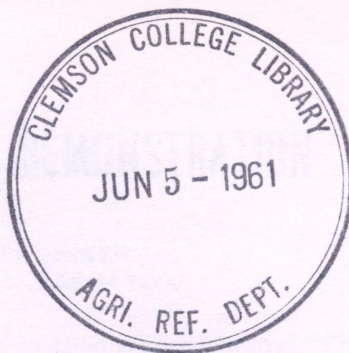
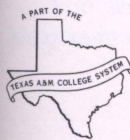
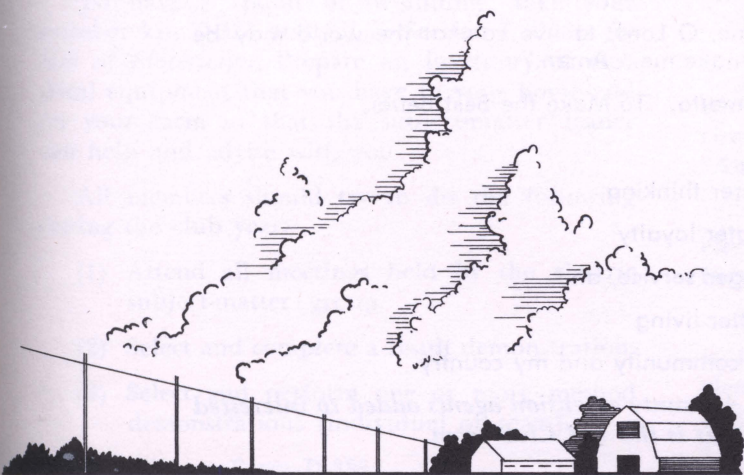


# Member Guide



# 4-H Electric Demonstration



THE AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS  
TEXAS AGRICULTURAL EXTENSION SERVICE  
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## What Is 4-H?

**Did you know** that as a 4-H member, you belong to an organization which has more than 100,000 members in Texas and more than 2 million in the United States?

**4-H Club work** is the youth phase of the Texas Agricultural Extension Service. 4-H Club work is voluntary. There are no dues and 4-H is not a school subject. To become a 4-H Club member, an individual must be between the ages of 9 and 21, must want to be a member, must know about 4-H work and what is expected. 4-H members learn improved practices in agriculture, home economics and related fields by carrying on 4-H result demonstrations. 4-H is a family affair in which you and your parents, with the advice of adult leaders and county extension agents, decide on your result demonstration. You will work with an adult leader in a subject-matter group to develop your result demonstration. You will learn useful and practical skills.

**Adult leaders** are the key persons in every 4-H Club. You and other members of your subject-matter group will work with your subject-matter leader to plan and carry out your group activities. The organization leader of your 4-H Club will help you and other club members plan and carry out the monthly club meetings and club activities. County extension agents train and advise these adult leaders.

**The four-leaf clover** is the accepted emblem. The letter "H" on each leaf stands for Head, Heart, Hands and Health. This emblem is protected by the United States Department of Agriculture copyright.

**The 4-H colors** are green and white.

**The 4-H prayer** is "Help me, O Lord, to live so that the world may be a little better, because Thou didst make me. Amen."

**In support** of the 4-H Club motto, "To Make the Best Better,"

I Pledge:

My Head to clearer thinking

My Heart to greater loyalty

My Hands to larger service, and

My Health to better living

For my club, my community and my country.

**4-H parents + adult leaders + county extension agents added to interested 4-H members = useful citizens. This is the 4-H Club team.**

# MEMBER GUIDE, 4-H ELECTRIC DEMONSTRATION

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## Objectives

Proper planning will make your work in the electric demonstration easier and more satisfying. Your electric subject-matter leader will assist and guide you; however, you should think about the things you want to learn and accomplish in this activity. You have a list of "Things to Learn and Do" that you can fill out to help you and the leader to decide what will be the best activities to work on during the coming year. Check the things that you already know and the things that you would like to learn. Discuss these plans with your parents and later with your leader at the proper time during the electric subject-matter meeting.

Whether you have planned to build a piece of equipment or will perform a method demonstration, find out all you can about the subject. Use the reference list, materials in your member kit, or check over the list of aids available from your power supplier, for facts and tips that will help you do a better job.

To have a "point of beginning" take your member kit, D-335 and fill in Section I, *Plans for Use of Electricity*. Prepare an inventory of electrical equipment that you have in your home and on your farm so that the subject-matter leader can help and advise with you.

All members should try to do the following during the club year:

- (1) Attend all meetings held by the electric subject-matter group.
- (2) Select and complete a result demonstration.
- (3) Select and perform one or more method demonstrations (individual or team).
- (4) Fill out Form D-335.
- (5) Fill out Standard Report Form.
- (6) Turn in a complete record to your electric subject-matter leader.

## Planning Subject-matter Group Meetings

You will deal with two terms in your electric subject-matter activities—the result demonstration

and the method demonstration. They are defined for your purposes as follows:

*Result demonstration*—The activity (or activities) you will perform and accomplish.

*Method demonstration*—Showing how something should be done while telling the "why" and "how" of doing it.

You will find Extension D-510, The 4-H Method Demonstration, a valuable aid in planning and checking the key points of a good method demonstration.

You will find many subjects from which to select in the member kit and a list of references available from your subject-matter leader. Do the things that will be within your capabilities and that will help you learn more about electricity.

The beginner will need to learn electrical terms. Here are some of the terms you should know.

## Electrical Terms and Definitions

Learn to use them correctly.

**AMPERE.** An ampere (current) is the rate at which electricity flows through a conductor or circuit. The term ampere is often abbreviated, "Amp."

**VOLT.** A volt is a unit used in measuring the electrical pressure or force causing the current to flow. The pressure is called voltage.

**WATT.** A watt is a unit of electric power and is 1/746 horsepower. Watts, the rate at which electricity works, depend upon pressure (volts) and upon the rate of flow (amperes).  $1 \text{ volt} \times 1 \text{ ampere} = 1 \text{ watt}$ .  $120 \text{ volts} \times 2 \text{ amperes} = 240 \text{ watts}$ .

**KILOWATT.** A kilowatt is 1,000 watts, or 1.34 horsepower.

**KILOWATT HOUR.** A kilowatt hour is a kilowatt of power working continuously for 1 hour. Electrical energy is metered and sold by the kilowatt hour. It is often written as "KWH." One kilowatt  $\times$  1 hour = 1 kilowatt hour.

**CONDUCTORS.** Metals such as silver, copper and aluminum, through which electricity can easily move, are called conductors.

**INSULATORS.** Some substances such as mica, glass, porcelain and rubber are called "non-conductors," or insulators, because it is very difficult to move electricity through them.

**CIRCUIT.** In order to have a continuous flow of electric current it is necessary to have a complete path for the electric current. That path is called an "electric circuit." It usually consists of two wires, one to bring in the current from the source of supply and the other to take it back.

**BRANCH CIRCUIT.** A branch circuit is that part of the wiring system extending beyond the final fuses.

**CLOSED CIRCUIT.** A circuit that is carrying current is a closed circuit. It is sometimes referred to as a "live" or "hot" circuit.

**OPEN CIRCUIT.** An open circuit is a circuit that has been disconnected by a switch, removed fuse or a tripped circuit breaker. It is sometimes referred to as a "dead" or "cold" circuit.

**SHORT CIRCUIT.** A short circuit is an improper or accidental contact between two or more electric wires, or between one wire and a path to ground.

**SWITCH.** Just as a valve is used to control the flow of water in a pipe, a switch is used to start and stop the flow of electric current in a circuit.

**ENTRANCE SWITCH.** An entrance switch is a wiring device for breaking the connection between the farmstead wiring system and the wires leading from the feeder line to the farm.

**GROUND.** A ground is an electrically tight connection to moist earth which is used to take care of surplus or overflow currents such as lightning and short circuits.

**FUSE.** A fuse is a strip of soft wire or strip of metal in a special container. It is placed in an electric circuit to limit the amount of current in that circuit. When an attempt is made to overload the circuit, the soft metal in the fuse melts or "blows" and the circuit is disconnected.

**CIRCUIT BREAKERS.** Circuit breakers replace fuses, give the same protection, and in many cases can be used as switches. When they are tripped by an over-load the circuits are disconnected. When the breaker is reset, the circuit again is connected.

**OUTLET.** An outlet is any point on a wiring system at which current is taken to supply fixtures, lamps, heaters, motors and current-consuming devices generally.

**CONVENIENCE OUTLET.** A convenience outlet is a wiring device where appliances, lamps and small electrical equipment can be plugged in.

**POWER OUTLET.** A power outlet is a connection for ranges, water heaters, motors of  $\frac{1}{2}$  horsepower or larger, and other high-capacity equipment.

**CYCLE.** A 60-cycle, alternating current (A.C.), means that the current flows 60 times per second in one direction and 60 times per second in the opposite direction, making 120 changes or alternations per second. Practically all farms with high-line electric service have alternating current, and 60-cycle is standard. The information is used in connection with the purchase or repair of equipment designating the kind of electricity the equipment uses. Alternating current may be in frequencies other than 60 cycle. Direct current (D.C.) does not alternate. It flows one direction only.

**METER.** A meter is a device for totaling the amount of electricity used. Most new meters show the total kilowatt hours on a register just like the speedometer of an automobile. On old-style dial meters, two of the pointers move in one direction and the others, in the opposite direction. The total kilowatt hours are read by simply writing down from left to right, the numbers that the pointers have passed.

## "Do's" for Working at Home with Wire and Electricity

**DO ground all circuits.** Before you get your farmstead rewired, go over the whole wiring plan with a competent person. Planning ahead will save trouble later when you want to extend your basic wiring job, add connections or make other changes. Planning is the basis for safe wiring.

**DO check cables, conduits, outlet boxes and equipment periodically** to see that they are fastened rigidly in place, and that fittings are bonded properly. Check for loose connections at terminal points, switches and motors.

**DO make good connections to terminals.** Wrap the wire around the screw in the direction the screw turns in tightening.

**DO twist stranded wire between fingers** to gather loose strands.

**DO solder all wire splices.**

**DO cover each soldered joint** at least twice with rubber tape and then twice with friction tape.

**DO cut wire for repair** of plugs evenly back from defective parts.

**DO protect stranded wire.** In removing insulations be careful not to damage any of the strands.

**DO connect cord caps correctly.** Pass each wire around its prong before putting a loop under the tightening screw.

**DO pull plug from receptacle** by holding plug between fingers.

**DO follow the wiring code** when putting in a circuit—hot wire, black, ground wires, white.

**DO keep your television aerial** well away from electric wires.

**DO plan wiring.** Use the next larger wire than presently needed to allow for future expansion.

**DO keep gears enclosed** or guarded on all operating devices. Put adequate guards on rotating, flying or otherwise protruding parts, and around running belts. Shut off power when making repairs or oiling equipment.

**DO call your local power supplier** for information. Taking chances does not pay.

### **“Don’ts” for Working at Home with Wire and Electricity**

**DON’T forget to pull** the main switch when changing fuses or working on circuits.

**DON’T add electrical extension** haphazardly! Make sure all new wiring is heavy enough to carry the load intended for it, as well as the old wiring to which the new is added. (Check with your electrician.)

**DON’T overload** your wire.

**DON’T use extension cords** as permanent wiring!

**DON’T use wire for any purpose** except that for which it has been designed.

**DON’T use metal sockets** in farmstead wiring, especially for heat lamps—use porcelain or other approved non-metallic ones throughout!

**DON’T use pull chain switches** unless they contain an insulating link or cord!

**DON’T overload** your motors.

### **Records**

Your 4-H Record Book should be like a mirror reflecting the work done on your result demonstration. It should be concise and tell exactly what you have done free of excess words and material unrelated to the subject.

### **Awards Program**

The eyes of 4-H Club members should focus on their result demonstrations, club activities, helping members of their club and showing experiences.

The awards you may earn are listed in the Announcement Folder, Texas 4-H Electric Awards Program, and National Awards Program, available from your adult leader.



## THINGS TO DO AND LEARN

GROUP 1	Already know	Want to learn or do	Plan to do this year
<p>How to make an electric cord</p> <p>How to make an extension cord</p> <p>How to install a drop cord socket</p> <p>Results of improper wiring on operation of heating appliances</p> <p>How to use an electric soldering iron and make splices</p> <p>How to read an electric meter</p> <p>How to improve an old lamp</p> <p>How to cover an old lamp shade frame</p> <p>Uses of as many kinds of light bulbs as you can find</p> <p>Collect different wire sizes (exhibit them and give a short talk on their uses)</p> <p>Demonstrate the uses and sizes of different types of safety devices (such as various fuses, switches, guards, etc.)</p>			
<p><b>GROUP 2</b></p> <p>How to make an electric pig brooder</p> <p>How to make an electric lamb brooder</p> <p>How to brood chicks with a heat lamp</p> <p>How to make a poultry waterheater</p> <p>How to make a small electric motor portable</p> <p>How to make an insect trap with a light bulb</p> <p>How to make an automatic switch with an alarm clock</p> <p>How to wire a simple bell circuit</p> <p>How to replace a wall switch</p> <p>How to prevent water pipes from freezing by the use of electricity</p> <p>How to make a toy electric motor</p> <p>How to make a test light</p> <p>How to make a lamp</p> <p>How to clip dairy cattle electrically</p> <p>How to make an electric ice cream freezer</p> <p>Proper use of an electric de-horner</p> <p>Use and care of kitchen appliances such as mixers, roasters, etc.</p> <p>Use and care of a household appliance such as a cleaner, sewing machine, etc.</p> <p>Care and use of fans</p> <p>How to reverse an electric motor</p> <p>How to have good light, good sight</p>			
<p><b>GROUP 3</b></p> <p>How to make an electric fencing model</p> <p>How to use heating cable in a hotbed</p> <p>How to install a ventilating fan</p> <p>How to make an egg candler</p> <p>How to make a wiring layout</p>			

## References

### Extension Service

D-335—Members Kit Texas 4-H Electric Awards Program

Announcement Leaflet—Texas 4-H Electric Awards Program

MP-183—Electric Cords Selection, Care and Repair

L-237—Use of the Electric Hover Type Chick Brooder

L-238—Brooding Chicks with Infrared Lamps

L-239—Building Infrared Brooders for 50 to 175 Chicks

L-240—Building Infrared Brooders for 250 to 330 Chicks

L-325—Building Infrared Brooders for 370 to 500 chicks

L-191—Warm Poultry Water with Soil Heating Cable

B-175—Frozen Foods

L-289—Home Pasteurization of Milk

B-233—Ironing a Shirt

L-403—The Vacuum Cleaner

B-177—Freezing Poultry for Home Use

B-810—Environment Affects Market Value of Eggs

D-510—The 4-H Method Demonstration—A Guide for Leaders

L-444—Getting Acquainted with Electricity

L-445—Tools for Electricians

L-446—Replacing Switches and Outlets

L-447—Reading the Electric Meter

L-448—What Makes Motors Run

L-449—Make A Test Light

### Westinghouse Foundation

Booklet—Leaders Idea Book

Booklet—Electrical Equipment You Can Build

Booklet—Electrical Demonstrations You Can Perform

Booklet—Especially for the Girls

Leaflet—Announcement—National Awards Program

### Your Power Supplier

Your power supplier has a list of aids including publications, demonstration guides, films, slides and other materials prepared for your area. They will be glad to supply copies of the printed materials and loan films for meeting purposes.