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Technology and Livelihood Education

Quarter 4 – Module 5: Protocols in Making Electrical Gadgets



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Quarter 4 – Module 5: Protocols in Making Electrical Gadgets

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What I Need to Know

This module was designed and written with you in mind. It is here to help you to find out the protocols or processes in making electrical gadgets. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course.

This lesson will expand your knowledge in how to construct simple electrical gadgets by following the protocols in making electrical gadgets.

After going through this module, you are expected to:

- a. Explains the protocols (processes) in making electrical gadgets
- b. Demonstrate an understanding of and skills in making simple electrical gadgets.
- c. Construct simple electrical gadgets with ease and dexterity



What I Know

Directions: Write **true** if the statement tells safety in making electrical gadgets and **false** if the statement is wrong.

- ____ 1. Turn off the main switch when working on electrical devices.
- ____ 2. It is safe to wear metallic pencil or rulers, or wear rings or metal watchbands when working with electrical equipment.
- ____ 3. It is safer to work with two hands in making electrical gadgets.
- ____ 4. Tools with insulators are safe to when making electrical gadgets.
- ____ 5. Avoid doing any electrical activities when the hands are wet.

Lesson

1

Protocols in Making Electrical Gadgets

A **safe work environment** is not always enough to control all potential electrical hazards. You must be **very cautious** and **work safely**. Safety rules help you control your and others risk of injury or death from workplace hazards.

If you are working on electrical circuits or with electrical tools and equipment, you need to use following golden safety rules:



What's In

Did you know that the voltage and available electrical current in the house or any building establishment has enough power to cause death by electrocution?

The fact is that all electrical system has the potential to cause accidents. Our body is a natural conductor of electricity, and very vulnerable to electrical shocks and burns. Direct contact with energized conductors or circuit parts can interfere with the brain, make it difficult to breath, or even stop your heart.

The list below is the safety protocols and health measures that should be observed while working any electrical project to avoid accidents.

PROTOCOLS IN MAKING ELECTRICAL GADGETS

1. Avoid contact with energized electrical circuits.
2. Treat all electrical devices as if they are alive or energized.
3. Disconnect the power source before servicing or repairing electrical equipment.
4. Use only tools and equipment with non-conducting handles when working on electrical devices.
5. Never use metallic pencil or rulers, when working with electrical equipment.
6. Wear non-conductive gloves, protective clothes and shoes with insulated soles.
7. Never handle electrical equipment when hands, feet or body are wet or perspiring or when standing on a wet floor.
8. Do not store highly flammable liquids near electrical equipment.
9. Never touch another person's equipment or electrical control devices unless instructed to do so.
10. When it is necessary to touch electrical equipment (for example, when checking over heated motors or heating flat iron) use the back of the hand.



What's new

People are injured when they become part of the electrical circuit. Humans are more conductive than the earth (the ground we stand on) which means if there is no other easy path, electricity will try to flow through our bodies.

What kinds of injuries result from electrical currents?

There are four main types of injuries: **electrocution (fatal), electric shock, burns, and falls**. These injuries can happen in various ways:

- Direct contact with exposed energized conductors or circuit parts. When electrical current travels through our bodies, it can interfere with the normal electrical signals between the brain and our muscles (e.g., heart may stop beating properly, breathing may stop, or muscles may spasm).
- When the electricity arcs (jumps, or "arcs") from an exposed energized conductor or circuit part (e.g., overhead power lines) through a gas (such as air) to a person who is grounded (that would provide an alternative route to the ground for the electrical current).
- Thermal burns including burns from heat generated by an electric arc, and flame burns from materials that catch on fire from heating or ignition by electrical currents or an electric arc flash. Contact burns from being shocked can burn internal tissues while leaving only very small injuries on the outside of the skin.
- Thermal burns from the heat radiated from an electric arc flash. Ultraviolet (UV) and infrared (IR) light emitted from the arc flash can also cause damage to the eyes.
- An arc blast can include a potential pressure wave released from an arc flash. This wave can cause physical injuries, collapse your lungs, or create noise that can damage hearing.
- Muscle contractions, or a startle reaction, can cause a person to fall from a ladder, scaffold or aerial bucket. The fall can cause serious injuries.



What Is It

It's vital important to take safety precautions when working with electricity. Safety must not be compromised and some ground rules need to followed first.

What do I need to know about electricity?

All electrical systems have the potential to cause harm. Electricity can be either “static” or “dynamic.” Dynamic electricity is the uniform motion of electrons through a conductor (this is known as electric current). Conductors are materials that allow the movement of electricity through it. Most metals are conductors. The human body is also a conductor. This document is about dynamic electricity.

Note: Static electricity is accumulation of charge on surfaces as a result of contact and friction with another surface. This contact/friction causes an accumulation of electrons on one surface, and a deficiency of electrons on the other surface. The OSH Answers document on How Do I Work Safely – Static Electricity has more information.



What's More

Have this sample check list for basic electrical safety.

➤ **Inspect Cords and Plugs**



- Check extension cords and plugs daily. Do not use, and discard cords and plugs if they are worn or damaged.
- Have any extension cord that feels more than comfortably warm checked by an electrician.

➤ **Eliminate Octopus Connections**



- Do not plug several items into one outlet.
- Pull the plug, not the cord.
- Do not disconnect power supply by pulling or jerking the cord from the outlet. Pulling the cord causes wear and may cause a shock.

➤ **Never Break OFF the Third Prong on a Plug**



- Replace broken 3-prong plugs and make sure the third prong is properly grounded.

➤ **Never Use Extension Cords as Permanent Wiring**



- Use extension cords only to temporarily supply power to an area that does Keep extension cords away from heat, water and oil. They can damage the insulation and cause a shock.
- Do not allow vehicles to pass over unprotected extension cords. Extension cords should be put in protective wire way, conduit, pipe or protected by placing planks alongside them.



What I Have Learned

Direction: Cite the advantages and disadvantages of knowing the different safety precautions when working with electricity.

1. Advantages

2. Disadvantages



What I Can Do

Practical Activity:

Now let's try to construct simple circuit by following the protocols in making electrical gadgets.

Materials Needed for a Simple Circuit

- Aluminum foil
- Electrical tape
- D-cell battery
- Small light bulb (maybe from Flashlight)

How to make a Simple Circuit

1. Cut two pieces of aluminum foil and fold them into strips. These will be your wires for the circuit.
2. Tape one to the positive end of the battery and the other to the negative end.
3. Touch one strip to the metal part of the bulb, just under the glass.
4. Touch the other strip to the silver tip on the end of the bulb.

The bulb should light up because you have created an unbroken circuit with "wires"



Assessment

Let's see how much you learned today!

Direction: Draw a happy face 😊 if the statement is correct and sad face ☹️ if it is correct.

- ____ 1. Avoid water at all times when working with electricity.
- ____ 2. Never touch or try repairing any electrical equipment or circuits with wet hands.
- ____ 3. If you are working in any receptacle at your home then always turn off the main.
- ____ 4. Always use insulated tools while working.
- ____ 5. Never try repairing energized equipment.
- ____ 6. Use bamboo, wooden or fiber glass ladder if you are working on any receptacle at height.
- ____ 7. Take care while removing a capacitor from a circuit.
- ____ 8. Always use a circuit breaker or fuse with the appropriate current rating.
- ____ 9. Always take care while soldering your circuit boards.
- ____ 10. Working outside with underground cabling can be dangerous.



Additional Activities

Directions: Write **C** if the statements is correct and write **W** if the statement is wrong.

- ____ 1. Always use tools with non-conducting handles when working on electrical devices.
- ____ 2. An experienced electrician can do some repair of electrical appliances even with wet hands.
- ____ 3. To test the hotness of an electric iron, you can use back part of your hand.
- ____ 4. Unplug the equipment if water spilled into it.
- ____ 5. An electrical current passes to the person as you touch a live wire.



Answer Key

What I Know

1. True
2. False
3. True
4. True
5. True

Assessment

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Additional Activities

1. C
2. W
3. C
4. C
5. C

References

Technology and Livelihood Education, pages 224-225

Susana V. Guinea, Ma. Gilmina G. Sotoya, Randy R. Emen

<https://www.scrib.com/document/446529419/protocol-in-making-extension-cord>

<https://www.wierdunsocializedhomeschoolers.com/how-to-make-a-simple-circuit/>

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