



ELECTRICAL VOLUNTEER GUIDE

JA Trades Electrical introduces students to the importance and value of trades careers within their communities. Your role is to lead small groups in a simulation that teaches students how electricity travels from a power plant to their home. You will introduce the activity, demonstrate each step, and help them understand how this process connects to careers in the trades.

At the start of each 20-minute rotation, divide students into two groups with the Virtual Reality volunteer. Each group spends 10 minutes at Electrical and 10 minutes at Virtual Reality, then switches stations.

Before the session begins, **please review:**

- **JA Trades Electrical Facilitator Guide**
- **JA Trades Electrical Volunteer Training PowerPoint**
- **Practice running the station and completing the sequence.**

Instructions to Read Aloud (Bolded Sections)

Welcome to Electrical!

Today, you'll explore how electricity travels to your home and learn about electricians.

Can you name a few places where electricians might work? (Homes, schools, office buildings, hospitals, construction sites.) **Electricians work in many different places to keep our lights on and our communities running.**

Imagine a big storm just hit your neighborhood and the power goes out. Let's see what happens.

Have a student flip the light switch.

Nothing happens because turning power back on takes a lot of important steps. Electricity starts at a power plant, where it is generated. Then it travels a long way through transmission and distribution lines through the substation to reach homes and buildings.

Let's take a look! Point to the Power Plant on the banner.

Electricity starts at a power plant. This is where energy is created before it ever reaches a home, school, or business.

Power Plant Electrician/ Powerhouse Technician

- **Maintains electrical systems that generate power**
- **Works in power plants, substations, transformer yards**
- **Trained through apprenticeships and hands-on training.**

Point out the transmission lines on the banner.

Transmission lines carry electricity across long distances.

Transmission Line Electrician (Lineman)

- **Installs, maintains, and repairs high-voltage lines**
- **Works outdoors and at heights**
- **Essential after storms and emergencies**

Point to the substation on the banner.

Before electricity reaches neighborhoods, voltage must be lowered at a substation so it's safe to use.

Substation Electrician

- **Works where transmission meets local distribution**
- **Maintains transformers, breakers, and switchgear**
- **Safely steps voltage down for homes and businesses**

Point to the distribution lines and transformer on the banner.

Transformers reduce the volts so that electricity is safely brought to buildings by distribution lines. Electricity is now safe to use inside homes, schools, and businesses.

General Electrician

- **Works in homes, schools, and businesses**
- **Installs wiring, outlets, lighting, and panels**
- **Often the entry point into the electrical field**

Electrical Technician and Journeyman Electrician

- **Installs and repairs electrical equipment and circuits**

- Works in industrial and commercial settings
- Reads blueprints and troubleshoots equipment

What does it take to restore power? Who fixes it? Electric companies locate the problem; electricians repair safely.

Student Activity: It's Your Turn! Restore the Power (Bolded Sections)

Today, you're going to become electricians. Your job is to work as a team to restore power to a home after a storm. Each of you will be responsible for one part of the system. Just like in real life, electricians must complete each step in the correct order for everything to work. I'll explain each task and ask for volunteers to take on different roles in the system. Remember, teamwork matters! If one step is missed or out of order, the power won't turn on. You'll also learn how the voltage changes along the way.

Let's get started and bring the lights back on!

- 1. Generating Power at the Power Plant: Hand Crank** - Choose 1 volunteer.
 - Who would like to work in the Power Plant?
 - Crank continuously. Do not stop.
 - All lights on = READY.
- 2. Turning Keys** - Choose 1 volunteer.
 - Turn keys from left to right to energize the transmission power lines.
 - Press green start button. Reset if error.
- 3. Connect Lines** – Choose 2-3 volunteers. Point out transmission lines, substation, transformer, and distribution lines.
 - Follow light sequence.
 - Use wires to connect all power lines.
 - Connect in order from power plant to home.
- 4. Circuit Breaker: Last step** – Choose 1 or 2 volunteers.
 - Flip the breaker switch labeled "Light".
 - Flip the breaker switch labeled "Outlet".
 - Flip the light switch to complete the sequence.
 - Turn on the small lamp plugged in to the outlet.

Encourage role rotations as time allows.

Lightbulbs (Bolded Sections) (As time allows)

Now we are going to compare how much power different lightbulbs use. We will look at incandescent, fluorescent, and LED bulbs. Which type do you think is used most today and why? LED because it uses the least power

Ask for a student volunteer to demonstrate.

1. Turn on the light switch for **ONE** light bulb at a time starting on the left.
2. Begin turning hand crank until it lights up.
3. Once it lights, **STOP** cranking and turn the switch off.
4. Repeat steps for all (3) lightbulbs.
 - Which one was easiest to power? Why?
 - LED uses less power and is easier to light up, incandescent takes more power to light up.
5. Let the other students try it out if time allows.

Wrap-Up Discussion

Career Path Takeaways

- No four-year college required for many roles
- Paid apprenticeships + technical training
- Strong job demand and career growth
- Specialization leads to higher pay

What would our community look like without electricians?

What skills do you think are needed? Teamwork, physical stamina, mathematical/blueprint skills, problem solving, detail-oriented, etc.

Trades careers play a crucial role in our communities. Electricians and other skilled tradespeople keep our homes, schools, and workplaces running safely. These careers make a real difference. Every step of electricity's journey requires skilled electricians and every one of these jobs keeps our communities running.

