



PLTW Engineering

10-12/Career Exploration - Electrician

April 24, 2020



10-12/DE

Lesson: 4/24/2020

Objective/Learning Target: Students will be able to explain the career path of an electrician.



What do electricians do?

Electricians install, maintain, and repair electrical power, communications, lighting, and control systems in homes, businesses, and factories.

Almost every building has an electrical power, communications, lighting, and control system that is installed during construction and maintained after that. These systems power the lights, appliances, and equipment that make people's lives and jobs easier and more comfortable.



Typical Job Duties

Electricians typically do the following:

- Read blueprints or technical diagrams
- Install and maintain wiring, control, and lighting systems
- Inspect electrical components, such as transformers and circuit breakers
- Identify electrical problems using a variety of testing devices
- Repair or replace wiring, equipment, or fixtures using hand tools and power tools
- Follow state and local building regulations based on the National Electrical Code
- Direct and train workers to install, maintain, or repair electrical wiring or equipment



Typical Job Duties

Installing electrical systems in newly constructed buildings is often less complicated than maintaining equipment in existing buildings because electrical wiring is more easily accessible during construction.

Maintaining equipment and systems involves identifying problems and repairing broken equipment that is sometimes difficult to reach. Maintenance work may include fixing or replacing parts, light fixtures, control systems, motors, and other types of electrical equipment.



Typical Job Duties

Electricians read blueprints, which include technical diagrams of electrical systems that show the location of circuits, outlets, and other equipment.

They use different types of hand tools and power tools, such as conduit benders, to run and protect wiring. Other commonly used tools include screwdrivers, wire strippers, drills, and saws. While troubleshooting, electricians also may use ammeters, voltmeters, thermal scanners, and cable testers to find problems and ensure that components are working properly.



Work Environment

Electricians work indoors and outdoors at homes, businesses, factories, and construction sites. Because electricians must travel to different worksites, local or long-distance commuting is often required.

On the jobsite, they occasionally work in cramped spaces. The long periods of standing and kneeling can be tiring. Electricians may be exposed to dirt, dust, debris, or fumes. Those working outside may be exposed to hot or cold temperatures and inclement weather. Those who work in factories are often subject to noisy machinery.



Work Environment

Electricians may be required to work at great heights, such as when working on construction sites, inside buildings, or on renewable energy projects.

Many electricians work alone, but sometimes they collaborate with others. Electricians employed by large companies are likely to work as part of a crew, directing helpers and apprentices to complete jobs.



Work Environment

Injuries and Illnesses

Working with electricity is dangerous. Electricians must take precautions to avoid getting hurt. Although accidents are potentially fatal, common injuries include electrical shocks, falls, burns, and other minor injuries.

To reduce these risks, workers must wear protective clothing and safety glasses. Electricians who are subject to loud noises, such as those in factories, must wear hearing protection.



How to become an Electrician

A high school diploma or equivalent is required to become an electrician.

Some electricians start out by attending a technical school. Many technical schools offer programs related to circuitry, safety practices, and basic electrical information. Graduates of these programs usually receive credit toward their apprenticeship.

Most states require electricians to be licensed. For more information, contact your local or state electrical licensing board.



How to become an Electrician

Training

Most electricians learn their trade in a 4- or 5-year apprenticeship program. For each year of the program, apprentices typically receive 2,000 hours of paid on-the-job training as well as some technical instruction.

Workers who gained electrical experience in the military or in the construction industry may qualify for a shortened apprenticeship based on their experience and testing.



How to become an Electrician

Training

Technical instruction for apprentices includes electrical theory, blueprint reading, mathematics, electrical code requirements, and safety and first-aid practices. They may also receive specialized training related to soldering, communications, fire alarm systems, and elevators.

Several groups, including unions and contractor associations, sponsor apprenticeship programs. Apprenticeship requirements vary by state and locality.



How to become an Electrician

Training

Some electrical contractors have their own training programs, which are not recognized apprenticeship programs but include both technical and on-the-job training.

Although most workers enter apprenticeships directly, some electricians enter apprenticeship programs after working as a helper. The Home Builders Institute offers a pre-apprenticeship certificate training (PACT) program for eight construction trades, including electricians.

After completing an apprenticeship program, electricians are considered to be journey workers and may perform duties on their own, subject to local or state licensing requirements.



Licenses, Certifications, Registrations

Most states require electricians to pass a test and be licensed. Requirements vary by state. For more information, contact your local or state electrical licensing board. The tests have questions related to the National Electrical Code and state and local electrical codes, all of which set standards for the safe installation of electrical wiring and equipment.

Electricians may be required to take continuing education courses in order to maintain their licenses. These courses are usually related to safety practices, changes to the electrical code, and training from manufacturers in specific products.

Electricians may obtain additional certifications, which demonstrate competency in areas such as solar photovoltaic, electrical generating, or lighting systems. Electricians may be required to have a driver's license.



Important Qualities for an Electrician

Color vision. Electricians must identify electrical wires by color.

Critical-thinking skills. Electricians perform tests and use the results to diagnose problems. For example, when an outlet is not working, they may use a multi-meter to check the voltage, amperage, or resistance in order to determine the best course of action.

Customer-service skills. Electricians work with people on a regular basis. They should be friendly and be able to address customers' questions.

Physical stamina. Electricians often need to move around all day while running wire and connecting fixtures to the wire.

Physical strength. Electricians need to be strong enough to move heavy components, which may weigh up to 50 pounds.

Troubleshooting skills. Electricians find, diagnose, and repair problems. For example, if a motor stops working, they perform tests to determine the cause of its failure and then, depending on the results, fix or replace the motor.



How much do electricians get paid?

The median annual wage for electricians was \$55,190 in May 2018. The median wage is the wage at which half the workers in an occupation earned more than that amount and half earned less. The lowest 10 percent earned less than \$32,940, and the highest 10 percent earned more than \$94,620.



Quiz yourself

1. List 3 typical job duties of an electrician.
2. Do you need a high school diploma to become an electrician?
3. What is the typical length of an electricians apprenticeship?
4. List 2 important qualities of an electrician.
5. What is the median wage for electricians?



Helpful links

[IBEW Local 124 – Electricians Union](#)

[Apprenticeship Training for Electricians](#)