4-H ELECTRIC ACTIVITY PAGE

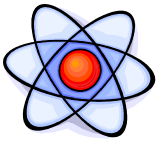
*Developed by **Martin Koon**, Extension Agent, Montgomery County*

Beginning

Life Skill

Ethical Decision Making

Your 4-H ELECTRIC Project



When you work with electricity, you have to make many important decisions. To make the best decisions, you have to know about electricity and electric safety. This 4-H project can help. Some of the skills you can learn and activities you can do in this project are listed below. Check your favorites. Then, work with your 4-H leaders and parents to make a 4-H project plan of what you want to do and learn this year.

- ☐ Learn the difference between AC and DC current.
- ☐ Learn how electricity flows through a circuit.
- ☐ Learn how to create static electricity.
- ☐ Learn about conductors and insulators.
- ☐ Learn about electric safety.
- ☐ Make an exhibit or poster about electric safety rules.
- ☐ Complete a service project using project skills learned.
- ☐ Give a project demonstration in a 4-H club meeting.
- ☐ Other _____

Lightning Fast Facts

- All over the earth, 50 to 100 lightning bolts hit the ground every second.
- Lightning strikes discharge 100 million volts of electricity and heat the air in their paths to more than 60,000 degrees Fahrenheit.
- An ordinary piece of steel will turn into a magnet if it is struck by lightning.

Types of Energy

Nearly everyone is familiar with the word ENERGY, yet few people know what it really is. ***Energy***, simply put, is the rate at which work is done. ***Work*** is the effort to produce or accomplish something.

There are six forms of energy. Look in books and on the Internet to find out more about each type. Use the spaces to the right to write an example of each type of energy. Share what you learn in a 4-H meeting.

Mechanical _____

Electrical _____

Radiant (light) _____

Thermal (heat) _____

Nuclear _____

Chemical _____

AC & DC Current

Electrons flow through wire in two ways. Electron flow in a circuit connected to a battery is always in the same direction. This is called ***direct current*** or ***DC***. ***Alternating current***, or ***AC***, is produced by generators. AC causes electrons to flow in one direction, come to a complete halt and then go in the opposite direction.

Try This—Static Electricity Balloon Magic

Everything we see is made up of tiny parts called ***atoms***. Atoms are made up of even smaller parts called ***protons***, ***electrons*** and ***neutrons***. They are very different from each other in many ways. One difference is their ***charge***. Protons have a positive (+) charge. Electrons have a negative (-) charge. Neutrons have no charge.

Usually atoms have the same number of electrons and protons. When this happens, the atom has no charge: it is ***neutral***. But if you rub things together, electrons can move from one atom to another. Some atoms get extra electrons and have a ***negative charge***. Other atoms lose electrons and have a ***positive charge***. When charges are separated like this, it is called ***static electricity***.

Here is an experiment to see how static electricity works. You'll need balloons and thread. Then, follow the directions. Be sure to record your observations in your 4-H project folder and share what you learn with your 4-H friends.

What To Do:

- Inflate and knot the end of a balloon.
- Rub the balloon against your hair for about one minute.
- Place the "rubbed" side of the balloon against the wall. Release the balloon. What happens?

Now Try This:

- Inflate and tie knots in the end of two balloons.
- Tie the balloons together with a long piece of thread.
- "Charge" each balloon by rubbing them with nylon, wool or on your clothing for one minute.
- Hold the thread in the middle with your arm stretched out so that the balloons are the same distance from the middle of the thread.
- Let the balloons hang freely. What happens?

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"Shocking" Search

Listed below are several words related to electricity. Look in books or on the Internet to learn more about these words. Record what you learn on a separate sheet of paper. Share it with your 4-H friends and keep it in your 4-H project folder. Then, look for the words in the puzzle.

B E I A C F G X T U E H G S E R Z D
K T N T Y W Q G G L O P B G V N J A
X J S O Y E V B B G O Y R E E H P E
D N U R X Q G H H F Y A Z T V A R W
A C L P P V R A Z E H G U G T S X N
A G A W T U M D T C O N D U C T O R
S C T T O N E E E L P H P H D A R T
P R O T O N K O L M O Z J M B L T E
L Q R B Y G F V L E O V B A X E N R
H I V G B P Q C A P C F T E R L Y E
S U E L C U N W D P A T G Y J F T P
O Y S M G E M M S X E T R X P Y F M
F E N V U T L T A R B M O O W D S A
J R I U Q Q J L Y R A F S M D Y N J
D X F H F N Z N D A Y H E G I E H B

AMPERE
ATOM
BATTERY
CELL
CHARGE
CONDUCTOR
ELECTRODE
INSULATOR
NUCLEUS
PROTON
VOLTAGE

Career Scavenger Hunt

By asking others, researching on the Internet or reading a book or magazine—search for a job that uses electric skills and knowledge. Here's what you are looking for.

1. Job Title _____
2. Job Description _____
   _____
   _____
3. Education Required _____
   _____

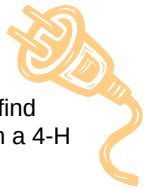
Demonstration Ideas

- Create static electricity from mechanical friction.
- Demonstrate how to electroplate metal.
- Demonstrate which common materials are conductors and which are insulators.
- Demonstrate how lightning is produced.

Safety Hazard Hunt

Look in books or on the Internet to learn more about electric safety in the home. Make a checklist of safety hazards. Use the checklist to conduct a "Safety Hazard Hunt" in your home. If you find a hazard, tell an adult and work to correct it.

Staying Safe



You are around electricity all day long. So, it's important that you know how to use electricity safely. Listed below are a few safety tips. Look in books or on the Internet to find other tips. Make a poster about electric safety. Share it in a 4-H meeting and display it in a public place.

- Never climb utility poles.
- When unplugging electrical appliances, pull by the plug, not by the cord.
- Never fly a kite near power lines or during an electrical storm.
- Never touch a downed power line.
- Never touch an electrical appliance or plug in anything electric if you're standing in water or if your hands are wet.
- Never use electric tools outside in the rain or on wet surfaces.

Service Ideas

- Conduct an electric safety hazard hunt in your home and the homes of friends and neighbors.
- Make and display posters about electric safety.
- Teach younger children about electric safety.

Don't forget to submit your project report to your 4-H leader.

Additional Resources

Making decisions is an important part of working with electricity. This activity sheet has given you the opportunity to explore things to think about as you make decisions in the electric project. You've experimented with electrons, learned about electric safety and done other cool things. But this is just the beginning! Use the resources listed below to continue learning about the electric project.

- School & public libraries
- People who know about electricity, such as science teachers or people work for your electric cooperative
- 4-H project groups
- The 4-H electric Web page: **http://www.utextension.utk.edu/4h/projects/electric.htm**

For more ideas, contact your 4-H office.

Other 4-H Electric Activities

4-H demonstrations
4-H visual exhibits
Project groups
Electric Camp

Reviewed by Mike Buschermohle, Professor, and members of the state 4-H Youth Development staff
Edited by Lori Jean Mantooth, Extension Assistant, and Wanda Russell, Publications Editor