

Electrical Systems

Explorers will be introduced to the basics of electrical systems within the automobile.

CATEGORY

- Auto Technology
- Electrical Systems

OBJECTIVES

By the end of this session, participants will be able to:

- Identify four electrical systems in the average vehicle.
- Service and/or replace a battery.
- Replace a spark plug.
- Replace an electrical fuse.

SUPPLIES

- Activity 2
 - Proper safety equipment for each participant (i.e., eye and ear protection, gloves)
 - Demonstration vehicle(s)
 - Parts and tools to repair or replace the chosen components

ADVISOR NOTE: Text in italics should be read aloud to participants. As you engage your post in activities each week, please include comments, discussions, and feedback to the group relating to **Character, Leadership, and Ethics**. These are important attributes that make a difference in the success of youth in the workplace and in life.

ACTIVITIES

Activity 1

Diagnosis

This activity is designed simply to point out that sometimes identifying a problem or something that isn't working isn't always obvious.

Divide the post into two teams. Have the Explorers form two parallel lines, about 5 feet apart, facing each other. Instruct each team to take a good look at the other team and study everything about them. After about 45 seconds, have both teams turn around.

Instruct the members of team 1 to remain in a straight line and close their eyes. Members of team 2 may break formation for discussion if they choose, but their goal is to change 10 things about their team. These may be things such as messing up somebody's hair, changing places in line, or trading hats or jackets. It doesn't really matter what the changes are as long as they are obvious and easily identifiable.

Once team 2 has made the changes, have the team form back in line. On your signal, have the members of team 1 open their eyes and have both teams turn and face each other.

Give team 1 a couple of minutes to identify as many of the changes as possible.

Now, reverse the roles and repeat with team 1 making the changes. The team that correctly identifies the most changes is the winner.

Activity 2

Main Event

Begin the main event by asking the following questions:

- *Was it easy to identify the changes that had been made?*
- *Did you see something that you thought was different but wasn't?*
- *What would have made it easier for your team to come up with the correct answers?*

Try to guide the discussion toward the conclusion that there were so many things that could have been changed that the only way to “diagnose” the real changes would have been to have a complete and thorough knowledge of each Explorer’s clothing, hairstyle, and other attributes. Say: *That’s how it is with electrical systems in your vehicle. The more acquainted you are with each of the various systems, the easier it will be to diagnose the problems.*

It is important that your Explorers have the opportunity to get their hands dirty and actually work on the various components of the electrical systems.

Explain that although the bulk of a vehicle’s power is derived from the engine, electricity is what makes the vehicle start, fires the spark plugs, and runs the accessory systems such as the lights and sound systems. Each of the systems discussed in this activity could easily be broken down into their own individual activities, so remember that this is just an introduction.

Choose one or more of the following activities to do with your Explorers.

1. The Ignition System

Help the members of the post identify the ignition system by having them locate various components such as the distributor cap, the spark plugs, and the starter. While explaining their functions, let the Explorers remove and replace one or more of these parts.

2. The Charging System

Discuss the difference between an alternator and a generator. Help the Explorers locate the alternator and remove or replace it.

3. The Lighting System

Have the Explorers identify as many lights on the vehicle as they can. Talk about how each is activated. Some may require a manual switch, while others are controlled by spring-loaded plungers or driving controls such as the brake pedal. Have them replace a bulb such as a dashboard light, an interior cabin light, or a headlight.

4. Accessories

Accessories are items such as the sound system, the heating and air conditioning systems, and power windows and doors. It is likely the Explorers will be more interested in one of these accessories than the others. Guide them through the steps of replacing a part in that accessory. If, for example, they show more interest in the sound system, you may wish to have them replace a speaker or install a radio or CD player.

5. The Battery

The battery will probably be the part of the electrical system that is most familiar to your Explorers. Have them locate it and take turns removing and reinstalling it or simply cleaning the posts. Depending upon the knowledge level of your members, you may wish to have them demonstrate the proper way to use jumper cables.

6. Fuses

Explain the function of fuses in an electrical system. Help the Explorers locate the fuse box and let them discover the various amperage ratings on the fuses. Allow each to remove and replace a fuse.

When you are done, give each participant an opportunity to identify each of the parts you have worked on and explain their function. Allow time for questions.

ADVISOR NOTE

Some sample questions are below. They are designed to help the participants apply what they have learned to their own interests. You are welcome to use these questions or develop your own questions that relate to your post or specific focus area.

REFLECTION

Focusing Questions

- *What did you learn about electrical systems that you didn't know before?*
- *How is the electrical system more or less complicated than you thought?*

Analysis Questions

- *What components of the various electrical systems do you think would require the most frequent repair?*
- *How can a thorough understanding of how electricity works make you a better technician?*

Generalization Questions

- *What additional training could you take to become more skilled at working on electrical systems?*
- *What subjects in school do you believe would be relevant to gaining a better understanding of how to diagnose electrical problems in a vehicle?*

ADVISOR'S PARTING THOUGHT

Share the following thought followed by a short discussion among the Explorers.

Electricity in a car, like electricity in your home, can be both a good thing and a challenge to deal with. If the fuses, regulators, or computers fail to control the amount and timing of the electricity sent to the spark plugs, the lights, or other electrical components, their circuitry may be fried. On the other hand, if too little electricity is received by these parts, they won't have the energy to function properly.

Similarly, each of us has the ability to regulate the power we have within us each day. Exercising too much power over those things or people in our lives can result in a "fried" relationship or mistrust. Not exercising enough power can cause others to feel as though you don't care or to question your leadership abilities.

Power or authority must be used wisely and controlled. Abraham Lincoln once said, "Nearly all men can stand adversity, but if you want to test a man's character, give him power."

Choose a boss, teacher, parent, or other leader whom you admire and ask yourself if perhaps the reason you admire them is because of how they control the way they use their power.

ADVISOR AND OFFICER REVIEW

After the meeting, address the following:

- Identify what was successful about the meeting.
- Identify what needed improvement.
- Schedule an officer and Advisor planning meeting to prepare for the next post meeting or activity.