students will enhance their understanding of various electrical devices and tools by recording the names on this lab sheet while attending a field trip to a new home site. The instruction should be led by the electrician doing the work or instructor.

**Instructions:** Record the name of each electrical device and tool as it is being demonstrated or shown to you.

- |    |    |
|----|----|
| a. | n. |
| b. | o. |
| c. | p. |
| d. | q. |
| e. | r. |
| f. | s. |
| g. | t. |
| h. | u. |
| i. | v. |
| j. | w. |
| k. | x. |
| l. | y. |
| m. | z. |

# Lab Sheet

## Identify and Describe the Use of Electrical Tools and Equipment

**Purpose:** Students will enhance their knowledge and understanding of electrical tools and equipment by correctly identifying each of the following tools and pieces of equipment as displayed in the shop or classroom.

**Instructions:** Record the name and give a brief description of its use for each of the following electrical tools and equipment.

	<b>Name</b>	<b>Description</b>
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		
17.		

**Name**

**Description**

- 18.
- 19.
- 20.
- 21.
- 22.
- 23.
- 24.
- 25.
- 26.
- 27.
- 28.
- 29.
- 30.