

# CONTENTS

	<u>PAGE</u>
Chapter One Apprenticeship_____	1
Chapter Two Electrician_____	9
Chapter Three Education_____	29
Chapter Four Women _____	55
Chapter Five License _____	69
Chapter Six Inspection_____	96
Chapter Seven Torque _____	116
Chapter Eight Load Test _____	138
Chapter Nine Circuit Analyzer _____	153
Chapter Ten Safety _____	162
Conclusion _____	185

In this book, I have explained the principles of electricity upon which they depend for their operation, and how the same thing is accomplished in the everyday world. In giving directions or in making cautions, I have usually given the reason for so doing in the hope that this information may be a stimulant to the imagination of the experimenter and a useful guide in enabling them to proceed along some of the strange roads on which they will surely go.

Science brings new words into our language and it constantly changes our mode of living. Electrical science probably has made the greatest changes in our world within the last 130 years. It has made us more comfortable, healthier, made our days longer, given us many pleasures.



No one knows what electricity is. There have been many theories or attempts to explain what this mysterious force may actually be, but all of them have been mere guesses and cannot be proven.

### **Electricity**

**It is not a solid, liquid, nor gas; something having no weight, being invisible, occupying no space, moving at enormous speed, but yet a normal part of nature.**

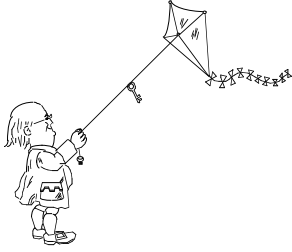
It is not necessary to know what electricity is in order to use it and make it obey, or even in order to invent new electrical devices. It is merely necessary to know and understand the laws which govern electricity's actions and *behavior*.

There is nothing mysterious about electricity's actions. It will do exactly the same thing under exactly the same circumstances.

In order to understand electricity's *behavior* it is necessary to know something about *magnetism*.

Magnetism is defined as an invisible force of attraction, like an *invisible glue*. Magnetism is like electricity; we cannot see it, but yet we can tell that it exists because it produces certain effects. There is no insulator for magnetism. It penetrates everything.

## WATER ANALOGY



During Benjamin Franklin's time, scientists thought electricity was *like a fluid* with positive and negative charges that flowed through a conductor.

Since water ( $H_2O$ ) can be seen and the electron can't be seen, it is good to paint a picture of water in your mind as you learn about electricity and current flow.

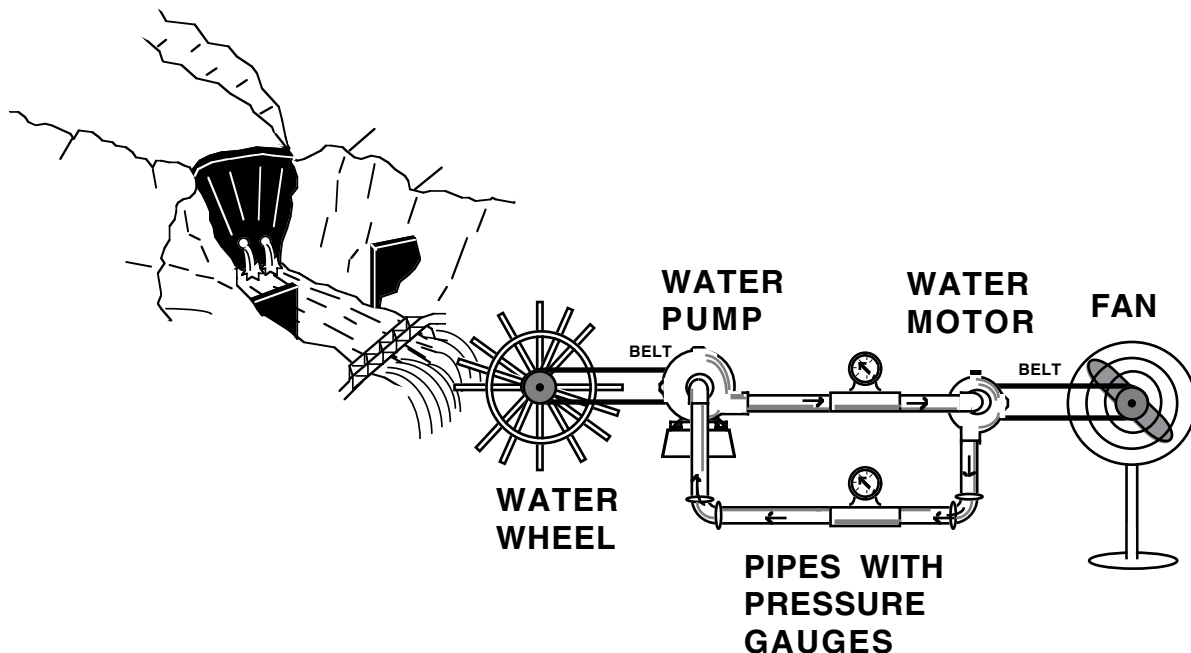
The tiny drop of water can be visualized in your mind as the electron. The drops of water travel through a pipe where the electron is carried through a conductor.

The source of energy to move the tiny water drops is the water pump that provides *pressure* to move the water drops.

The water pump that provides pressure for your house may be located several miles away at the other end of town in some cases. But, as soon as you turn on the faucet, water flows. The pump places water pressure on the molecules, or drops of water, at one end of the pipe, and then a continuous motion of water drops push water drops out of the faucet.

The river or lake has a dam that controls the constant pressure of water to the paddles of the water wheel. The water wheel as it turns has a connected belt which turns a water pump to create a pressure in the pipes to force the water motor to turn its belt which turns the fan to complete the cycle of work.

Water is energy at work as shown below.





### How To Apply

Each of the four types of electrical work share common skills and knowledge. However, the basic requirements for becoming an apprentice in any of the programs are similar. Below are the required steps for application and consideration. Each step must be completed before moving to the next step.

### Step 1: Application

Currently all applications must be completed in person at the Central Florida JATC. The following documents are required to complete an application and should be brought with you when you visit the office.

#### Required Documents

- Driver's License or Picture ID
- Social Security Card
- Birth Certificate or Passport
- High School Diploma or GED Certificate and Scores
- Official Sealed High School Transcripts showing **one (1) full credit of Algebra.**
- **Algebra - If you can score 4 or above on the Aptitude Exam you don't need one year.**

#### Additional Information

- Resume
- Proof of Military Experience (DD214)
- College Transcripts
- Vocational Transcripts
- Letter of Electrical Experience
- Referral Letters

### Step 2: Aptitude Exam

The aptitude exam is validated for use by sponsors of the IBEW/NECA electrical apprenticeship programs to assist in the selection of apprentices. The Aptitude Exam evaluates candidates on their math skills and Reading comprehension. A score of Pass or Fail is provided the day after the exam. Applicants are only tested once a month in order of completed application dates. A \$20 application fee (cash only) is required before taking the exam. Anyone absent for the exam must wait 6 months before being rescheduled.

### Step 3: Interview

Applicants are interviewed and scored by the appropriate program committee. Committee interviews take place once a month; depending on the volume of applicants, it could take up to 6 months to be interviewed. Based on interview performance, all applicants are placed on a ranking list. Applicants are accepted into Apprenticeship programs based on their placement on the ranking list.

### Step 4: Accepted Applicants

Only those applicants accepted into the Apprenticeship program will receive a letter from the Central Florida Electrical Joint Apprenticeship and Training Committee (JATC) informing them of the decision and inviting them to attend classes. Keep in mind, selections are not always immediately following the interview. Very often, several months may pass before actual selections are made and a new school year starts. Applicants remain on the ranking list for possible selection into school for 2 years before needing to re-apply.



The recruitment, selection, employment and training of apprentices during their apprenticeship, shall be without discrimination because of race, color, religion, national origin, age or sex – except the applicant must be at least 17 years of age to apply and 18 years of age at the time of indenture.

The JATC does not and will not discriminate against a qualified individual with a disability because of the disability of such individual. The sponsor will take affirmative action to provide equal opportunity in apprenticeship and will operate the apprenticeship program as required under applicable law and lawful regulations issued thereunder.

As of October 2020, the pay scale, total package insurance, etc. \$18.50 for apprentice to start. Journeyman scale \$39.00.

Local 606 Orlando, Florida has 280 apprentices working. Between 6% to 7% are women which is above the National average of 2.4% for women.



## The Code and the Inspector



A good place to start when wondering how much *authority* (AHJ - authority having jurisdiction) the inspector has, turn to **Article 100 Definition**.

- **Approved.** Acceptable to the authority having jurisdiction.
- **Authority Having Jurisdiction (AHJ).** An organization, office, or individual responsible for enforcing the requirements of a code or standard, **or for approving equipment, materials, an installation, or a procedure.**
- **Identified (as applied to equipment).** Recognizable as suitable for the specific purpose, function, use, environment, application, and so forth, where described in a particular *Code* requirement.  
Informational Note: Some examples of ways to determine suitability of equipment for a specific purpose, environment, or application include investigations by a qualified testing laboratory (listing and labeling), **an inspection agency**, or other organizations concerned with product evaluation.
- **Labeled.** Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization **that is acceptable to the authority having jurisdiction** and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.
- **Listed.** Equipment, materials, or services included in a list published by an organization **that is acceptable to the authority having jurisdiction** and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.