

9

MODULE 3-Q3

GRADE 9

WELCOME TO THE WORLD OF COMPUTER SYSTEM SERVICING

This module covers the two of seven (4) common competencies in Computer System Servicing which will lead you to acquire a National Certificate Level II (NC II). It contains information and suggested learning activities for you to complete. Completion of this module will help you better understand the succeeding module on setting up computer networks.

This module consists of two (2) lessons and (6) learning outcomes. Each lessons and learning outcome contains other sub-learning outcome and learning activities supported by each instruction sheets. Before you perform the activities read the information in What's New and What is It, to ascertain yourself and your teacher that you have acquired the knowledge necessary to perform the skill required of the particular learning outcome.

The specific competency covered in this module and their schedule of recitation are as follows:

LESSON 5: USING HAND TOOLS (UHT)

- LO 1. Plan and prepare for tasks to be undertaken
- LO 2. Prepare hand tools
- LO 3. Use appropriate hand tools and test equipment
- LO 4. Maintain hand tools

LESSON 6: TERMINATING AND CONNECTING ELECTRICAL WIRING AND ELECTRONICS CIRCUIT (TCEW)

- LO 1. Maintain hand tools
- LO 2. Terminate/connect electrical wiring/electronic circuits

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COMPUTER SYSTEMS SERVICING 9	
3RD QUARTER: WEEK 1	TOPIC: Plan and Prepare Tasks to be Undertaken



Learning Competency: Lesson 6: Using Hand Tools (UHT)

Learning Outcomes:

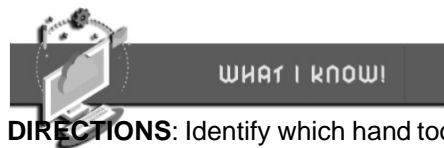
- LO 1. Plan and prepare tasks to be undertaken
 - 1.1 Identify tasks to be undertaken properly
 - 1.2 Identify and select appropriate hand tools according to the task requirements

Code: TLE_IACSS9-12UHT-IIIA-17

Learning Objectives:

At the end of the lesson, the students should be able to:

1. Identify the different hand tools used in Computer Systems Servicing.
2. Select appropriate hand tools to carry out the tasks properly.
3. Follow the task requirements in identifying and selecting appropriate hand tools.



DIRECTIONS: Identify which hand tool is being described in each statement. Write the correct answer on the space provided.

- _____ 1. This tool is sometimes called a nut driver. It is used to tighten nuts in the same way that a screwdriver tightens screws.
- _____ 2. This is a tool used to strip and cut wires.
- _____ 3. This tool is used to clean different computer components without scratching or leaving debris.
- _____ 4. It is a tool used to loosen or tighten slotted screws.
- _____ 5. A tool used to blow away dust and debris from different computer parts without touching the component.



DIRECTIONS: Write the meaning of the following acronyms:

1. USB – _____
2. ESD – _____
3. LCD – _____
4. PC – _____
5. RAM – _____



DIRECTIONS: Select and encircle the hand tools needed in cleaning the computer and other peripherals based on the given scenario.



Euhrica needs to use her computer to have an access to her online class since her mother brought her mobile phone at work. Since the computer has not been used in a month, the keyboard is full of dust and debris as well as the cable wires and monitor. She also wants to open the computer case to see if the internal parts are also covered in dust or if they are still in good condition. In doing so, she needs something to clean the dust and debris on keyboard, monitor and cable wires and a hand tool to open the computer case safely.



Proper Tool Selection

A **tool** is a handheld device or equipment used to carry out a particular function in accomplishing a task. Using tools properly helps prevent physical injuries, accidents and damage to equipment and people.

- How do you select the best tool for the job?
 1. Know and understand in detail the scope of work to be accomplished.
 2. Plan for the scope taking into account the sequence of tasks.
 3. Have a training on the proper use of tools, field experience in their safe use, and following the manufacturer's guidance and instructions for that specific tool.
 4. Include all the associated tooling and consumable parts, as recommended by the manufacturer, when obtaining the tool. In addition, select and use related consumable parts according to their manufacturer's instructions.

Safe Use of Tools

Once selected, use the tool for the purpose for which it was designed. Not all tools come with detailed instructions, but there are those that do spell out for your own safety – Do's and Don'ts.

Environmental Safety and Health Program requires the following:

- All tools be kept in good condition with regular maintenance
- The right to be used for the job
- Each tool be examined before use and damaged or defective tools **not** be used
- Tools be operated according to manufacturer's instructions
- The right protective equipment for the tool and activity be used

Hardware Tools



There is always a right tool for every job. To complete hardware repairs, make sure that you are familiar with the function and correct use of each tool that is also used for the current task. Skilled use of tools and software makes the job less difficult and ensures that tasks are performed properly and safely.

A toolkit that contains all the tools necessary for the tasks is important. As you gain experience, you will learn which tools to have available for different types of jobs. Hardware tools are grouped into four categories: Electro-Static Discharge (ESD) tools, Hand tools, Cleaning tools and Diagnostic tools.

Electro-Static Discharge (ESD) Tools




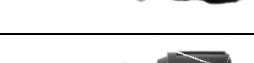



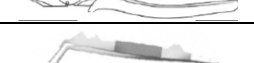

Static Electricity is the buildup of an electric charge of an object. It is easily generated by friction on carpets, tile flooring, clothing, hair, fabric, etc. Grounded antistatic work mats used with antistatic wrist straps provide the most basic means for the controlled discharge of electrostatic electricity.

There are two ESD tools: the antistatic wrist strap and antistatic mat.

1. Antistatic Wrist Strap – used to prevent ESD damage to computer equipment.	
2. Antistatic Mat – used to stand on or place hardware on to prevent static electricity from building up.	



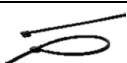

Hand Tools

A **hand tool** is any implement or tool that is generated and operated by hand rather than a motor. The hand tools can be manually used employing force or electricity powered. Some common hand tools and their uses are:

1. Flat head screwdriver – used to loosen or tighten slotted screws.	
2. Philips head screwdriver – used to loosen or tighten cross-head screws.	
3. Torx screwdriver – used to loosen or tighten screws that have a star-like depression on the top, a feature that is mainly found on laptop.	
4. Hex driver – sometimes called a nut driver, is used to tighten nuts in the same way that a screwdriver tightens screws.	
5. Needle-nose pliers – used to hold small parts.	
6. Wire cutter – used to strip and cut wires.	
7. Tweezers – used to manipulate small parts.	
8. Part retriever – used to retrieve parts from location that are too small for your hand to fit.	
9. Flashlight – used to light up areas that you cannot see clearly.	




Cleaning Tools

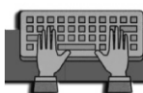
In maintaining and repairing computers, having the appropriate cleaning tools is important. Using these cleaning tools guarantees safety and that the computer components are not damaged during cleaning. Some cleaning tools are the following:

1. Lint-free cloth – used to clean different computer components without scratching or leaving debris.	
2. Compressed air – used to blow away dust and debris from different computer parts without touching the components.	
3. Cable ties – used to bundle cables neatly inside and outside of a computer.	
4. Parts organizer – used to hold screw, jumpers, fasteners, and other small parts and prevents them from getting mixed together.	

Diagnostic Tools

Computers give us convenience in knowing almost everything that we need. Because of this, we became more dependable with each new generation of hardware and operating system updates, but that doesn't mean that computers are problem-free. Below are the most popular tools for diagnosing your computer problems:

1. Multimeter – used to test the integrity of circuits and the quality of electricity in computer components.	
2. Loopback adapter – sometimes called a loopback plug. This tests the basic functionality of computer ports.	
3. LAN Tester - mainly used for testing Ethernet cables for faults or missing pair connections	



WHAT'S MORE!

DIRECTIONS: Enumerate at least three (3) tools under each category. Write your answer in their appropriate column.

ESD Tools	Hand Tools	Cleaning Tools	Diagnostic Tools



DIRECTIONS: Complete the sentences below.

I have learned that _____

I realized that _____

I will apply _____



DIRECTIONS: In a separate sheet of paper, give a sample scenario in which you can use the following hardware tools appropriately.

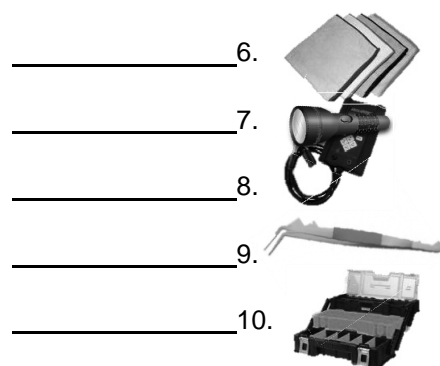
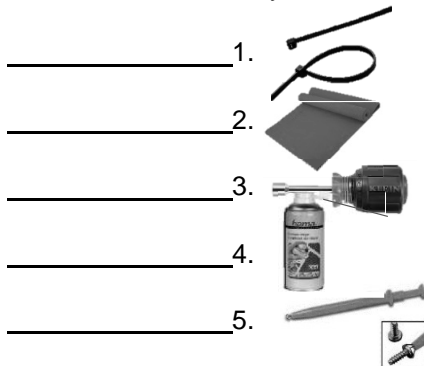
1. Antistatic wrist strap
2. Wire cutter

3. Cable ties
4. Multimeter

5. Tweezer



DIRECTIONS: Identify the hardware tools in each number.



DIRECTIONS: Prepare a matrix on Plan Preparation in maintaining and cleaning different parts/ components of a personal computer.

COMPUTER MAINTENANCE

Components to clean	Schedule	Tools to use
Example: Keyboard	Weekly	compressed air, lint-free cloth

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3 RD QUARTER: WEEK 2	TOPIC: Prepare Hand Tools



Learning Competency: Using Hand Tools (UHT)

Learning Outcomes: LO 2. Prepare hand tools

- 2.1 Check appropriate hand tools for proper operation and safety
- 2.2 Identify and mark unsafe or faulty tools for repair according to standard company procedure

Code: TLE_IACSS9-12UHT-IIIb-18

Learning Objectives:

At the end of the lesson, the students should be able to:

1. Identify the appropriate hand tools used in different tasks for proper operation and safety
2. Check and mark any defective or malfunctioning tools
3. Observe safety precautions while working on computers



DIRECTIONS: Write **TRUE** on the line if the given statement suggests correct ways in working with computers; otherwise, **change the underlined word/s** to make it correct.

- _____ 1. Pencils should not be used inside the computer because the pencil lead can act as a conductor and may damage the computer components.
- _____ 2. Turn on the power and unplug equipment before cleaning any device.
- _____ 3. Magnetized tools should be used around electronic devices.
- _____ 4. Avoid over tightening of screws because the threads may become stripped.
- _____ 5. Always wear an antistatic wrist strap if you are repairing a monitor or CRT.



WHAT'S IN!

DIRECTIONS: Group the following hardware tools based on their categories. Write your answer on the space provided.

Antistatic mat	Flashlight	Multimeter	
Antistatic wrist strap	Flat head screwdriver	Needle-nose pliers	
Cable ties	Loopback adapter	Parts organizer	
Compressed air	Lint-free cloth	Tweezers	
ESD Tools	Hand Tools	Cleaning Tools	Diagnostic Tools



WHAT'S NEW!

DIRECTIONS: Answer the following questions by writing **YES** or **NO** to see how well you are protecting yourself or your computer from potential damage and accidents.

- _____ 1. Are tool handles wedged tightly in the heads of all tools?
- _____ 2. Do you turn off and unplug the device from the power source before cleaning the device?
- _____ 3. Do you use magnetized tools around electronic devices?
- _____ 4. Do you use pencil inside the computer?
- _____ 5. Do you remove your watch and jewelry before working on computers?



WHAT IS IT!

Safety Precautions While Working on Computers

Safe working conditions help prevent injury to people and damage to computer equipment. You will be able to reduce the chance of accidents (such as cuts, burns, electrical shock, damage to eyesight and others) that may occur while working on computers by following these basic safety precautions:

- Regularly inspect your tools to make sure that they are in good condition.
- Remove your watch and jewelry and secure loose clothing.
- Turn off the power and unplug equipment before performing a service.
- Cover sharp edges inside the computer case with tape.
- Never open a power supply or a CRT monitor.
- Only operate tools according to manufacturers' instructions
- After using a tool, clean it and return it to its proper storage place.

Appropriate Hand Tools for Proper Operation and Safety

The use of hand tools starts with tools that work well. Hand tools are useful in our everyday lives, but they can also cause harm if not checked and used correctly. As a beginner, it is a must that you know how to use tools that are the right size and right type for your job and always follow the correct procedure for using every tool.

Proper Use of ESD Tools

- **Antistatic Wrist Strap**

1. Connect the cable to the metal chassis of the computer.
2. Wrap the strap around your wrist.
3. The connection will keep your body at the same voltage (potential) as the computer.
4. Attach the wire on the same side of the equipment as the arm wearing the antistatic wrist strap to keep the wire out of the way while you are working.

Caution: Never wear an antistatic wrist strap if you are repairing a monitor or CRT.

- **Antistatic Mat**

1. Lay the computer on the mat.
2. Connect the computer to the mat with the cable.
3. Connect the mat to a reliable electrical ground with its cable.
4. Now, you and the computer are at ground potential.

Proper Use of Hand Tools

1. Use the proper type and size of screwdriver by matching it to the screw.
2. Do not over tighten screws because the threads may become stripped.

Caution:

- If excessive force is needed to remove or add a component, something may be wrong.
- Magnetized tools should not be used around electronic devices.
- Pencils should not be used inside the computer because the pencil lead can act as a conductor and may damage the computer components.

Proper Use of Cleaning Materials

- To clean computers and accessories:
 1. Use mild cleaning solution and lint-free cloth to clean computer cases, outside of monitor, LCD screen, CRT screen and mouse.
 2. Use compressed air to clean heat sinks.
 3. Use isopropyl alcohol and lint-free swabs to clean RAM.
 4. Use hand-held vacuum cleaner with a brush attachment to clean a keyboard.

Caution: Turn off the power and unplug equipment before cleaning any device.

Identify Unsafe or Faulty Tools for Repair

These are the different ways to determine the faulty or defective and non-defective hand tools:

1. **Visual Inspection** - The defective and non-defective tools are easily identified through visual inspection. Defective and non-defective tools are described by its physical appearance such as dullness, sharpness, dismantled parts and more.

Example: Defective screwdrivers with rounded or damaged edges or tips; split or broken handle.

2. **Functionality** - Another way to determine the defective and non-defective tools is by checking or assessing if the tool is already susceptible to wear and tear or does it exceed its service life already.

Example: Check the blades of the wire cutter with splinters of metal or plastic that could cause problems with the joints or encourage corrosion for it will affect its function.

3. **Performance** - Checking the performance of the tool is another way to determine defective and non-defective tools. Checking the performance of a tool is not only done during the actual use, it should also be done periodically to determine whether the tool is still worthy to be used.

Example: In working with computers, you should use an antistatic wrist strap with a lower resistance in series with the strap because higher resistance is not always better when working with low voltage devices.

Mark Unsafe or Faulty Tools

After checking all the hand tools prior to performing a computer repair or maintenance service, it is important to mark those items that have the following problems:

- Deformations
- Visual Damage
- Pre-production anomalies
- Loose components

Any item with these defects should be coded as **Defective** with the specification of its defective state. Below is an example of a **Tool Inspection Report Form**.

Rubric links: https://drive.google.com/file/d/1p_G-8A6RWCjDth5jjL6yZ_pnpN0PyDDB/view?usp=sharing



DIRECTIONS: In a clean sheet of paper, explain the proper ways of using the following tools appropriately and safely.

ESD Tools	Cleaning Tools	Hand Tools	Diagnostic Tools
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DIRECTIONS: Answer the following questions below and write it in your TLE journal to be submitted together with your portfolio.

I have learned that _____
I realized that _____
I will apply _____



DIRECTIONS: Answer the following questions. (5 points each)

1. What are the different ways to determine the faulty or defective and non-defective tools?
2. Why do we have to check for the condition of hand tools before using them?
3. How will you determine if the hand tools are defective?



DIRECTIONS Arrange the steps in using the following tools properly and safely. Write numbers 1-4 to indicate its proper sequence.

A. Proper Use of Antistatic Wrist Strap

- ___ Attach the wire on the same side of the equipment as the arm wearing the antistatic wrist strap to keep the wire out of the way while you are working.
- ___ Wrap the strap around your wrist.
- ___ Connect the cable to the metal chassis of the computer.
- ___ The connection will keep your body at the same voltage (potential) as the computer.

B. Proper Use of Antistatic Mat

- ___ Lay the computer on the mat.
- ___ Connect the computer to the mat with the cable.
- ___ Connect the mat to a reliable electrical ground with its cable.
- ___ Now, you and the computer are at ground potential.



DIRECTIONS: Do the following tasks:

1. Check the condition of at least five (5) Hand tools that you have at home and fill up this Tool Inspection Form.
2. Send the pictures of those hand tools to your Subject teacher.

Rubrics link: https://drive.google.com/file/d/1p_G-8A6RWCjDth5jjL6yZ_pnpN0PyDDB/view?usp=sharing

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COMPUTER SYSTEM SERVICING GRADE 9	
3rd QUARTER: WEEK 3	TOPIC: USE APPROPRIATE HAND TOOLS AND TEST EQUIPMENT



WHAT I NEED TO KNOW!

Learning Competency: USING HAND TOOLS (UHT)

Learning Outcomes (LO) 3. Use appropriate hand tools and test equipment

- 3.1 Use tools according to tasks undertaken.
- 3.2 Observe all safety procedures in using tools at all times and use appropriate PPE.
- 3.3 Report malfunctions, unplanned or unusual events to the supervisor.

Code: TLE_IACSS9- 12UHT-IIIc-19

Learning Objectives:

At the end of the lesson, the students should be able to:

- 1. Identify the correct tools and test equipment to be used.
- 2. Use appropriate tools and test equipment when performing the tasks.
- 3. Follow safety measures properly.



WHAT I KNOW!

DIRECTIONS: Read and understand the following descriptions carefully. Choose the letter of the correct answer that describes it best. Write your answer on the space provided.

- _____ 1. A tool used for cutting or trimming of connecting wires or terminal leads in the circuit board.
A. crimping tool B. long nose pliers C. side cutter pliers D. tweezer
- _____ 2. A tool used to drive or fasten negative slotted screws.
A. cutter B. flat screw driver C. philips screw driver D. soldering pencil
- _____ 3. It is a device used to test the network connection.
A. LAN tester B. power supply tester C. RJ45 D. Volt-Ohms-Millimeter
- _____ 4. A large spectacles, with shields around the rims, for protecting the eyes from dust, excessive light, wind, etc.
A. apron B. face mask C. gloves D. goggles
- _____ 5. A garment worn over the front of the body as a protection for one's cloth.
A. apron B. face mask C. gloves D. goggles



DIRECTIONS: Identify which of the following safety practices is correct or wrong. Put a check (✓) if the statement is correct and put an ex (X) if not. Write your answers on the space provided.

- _____ 1. The use of hand protection like gloves will provide protection against cuts, abrasion, and repeated impact.
- _____ 2. You may use pliers as substitute for a wrench when turning bolts and nuts.
- _____ 3. Always use screwdriver tip that properly fits the slot of the screw.
- _____ 4. Always use a sharp blade. Dull blades require more force and thus are more likely to slip. Replace the blade when it starts to “tear” instead of cut.
- _____ 5. Screwdrivers can be used as a pry bar, chisel, and punch stirrer or scraper.



Before you start working it is essential to know the tools and equipment that you need in order to perform the assigned task properly. A tool is a handheld device that aids in accomplishing distinct task on the other hand the word equipment refers a tool or machine that you need to do a particular job or activity.

You also need to wear PPE or also known as Personal Protective Equipment to keep you safe while performing the task. PPE refers to protective clothing like helmets, goggles, or other gear designed to protect your body from injury.



Before you do any repair work on your personal computer or before you even think about opening the system unit, monitor or other computer peripherals it is recommended that you should prepare yourself with a computer tool kit. In computer application, the usage of proper hand tools and equipment is very important. A good troubleshooter must have the knowledge about proper tools and equipment to be used when dealing with computers.

Hand Tools and Testing Equipment



Side Cutter Pliers – a tool used for cutting or trimming of connecting wires or terminal leads in the circuit board.



Long Nose Pliers – Used for holding, bending and stretching the lead of electronics component or connecting wire.



Crimping Tool- a tool made of metal with plastic-rubber handle, to press into small folds, to frill, and to corrugate



Tweezers- a tool use to hold small sensitive part of a computer.



Cutter- a tool used in cutting wires.



Flat Screw Driver – a tool used to drive or fasten negative slotted screws.



Philips Screw Driver- a tool used to drive or fasten positive slotted screws.



Flashlight- a small electric light, a flash of electric light used to give light in dark conditions



Paint Brush- a device made of bristles set in handle, use for cleaning sensitive parts of a computer.



Magnifying glass- a device made in glass with handle, to exaggerate or to increase the apparent size of an object.



Volt-Ohms-Millimeter (VOM) - a measuring instrument used by technician for measuring: current, voltage, and resistance.



LAN Tester- is a device used to test the network connection.



Anti-Static Wrist wrap- is a device used to eliminate electrostatic discharge in your work area.



Soldering Gun – a tool used to join two or more metal conductors with the support of soldering lead melted around it.



Desoldering Tool – a tool used to unsolder unwanted parts or component in the circuit with the support of soldering pencil.

Personal Protective Clothing and Equipment

When you perform a task, a job or activity in your workplace you must use proper personal protective equipment (PPE) that is appropriate for the task and which follows the standard in your safety regulations and policies. Among other items, this may include:



Goggles- a large spectacles, with shields around the rims, for protecting the eyes from dust, excessive light, wind, etc.



Gloves- a covering material with a separate sheath for each finger used for hand protection.



Apron- a garment worn over the front of the body as a protection for one's cloth.



Rubber Sole- a special type of shoes used to prevent electrical shock and for waterproofing and insulating purposes.



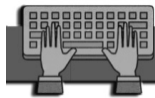
Face Mask- a covering for the face to prevent the inhaling or absorbing dust and other's chemicals.

Safety check

- Do not use flammable cleaners or water on electrical equipment.
- Make sure designated walkways are kept clear of any obstructions.
- Always wear protective clothing and the appropriate safety equipment.
- Make sure that you understand and observe all legislative and personal safety procedures when carrying out the following tasks.

Safety Requirements

- For your protection, observe the following safety requirements:
- Follow all cautions, warnings, and instructions marked on the equipment.
- Ensure that the voltage and frequency rating of the power outlet matches the electrical rating labels on the system.
- Use properly grounded power outlets.



WHAT'S MORE!

DIRECTIONS: Match the following personal protective equipment (PPE) in column B to its corresponding description in column A. Write your answers on the space provided.

Column A

- _____ 1. A special type of shoes used to prevent electrical shock and for waterproofing and insulating purposes.
- _____ 2. A large spectacle, with shields around the rims, for protecting the eyes from dust, excessive light, wind, etc.
- _____ 3. The covering material with a separate sheath for each finger used for hand protection.
- _____ 4. A garment worn over the front of the body as a protection for one's cloth.
- _____ 5. A covering for the face to prevent the inhaling or absorbing dust and other chemicals.

Column B

- A. apron
- B. face mask
- C. gloves
- D. goggles
- E. hard hat
- F. rubber sole



WHAT I HAVE LEARNED!

DIRECTIONS: Answer the following questions below and write it in your TLE journal to be submitted together with your portfolio.

I have learned that _____

I have realized that _____

I will apply _____



WHAT I CAN DO!

DIRECTIONS: Read and understand the instruction below. Perform the activity and write the steps you do to complete the task in a 1 whole sheet of paper. Submit it together with your worksheet to serve as your portfolio. Use the rubric below as your guide.

1. Clean a computer/laptop using a paint brush and use appropriate tools upon performing computer disassembly and assembly.
2. Apply safety measures and wear proper personal protective equipment.

See the attached link to access rubric:

<https://drive.google.com/file/d/1gkrT6bM0G9INBcFrXgLYJxsKDvQIGIO5/view?usp=sharing>



ASSESSMENT!

DIRECTIONS: Read the descriptions carefully and identify the input device that defines it best. Write your answer on the space provided.

- _____ 1. A tool used for cutting or trimming of connecting wires or terminal leads in the circuit board.
- _____ 2. It is a device used to eliminate electrostatic discharge in your work area.
- _____ 3. A device made of bristles set in handle, use for cleaning sensitive parts of a computer.
- _____ 4. Used for holding, bending and stretching the lead of electronics component or wire.
- _____ 5. A tool used to join two or more metal conductors with the support of soldering lead melted around it.
- _____ 6. A tool made of metal with plastic-rubber handle, to press into small folds, to frill, and to corrugate.
- _____ 7. A tool use to hold small sensitive part of a computer.
- _____ 8. A device made in glass with handle, to exaggerate or to increase the apparent size of an object.
- _____ 9. A measuring instrument used by technician for measuring: current, voltage, and resistance.
- _____ 10. It is a device used to test the network connection.



ADDITIONAL ACTIVITIES!

DIRECTIONS: State the function of the following tools and testing devices. Write your answer on the space provided.

1. Crimping tool- _____
2. Cutter- _____
3. Philip screw- _____
4. Tweezer- _____
5. VOM- _____

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3rd QUARTER: WEEK 4	TOPIC: MAINTAIN HAND TOOLS



WHAT I NEED TO KNOW

Learning Competency: USING HAND TOOLS (UHT)

Learning Outcomes (LO) 4. Maintain hand tools

- 4.1 Do not drop tools to avoid damage; carry out routine maintenance of tools according to standard operational procedures, principles, and techniques.
- 4.2 Store tools safely in appropriate locations in accordance with manufacturer's specifications or standard operating procedures.

Code: TLE_IACSS9- 12UHT-IIIId-20

Learning Objectives:

At the end of the lesson, the students should be able to:

1. Identify the proper ways to maintain hand tools.
2. Perform maintenance routine of tools according to standard operational procedures, principles and techniques.
3. Store tools in appropriate locations safely.



WHAT I KNOW

DIRECTIONS: Read and understand the following descriptions carefully. Choose the letter of the correct answer that describes it best. Write your answer on the space provided.

- _____ 1. It is the process of maintaining a property or equipment to prolong its good condition.
A. conservation B. maintenance C. preservation D. prolongation
- _____ 2. It is a handheld device that aids in accomplishing distinct task.
A. equipment B. material C. tool D. utensil
- _____ 3. Refers a tool or machine that you need to do a particular job or activity.
A. equipment B. material C. tool D. utensil
- _____ 4. It is the condition of being protected from or unlikely to cause danger, risk, or injury.
A. careful B. safety C. secure D. protection
- _____ 5. It refers to a general rule, principle, or a set of recommendation.
A. advice B. guideline C. recommendation D. suggestion



WHAT'S IN

DIRECTIONS: Identify the tools and testing devices below, write the letter of the correct answer on the space provided.

A. cutter
D. long nose plier

B. desoldering tool
E. magnifying glass

C. LAN tester
F. tweezer



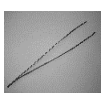
1. _____



3. _____



5. _____



2. _____



4. _____



Nowadays, buying food, rent, bill and other necessities is more important than buying other stuff but what will you do if you need a tool to fix something at home. How do you ensure that your tools and equipment will last longer? The answer is you need to perform tool maintenance.

Maintenance is the process of maintaining a property or equipment to prolong its good condition and here are the benefits of maintaining tools:

1. It will lessen the equipment downtime.
2. It will provide fewer interruptions to critical operations.
3. It will help to prolong asset life.
4. It will improve tool's/equipment's efficiency.
5. It will increase workplace safety.



Maintain Hand Tools

Your tools must be properly maintained and organized so that anyone will not be harmed. It requires to check, inspect and monitor tools, machines and equipment before and after using it. Preventive maintenance will provide care and protection for tools, equipment and machines in order to keep them in a safe, usable condition, limit downtime and extend its productivity. We must be knowledgeable that these maintenance routines are potentially hazardous and can cause injury.

The procedure and instruction regarding on tools and equipment maintenance will depend on the kinds of tools/equipment used. Some equipment may have very specific inspection and maintenance requirements. Hand tools may require only basic maintenance. Power tools should be maintained in good working order. This may be limited to ensuring that blades/bits are replaced when needed and those guards or other safety devices are operable and any damaged electrical cords/plugs are repaired or replaced. Non-working or defective equipment/tools should be checked and removed from service.

Most company provides a set of maintenance schedule for their manufactured equipment. Big businesses typically have a comprehensive maintenance program due to the capital investment and/or leasing agreements. Smaller companies may lease equipment and maintenance services may be included in the leasing agreement.

Here are the general requirement for tools and equipment maintenance:

1. Obtaining a copy of the recommended maintenance schedule by the manufacturer.
2. Ensuring that the given set of standards is met when the maintenance is performed.
3. Ensuring that the personnel involved in maintenance is highly competent and beholds the skill and knowledge needed to perform the task correctly. (e.g. licensed mechanic)
4. Writing down the records on when the maintenance/service have been conducted.
5. Specifying who is responsible for overseeing equipment maintenance and where the records are kept.
6. Set up a system for removal and tagging of damaged or defective tools and equipment.

Proper Storage of Tools, Parts and Equipment

To make sure that tools and equipment remains in good condition and will last longer,

you need to store them properly. Organized tools and equipment will be easy to find when needed and are less likely to be lost.

The following guidelines for Tool Use, Maintenance and Storage:

- Keep hand tools clean and free from ferrous or other contaminants.
- Do not use hand tools in direct contact with acetylene, due to the possible formation of explosive acetylides, especially in the presence of moisture.
- During normal use, all pliers and screwdrivers will progressively develop some damage to the striking faces of screwdrivers or the cutting edge and striking end of pliers. As part of the normal operating and safety procedures, these tools should be returned to the workshop, as with steel tools, to have the faces and heads redressed. This is essential to prevent eye damage resulting from chips detaching from the item during use.
- Do not put hand tools with wooden handles in places where the handles may dry out and shrink. This will increase the risk of the handle breaking or the head becoming loose.
- Tools are designed for specific use, as with any tool.
- The accepted standards of safety and maintenance for common steel hand tools must also be adopted with non-sparking hand tools, in addition to any specific recommendations resulting from the alloys used.
- When sharpening hand tools, follow normal safety procedures, such as the provision of eye and face protection, adequate extraction and dust collecting facilities.

The lists of good practices to be performed includes the following:

1. All parts should be stored and labeled.
2. All tools should be properly arranged and stored in its board. Consider the shape of the tools on your board so that they will put it back on the same position.
3. Use containers or bins for the smaller parts.
4. Assign someone to be responsible for the good maintenance of tools and other parts.
5. Clean tools and equipment work more efficiently. At the end of each working day clean the tools and equipment you used and check them for any damage.
6. Electrical current can travel over oily or greasy surfaces. Keep electrical power hand tools free from dust and dirt and make sure they are free of oil and grease.
7. All workshop hand tools and equipment should have maintenance schedule. Always complete the tasks described on the schedule at the required time. This will help to keep the hand tools in safe working order.
8. Store commonly used hand tools in an easy-to-reach location. If a tool or a piece is too difficult to return, it could be left on a workbench or on the floor where it will become a safety hazard. Keep your work area tidy. This will help you work more efficiently and safely.

Benefits of properly stored tools, parts and equipment:

- Tools and parts are kept in good condition and are easy to find.
- Costs are reduced.
- Productivity is increased because time is not wasted looking for tools, parts and equipment.
- Workshop staff develop a sense of responsibility and pride in their work.



DIRECTIONS: Identify which of the following guidelines in using, maintaining and storing hand tools is correct or wrong. Put a check (/) if the statement is correct and a cross (x) if not. Write your answers on the space provided.

_____ 1. Tools are designed for specific use.

- _____ 2. Keep hand tools clean and free from ferrous or other contaminants.
- _____ 3. It is necessary to wear PPE like goggles and face mask when sharpening hand tools.
- _____ 4. You can put hand tools with wooden handles anywhere you want.
- _____ 5. Use hand tools in direct contact with acetylene.



WHAT I HAVE LEARNED!

DIRECTIONS: Answer the following questions below and write it in your TLE journal to be submitted together with your portfolio.

I have learned that _____

I have realized that _____

I will apply _____



WHAT I CAN DO!

DIRECTIONS: Read and understand the instruction below. Perform the activity and write the steps you do to complete the task in a 1 whole sheet of paper. Submit it together with your worksheet to serve as your portfolio. Use the rubric below as your guide.

1. Perform maintenance routine of tools according to standard operational procedures, principles and techniques.
2. Store tools in appropriate locations safely.

See the attached link to access rubric:

<https://drive.google.com/file/d/1t2y3iA0S88PaZM-LHIBxjKA5v7dTizsf/view?usp=sharing>



ASSESSMENT!

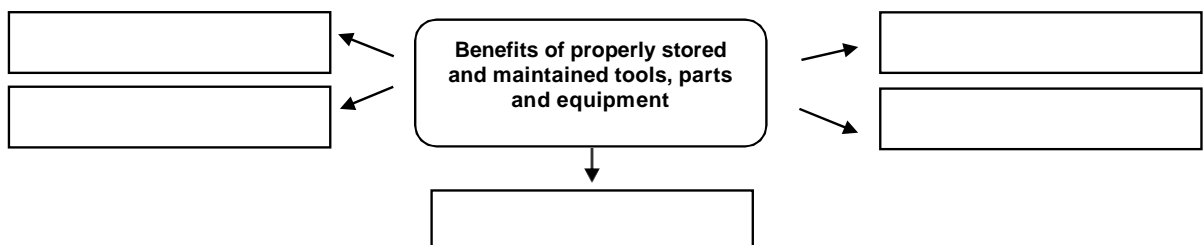
DIRECTIONS: Fill in the blanks below with the correct word to complete the following sentences on how to use, maintain and store tools.

1. Obtaining a copy of the recommended _____ by the manufacturer.
2. Ensuring that the given set of standards is _____ when the maintenance is performed.
3. Ensure that the personnel involved in maintenance is _____ and beholds the skill and knowledge needed to perform the task correctly.
4. Specifying who _____ for overseeing equipment maintenance is and where the records are kept.
5. _____ a system for removal and tagging of damaged or defective tools and equipment.
6. Keep hand tools _____ and free from ferrous or other contaminants.
7. When sharpening hand tools, follow normal _____, such as the provision of eye and face protection, adequate extraction and dust collecting facilities.
8. All parts should be stored and _____.
9. Use _____ for the smaller parts.
10. Store commonly used hand tools in an _____ location.



ADDITIONAL ACTIVITIES!

DIRECTIONS: Write down five (5) benefits of properly stored and maintained tools, parts and equipment. Use the boxes around it upon answering.



MA. AURORA M. CRUZ	
COMPUTER SYSTEMS SERVICING 9	
3RD QUARTER: WEEK 5	Topic: Hand Tools and Equipment Electrical Splices and Joints



Learning Competency: Terminating and Connecting Electrical Wiring/ Electronic Circuits

Learning Outcome 1: Plan and Prepare for Termination/Connection of Electrical Wiring/ Electronic Circuits

- 1.1. Check materials according to specifications and tasks
- 1.2. Select appropriate tools and equipment according to task requirements

Code: TLE_IACSS9- 12TCEW-IIIe-f21

Learning Objectives: At the end of the lesson, the students are expected to:

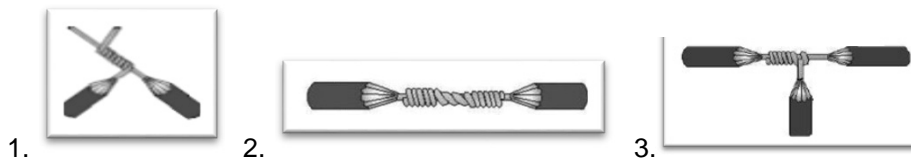
1. Classify the tools and equipment in termination and connection of electronic circuit.
2. Make a video/vlog showing the appropriate tools and equipment according to task requirements.
3. Value the importance of safety standards in using tools and equipment.



A. DIRECTIONS: Write **True** if the statement is correct and **False** if it is not.

- ___ 1. Hand tools are powered devices only.
- ___ 2. A multi-tester is used in boring holes in the plastic chassis.
- ___ 3. Philips screwdriver is used in driving or fastening positive slotted screw.
- ___ 4. Safety procedure in using tools must be observed at all times.
- ___ 5. The joint formed when two electric wires are joined is called splice.

B. DIRECTIONS: Label the type of joints and splices.



C. Directions: Enumerate 2 hand tools

1. _____
2. _____



DIRECTIONS: Identify the term being described in each statement by supplying the missing letters on the blanks.

1. It is any tool or implement designed for manual operation. H ____ D ____ O ____ L

2. It is used for holding, bending and stretching the lead of electronics component or connecting wire. N O L R
3. It is the joint formed by two connected wires. S L C
4. The type of splice often used when wires are joined inside an electrical outlet box.
 I A
5. It is a single slender rod or filament of drawn metal. W R
6. It is used for boring hole in the plastic or metal chassis. H R
7. It is a tool used to drive or fasten negative slotted screws.
 F S W D R
8. It is a tool used to unsolder unwanted parts or components in the circuit.
 E R G
9. It is an instrument used by technician for measuring current, voltage, and resistance.
 M L R
10. It is a tool used to join two or more metal conductors with the support of soldering lead melted around it. S L R I N



Before a computer technician do any repair or work on PC, he must prepare and organize the things he needs. He should also check the appropriate hand tools and equipment for proper operation and safety.

DIRECTIONS: Write the hand tools and equipment below to its proper section in the tool box.

- | | |
|------------------------|----------------------------|
| • soldering iron | • multi-volts power supply |
| • utility knives | • crimping tool |
| • long nose pliers | • magnifying glass |
| • flat screwdrivers | • multi tester |
| • Philips screwdrivers | • electric hand drill |










TOOLBOX	
HAND TOOLS	EQUIPMENT

Hand Tools and Equipment







In assembling and troubleshooting electronic and electrical circuits, one must acquire knowledge on how to use the hand tools and equipment required for the task. Each of these hand tools and equipment does one or more specific job in connecting, replacing, securing and repairing of electronic circuits.

A. Common Hand Tools - a hand tool is any tool or implement designed for manual operation and powered by hand rather than a motor or engine.

Hand tool	Function
	Side Cutter Pliers – tool used for cutting or trimming of connecting wires or terminal leads in the circuit board
	Long nose Pliers – used for holding, bending and stretching the lead of electronics component or connecting wire.
	Crimping Tool - tool made of metal with plastic-rubber handle that is used to press into small folds, to frill or to corrugate.
	Flat Screw Driver – a tool used to drive or fasten negative slotted screws
	Philips Screw Driver - a tool used to drive or fasten positive slotted screws
	Anti-Static Wrist wrap - is a device used to eliminate electrostatic discharge in your work area.
	Soldering iron – a tool used to join two or more metal conductors with the support of soldering lead melted around it.
	Desoldering Tool – a tool used to unsolder unwanted parts or component in the circuit with the support of soldering pencil.
	Utility knives – a fixed blade knife with a sharp edge for general or utility purposes.

B. Basic Electronic Equipment

Electronic equipment includes any machine powered by electricity which are used for a particular purpose.

	Multi-Volts Power Supply -is used to supply the desired direct current voltages in the circuit.
	Electric Hand drill - is used for boring hole in the plastic or metal chassis.
	Multitester -is used for measuring resistance, voltage and current.
	Oscilloscope - is an electronic test instrument that graphically displays and analyzes varying signal voltages.



Signal generator- a device that generates signals that are used as stimulus for electronic measurements, typically used in designing, testing and troubleshooting.

Basic Component of Circuit

A simple circuit requires the minimum things needed to function.

AC/DC source

- Equipment that will operate on either an AC or DC power source
- Battery – a DC voltage source containing two or more cells that convert chemical energy to electrical energy.
- Cell- single unit used to convert chemical energy into a DC electrical voltage.

Fuse

- It is a safety device used to protect an electrical circuit from the effect of excessive current. Its essential component is usually a strip of metal that will melt at a given temperature.

Wires and cables

- A wire is a conductor suitable for carrying an electric current. It is a single slender rod or filament of drawn metal.
- A wire covered with insulation is called an insulated wire.
- A stranded conductor is composed of group of wires.
- A cable is either a stranded conductor (single-conductor cable) or a combination of conductors insulated from one another (multiple-conductor cable). The term “cable” is a general one and usually applies only to the large sizes of conductor.

Switch

- The switch is a mechanical device used to connect and disconnect a circuit. It breaks an electric current or transfer it to another conductor. Switches are commonly used to open or close a circuit.

Load

- A source drives the load. Whatever component or piece of equipment is connected to a source and draws current from a source is called load such as bulb and appliances.

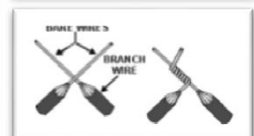
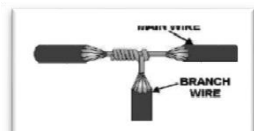
Electrical Splices and Joints

When two electric wires are joined together, the joint formed is normally called a splice. A good splice should not only be mechanically secure, it must also form an electrical connection which is just as efficient conductor as the wire itself. There are three set of splices commonly used in wiring and repair jobs: the pigtail or rat tail splices, western union splice, and the tap or branch splice.

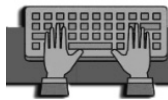
The **pigtail or rat tail splice** is most often used when wires are joined inside an electrical outlet box, or inside a junction box where wires come together in an electrical appliance.

The **western union splice** is used whenever two lengths of wire are to be joined end-to-end and it is particularly designed for those jobs where there is a likelihood of strain or pull being applied to the wires after the joint had been made.

The **tap or branch splice** is used whenever a second wire must be connected at right angles, or when a wire must be tapped into a continuous main wire.



www.electronicuon.com



WHAT'S MORE!

A. Directions: Follow the instructions below:

- A. Draw a simple circuit and label the component.
- B. Illustrate the 3 types of splices and joints

Rubric links: https://drive.google.com/file/d/1p_G-8A6RWCjDth5jjL6yZ_pnpN0PyDDB/view?usp=sharing



WHAT I HAVE LEARNED!

I have learned that _____

I realized that _____

I will apply _____



WHAT I CAN DO!

A. Captured

Directions: Make a 3-minute vlog presenting the name and function of hand tools and electronic equipment needed to do your selected type of splice. Your work will be graded according to the rubric below. See attached rubric for checking.

Rubric links: https://drive.google.com/file/d/1p_G-8A6RWCjDth5jjL6yZ_pnpN0PyDDB/view?usp=sharing

B. Directions: Write **H** if the given is a hand tool and **E** if it is an equipment.

- ___1. desoldering tool ___4. long nose plier ___7. screwdriver ___10. soldering iron
- ___2. electric hand drill ___5. multimeter ___8. side cutter plier
- ___3. LAN tester ___6. power supply ___9. signal generator

C. Directions: Fill in the blanks with correct word/words to complete the statement.

- 1. Fuse is a safety device used to protect an electrical circuit from the effect of excessive.
- 2. The component of a simple circuit is connected using _____.
- 3. The mechanical device used to connect and disconnect a circuit is called _____.
- 4. The joint formed by two electric wires is normally called a _____.
- 5. A hand tool is any tool or implement designed for _____ operation.



ADDITIONAL ACTIVITIES!

Directions: Explain briefly the importance of knowing the proper function of each hand tool and equipment before using it in termination and connection of circuit.

Rubric

Criteria	Very Good (10pts)	Good (7pts)	Fair (4pts)
Reasoning	Reasoning and evidence given fully supported and elaborated his answer	Reasoning and evidence given partially supported and elaborated his answer	Reasoning and evidence given slightly supported and elaborated his answer
Organization of content	Organization of thought is clear and compelling	Organization of thought is somewhat clear and compelling	Thought is not coherent and irrelevant
Timeliness	Submitted the answer on or before the deadline	Submitted the answer 1 day after the deadline	Submitted the answer 2 or more days after the deadline

MA. AURORA M. CRUZ	
COMPUTER SYSTEMS SERVICING 9	
2ND QUARTER: WEEK 6	Topic: Electrical Wiring Diagram/ Electronic Circuit



Learning Competency: Terminating and Connecting Electrical Wiring/ Electronic Circuits

Learning Outcome 1: Plan and Prepare for Termination/Connection of Electrical Wiring/ Electronic Circuits

- 1.4 Prepare electrical wiring/electronics circuits correctly for connecting/ terminating in accordance with instruction and work site procedures.

Code: TLE_IACSS9- 12TCEW-IIIg-i22

Learning Objectives: At the end of the lesson, the students are expected to:

1. Identify electronic circuit and its component.
2. Create schematic diagram of an electronic circuit.
3. Value the importance of electronic symbols in a schematic diagram.



DIRECTIONS: Supply the missing letters on the blanks to complete the word/s.

1. R__SI__TO__

A device designed intentionally to have a definite amount of resistance.

2. C__PA__ITO__

A device that stores electrical energy.

3. E__EC__RO__IC C__RC__IT

It is composed of electronic components, such as resistors and transistor connected by wires through which electric current can flow.

4. __OU__C__

A device used to supply AC or DC voltage.

5. R__S__S__A__C__

The opposition to current flow.



DIRECTIONS: Identify the term being described in each statement. Choose the answer from the box below and write it on the blank before each number.

cable	fuse	multitester	splice	tap
circuit	load	rat tail	switch	wire

- _____ 1. It is a safety device used to protect an electrical circuit from the effect of excessive current.
- _____ 2. It is a path in which electrons from a voltage or current source flow.
- _____ 3. It is a single slender rod or filament of drawn metal.
- _____ 4. It is either a stranded conductor or a combination of conductors insulated from one another.

- _____ 5. The mechanical device used to connect and disconnect a circuit.
- _____ 6. The component or piece of equipment that is connected and draws current from a source such as bulb and appliances.
- _____ 7. The joint formed when two electric wires are joined together.
- _____ 8. The type of splice often used when wires are joined inside an electrical outlet box.
- _____ 9. It is the splice used whenever a second wire must be connected at right angles.
- _____ 10. The device used to measure resistance, voltage and current.



In this 21st century, the use of electronic circuit has become a very important part of our daily lives because gadgets, home appliances, computers, transport systems, cell phones, cameras, TV, etc. have electronic components.

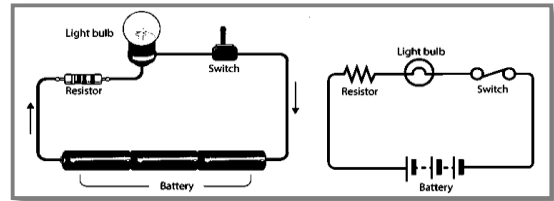
Moreover, electronics have made deep inroads in several areas, such as healthcare, medical diagnosis, automobiles, industries, electronics projects etc. It helps people do work easily and efficiently.



UNDERSTANDING ELECTRIC CIRCUIT

An electric circuit is a path in which electrons from a voltage or current source flow. A simple electric circuit contains minimum things to function such as:

- **Source**- a device used to supply AC or DC voltage.
- **Load**- any device that consumes voltage, whatever component or piece of equipment that is connected and draws current from a source.
- **Switch**- any device having two states, on (closed) or off (open). Ideally having zero resistance when closed and infinite resistance when open.
- **Resistance**-a component used to open the circuit when current exceeds a predetermined maximum value. The opposition to current flow.
- **Connecting wires or cables**- a material that conducts electric current and used to connect a complete path for current.



<https://byjus.com/physics/resistors-in-series-parallel/>

OHM's and Power Law

Ohm's law states that, for a constant current, the current in a circuit is directly proportional to the total voltage acting in the circuit and inversely proportional to the total resistance of the circuit. The law may be expressed by the following equation:

$$R = E/I$$

$$E = I \times R$$

$$I = E/R$$

where:

E – EMF in Volts

R – Resistance

I – Current

Electronic Circuit

A circuit to be referred as electronic rather than electrical must have at least one active electronic component, such as resistor, transistor, capacitor, inductor and diodes, connected by conductive wires or traces through which electric current can flow. An electronic circuit can be categorized into the following:

a. Analog electronic circuits

- are those in which current or voltage may vary continuously with time to correspond to the information being represented. Analog circuitry is constructed from two fundamental building blocks: series and parallel circuits.

b. Digital electronic circuits

- In this circuit, electric signals represent logical and numeric values. These values signify the information that is being processed. It makes extensive use of interconnected transistors to create logic gates that perform arbitrary computational functions.




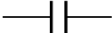


c. Mixed-signal circuits

- Mixed-signal or hybrid circuits contain elements of both analog and digital circuits. Examples include comparators, timers and modern radio communications circuitry.

CLASSIFICATION OF ELECTRONIC COMPONENT




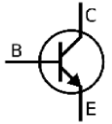




a. Passive device

- This contribute no power gain (amplification) to a circuit or system. It has no control action and does not require any input other than a signal to perform its function. Examples are resistors, capacitors and inductors.

Component	Description	Symbol
Resistor 	It is used mainly to control current and voltage within the circuit. It uses a system of color-coded bands to identify the value of the component (measured in Ohms)	
Capacitor 	It stores electrical energy in the form of electrostatic charge. It varies in size and shape.	
Inductor 	Inductors are used in Alternating Current circuits to oppose changes in the existing current.	


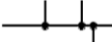

b. Active device

- This is capable of controlling voltages or currents and can create a switching action in the circuit. Examples are Diodes, Transistors and Integrated circuits.

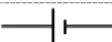
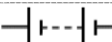
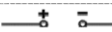
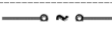
Component	Description	Symbol
Diode 	It is basically a one-way valve for electrical current. They let it flow in one direction (from positive to negative) and not in the other direction.	
Transistor It 	It performs two basic functions. 1) It acts as a switch turning current on and off. 2) It acts as an amplifier. This makes an output signal that is a magnified version of the input signal.	
LED 	LEDs are simply diodes that emit light of one form or another. They are used as indicator devices.	
Integrated Circuit 	ICs are complex circuits inside one simple package. Silicon and metals are used to simulate resistors, capacitors, transistors, etc.	




ELECTRONIC SCHEMATIC SYMBOLS

a. Wire and connection



Component	Function	Symbol
Wire	To pass current very easily from one part of a circuit to another.	
Wires joined	A 'blob' should be drawn where wires are connected (joined), but it is sometimes omitted.	
Wires not joined	In complex diagrams it is often necessary to draw wires crossing even though they are not connected.	

b. Power supplies/source

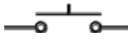



Component	Function	Symbol
Cell	A single cell that supplies electrical energy. The larger terminal (on the left) is positive (+).	
Battery	Supplies electrical energy. A battery is more than one cell. The larger terminal (on the left) is positive (+).	
DC Supply	Supplies electrical energy. DC = Direct Current, always flowing in one direction.	
AC Supply	Supplies electrical energy. AC = Alternating Current, continually changing direction.	

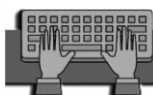
Fuse	A safety device which will 'blow' (melt) if the current flowing through it exceeds a specified value.	
Transformer	Two coils of wire linked by an iron core. Transformers are used to step up (increase) and step down (decrease) AC voltages.	
Earth Ground	A connection to earth. For many electronic circuits this is the 0V (zero volts) of the power supply. It is also known as ground.	

c. Output devices/loads: Lamps

Component	Function	Symbol
Lamp (lighting)	A transducer which converts electrical energy to light. This symbol is used for a lamp providing illumination, for example a car headlamp or torch bulb.	
Lamp (indicator)	A transducer which converts electrical energy to light. This symbol is used for a lamp which is an indicator, for example a warning light on a car dashboard.	

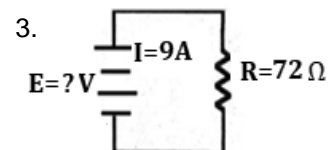
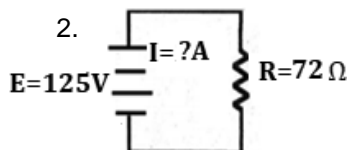
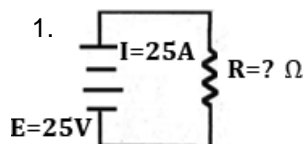
d. Switches

Push Switch (Push-to-make)	A push switch allows current to flow only when the button is pressed. This is the switch used to operate a doorbell.	
Push-to-Break	This type of push switch is normally closed (on); it is open (off) only when the button is pressed.	
On-Off Switch (SPST)	SPST = Single Pole, Single Throw. An on-off switch allows current to flow only when it is in the closed (on) position.	
2-way Switch (SPDT)	SPDT = Single Pole, Double Throw. A 2-way changeover switch directs the flow of current to one of two routes according to its position.	



WHAT'S MORE!

A. DIRECTIONS: Compute the missing value in the diagram. Five (5) points each. Show your solution.



B. DIRECTIONS: Illustrate the symbol of each component below. Write the answers on the blanks.

- | | | | |
|--------------------|-------------------|-------------------|----------------------|
| _____ 1. cell | _____ 4. IC | _____ 7. load | _____ 10. transistor |
| _____ 2. capacitor | _____ 5. inductor | _____ 8. resistor | |
| _____ 3. diode | _____ 6. LED | _____ 9. source | |



WHAT I HAVE LEARNED!

I have learned that _____

I realized that _____

I will apply _____



WHAT I CAN DO!

DIRECTIONS: Draw the schematic diagram of the circuit shown in figure 1.

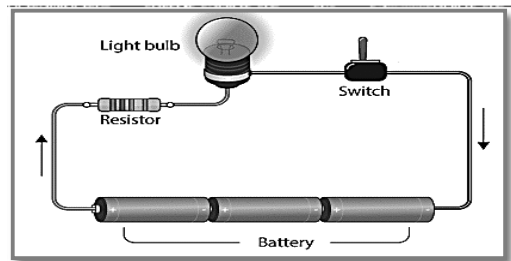


Figure 1: <https://byjus.com/physics/resistors-in-series-parallel/>



ASSESSMENT!

DIRECTIONS: Name the symbols below.

_____ 1.

_____ 4.



_____ 7.

_____ 2.

_____ 5.

_____ 8.

_____ 3.

_____ 6.

_____ 9.

_____ 10.



ADDITIONAL ACTIVITIES!

DIRECTIONS: List down at least 10 electronic devices that can be found at home. Write your answer in your activity notebook.

LORADEL DC. MAPILISAN, PHD.			
COMPUTER SYSTEM SERVICING GRADE 9			
3RD QUARTER: WEEK 7	Topic:	Terminate/connect	electrical
	wiring/electronic circuits	(TLE_IACSS9- 12TCEW-IIIg-i-22)	



Learning Competency: Lesson 6: Terminating and Connecting Electrical Wiring and Electronics Circuit (TCEW)

Learning Outcomes: LO 2. Terminate/connect electrical wiring/electronic circuits

- 2.1 Observe safety procedures in using tools and use appropriate personal protective equipment at all times
- 2.2 Identify the tasks to be undertaken to work safely in accordance with the workplace and standard procedures.

Learning Objectives: At the end of the module, the student should be able to:

1. Explain the different safety procedure in using tools and the use of appropriate personal protective equipment.
2. Follow the safety procedures in using tools and the proper way of used of personal protective equipment.
3. Value the different safety procedures in using tools.





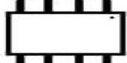


DIRECTIONS: Write TRUE if the statement is correct but if it is false, change the underline word to make the statement true. Write your answer on the space provided.

- _____ 1. Keep the work area always clean and orderly.
- _____ 2. Use tools or equipment frequently even you are not familiar.
- _____ 3. Treat every wire in the electrical system as live wire and act accordingly
- _____ 4. Report accidents and injuries to your teacher no matter how simple it is.
- _____ 5. The repair shop is a place of work so everyone can engage in a play while at work.



DIRECTIONS: Write the name of symbol and explain the function of each electronic component. Write your answer in a separate sheet of paper.

- | | |
|--|---|
| 1.  - _____ | 4.  - _____ |
| 2.  - _____ | 5.  - _____ |
| 3.  - _____ | |



OHS and Safety Practices

Observing occupational health and safety practices, procedures must be set to be followed by the students. Specifically, it measures to emphasize the manner of observing safety practices.

1. As a general rule all passages must be free of any obstruction that will hamper the movement of persons in the area.
2. Treat every wire in the electrical system as live wire and act accordingly. Never attempt to work in any "live" electronic or electrical circuits.
3. All tools and equipment must be checked to be in excellent condition before they are given to users.
4. All instructions must be unified and must initiate from the person-in-charge.
5. The repair shop is a place of work, so do not engage in a show or game while at work.
6. Do not use tools or equipment that you do not know how to operate. Always ask assistance from your teacher to avoid accidents.
7. Keep hand tools such as screw driver, and pliers on the table or in a tool cabinet.
8. Use only tools that are in good condition.
9. Report accidents and injuries to your teacher no matter how simple it is.
10. Keep the work area always clean and orderly.

Personal Safety Guidelines

To prevent minor injuries such as cuts, burns, electrical shock and damage to eyesight as well as the loss of human lives. These are general guidelines for all types of troubleshooting, installation and maintenance tasks.

1. Never work alone. Be sure to have somebody to keep an eye ready for any potential problem.
2. Always use eyes and face protective gear when appropriate.
3. Do not go barefoot when moving tool boxes or laboratory equipment.
4. Never assume that an electrical device is safe to handle. Perform your test with the device disconnected from the power source.
5. Some tests must be connected with power applied. Be extremely cautious when performing these test.
6. Do not wear conductive apparel. Jewelry and clothing such as watch bands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, or metal headgear.
7. As good practice, make sure that a fire extinguisher and a first aid kit are available in case of injury or even fire.



DIRECTIONS: Identify which of the following guidelines is correct or wrong. Put a check (/) if the statement is correct and cross (x) if not. Write your answers on the space provided.

- ____ 1. Work alone.
- ____ 2. Use only tools that are in good condition.
- ____ 3. Assume that an electrical device is safe to handle.
- ____ 4. The shop is a place of work, and also a place to play while at work.
- ____ 5. As a general rule all passages must be free of any obstruction that will hamper the movement of persons in the area.



WHAT I HAVE LEARNED!

DIRECTIONS: Complete the sentence below by writing your answer on the blanks after each phrase. You will be grading according to the criteria below.

I have learned that _____.

I realized that _____.

I will apply _____.



WHAT I CAN DO!

Activity: Computer Repair Shop Layout

DIRECTIONS: Draw your Computer repair shop layout using the instructions below.

Instructions:

1. Using a meter or pull throw meter, measure the dimension of the place or room that you like to make as a layout of a computer repair shop.
2. Review the set occupational health and safety practices
3. Using your observation and analysis, draw a proposed layout of your shop, showing the flow of focusing with the occupational health and safety practices.

***See K to 12 Basic Education Curriculum. Technology and Livelihood Education. Learning Module. Consumer Electronics Servicing. Exploratory Course. Page 125 for the Rubrics standards.



ASSESSMENT!

DIRECTIONS: Fill in the blanks below with the correct word to complete the Safety Practices and Personal safety guidelines.

1. Do not use tools or equipment that you do not know how to _____. Always ask assistance from your teacher to avoid accidents.
2. Some tests must be connected with power applied. Be extremely _____ when performing these test.
3. Report _____ and injuries to your teacher no matter how simple it is.
4. Do not wear _____ apparel. Jewelry and clothing such as watch bands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, or metal headgear.
5. All instructions must be unified and must initiate from the _____.
6. All tools and equipment must be _____ to be in excellent condition before they are given to users.
- 7-8. As good practice, make sure that a _____ and a firs _____ are available in case of injury or even fire.
- 9-10. Always use and protective gear when appropriate.

LORADEL DC. MAPILISAN, PHD.	
COMPUTER SYSTEM SERVICING GRADE 9	
3RD QUARTER: WEEK 8	Topic: Terminate/ Connect Electrical Wiring/Electronic Circuits



Learning Competency: TERMINATING AND CONNECTING ELECTRICAL WIRING AND ELECTRONICS CIRCUIT (TCEW)

Learning Outcomes 2: Terminate/Connect Electrical Wiring/Electronic Circuits

- 2.3. Use appropriate range of methods in termination/connection in accordance to specifications, manufacturer's requirements, and safely.
- 2.4. Follow correct sequence of operation

Code: TLE_IACSS9- 12TCEW-IIIg-i-22

Learning Objectives: At the end of the module, the student should be able to:

1. Identify the different methods of electrical termination.
2. Demonstrate the proper way of terminating an electrical wiring.
3. Follow cautiously the safety reminders when soldering, crimping and terminating wire connection.



WHAT I KNOW

DIRECTIONS: Identify the given statement. Write your answer on the space provided before the number. Choose your answer inside the work bank below.

Crimping	IDC	Soldering	Oxidize	Punch Panel
		Termination		

- _____ 1. Heated metals tend to rapidly.
- _____ 2. This is the fastest way to terminate wires.
- _____ 3. It removes or displaces the conductor's insulation as it is seated in the connector.
- _____ 4. It is an efficient and highly reliable method to assemble and terminate conductors.
- _____ 5. It is the process of joining two or more electronic parts together by melting solder around the connection.



WHAT'S IN

DIRECTIONS: Directions: Write **TRUE** if the statement is correct but if it is **false**, **change the underline word** to make the statement true. Write your answer on the space provided.

- _____ 1. Use only tools that are in good condition.
- _____ 2. Use tools or equipment that you do not know how to operate.
- _____ 3. All instructions must be unified and must initiate from anyone.
- _____ 4. Keep hand tools such as screw driver, and pliers on the table or in a tool cabinet.
- _____ 5. Treat every wire in the electrical system as live wire and act accordingly. Always attempt to work in any "live" electronic or electrical circuits.



WHAT'S NEW

Wire Termination Uses and Methods

Copper wire has been used as an electrical conduit. But wire requires termination. Simple screw clamps were originally used to terminate wire. Although screw clamps are still used today, there are now numerous means to terminate wires.

Electrical termination of a signal involves providing a terminator at the end of a wire or cable to prevent an RF signal from being reflected back from the end, causing interference. Sometimes called electrical terminators, these electrical devices are used to prevent electrical interference. The terminator is placed at the end of a transmission line or daisy chain bus (such as in SCSI). SCSI terminations are electrical circuits placed at each end of a small computer system interface (SCSI) cable for impedance matching.

1. Soldering

Soldering is the process of joining two or more electronic parts together by melting solder around the connection. Solder is a metal alloy and when it cools it creates a strong

electrical bond between the parts. Even though soldering can create a permanent connection, it can also be reversed using a desoldering tool.

Soldering Process

Cleanliness is important for efficient, effective soldering. Solder will not adhere to dirty, greasy, or oxidized surfaces. Heated metals tend to oxidize rapidly. This is the reason the oxides, scale, and dirt must be removed by chemical or mechanical means. Grease or oil films can be removed with a suitable solvent. Connections to be soldered should be cleaned just prior to the actual soldering operation.

Items to be soldered should normally be "tinned" before making a mechanical connection. Tinning is the coating of the material to be soldered with a light coat of solder. When the surface has been properly cleaned, a thin, even coating of flux should be placed over the surface to be tinned. This will prevent oxidation while the part is being heated to soldering temperature. Rosin-core solder is usually preferred in electrical work. However, a separate rosin flux may be used instead. Separate rosin flux is frequently used when wires in cable fabrication are tinned.

Step by Step guide in Soldering

1. Start with the smallest components working up to the taller components, soldering any interconnecting wires last.
2. Place the component into the board, making sure it goes in the right way around and the part sits flush against the board.
3. Bend the legs slightly to secure the part. Place the board so you can access the pads with a soldering iron.
4. Make sure the soldering iron has warmed up. If necessary use a brass soldering iron cleaner or damp sponge to clean the tip.
5. Pick up the Soldering Iron in one hand, and the solder in the other hand
6. Place soldering iron tip on the pad.
7. Feed a small amount of solder into the joint. The solder should melt on the pad and flow around the component leg.
8. Remove the solder, then remove the soldering iron.
9. Leave the joint to cool for a few seconds, then using a pair of cutters trim the excess component lead.
10. Most connections are made with stranded wire. It is usual to 'tin' wire to make it easier to place through the holes in the PCB, and to help it solder successfully. To tin wire firstly strip a small length of the insulation off. The twist the strands together to form a single neat core. With the soldering iron in one hand, and solder in the other place the soldering iron tip at the end of the twisted core. This will heat the wire. 'Wipe' the end of the solder down the twists. This will melt when the wire is hot enough and apply a small amount of solder.

2. Insulation Displacement Connections

Insulation displacement connectors (IDC) are one of the easiest and fastest way to terminate wires. IDCs were first used in the telecom industry on small, stranded wire. The process can quickly and efficiently terminate many wires in a large patch panel.

Insulation Displacement Connection (IDC) is commonly known as punch-down connections, these connections require the use of a small punch-down tool to properly secure the cable to terminal block.

Punch-down connections displace the conductor's insulation as it is placed in the connector. During termination, you need to press the cable between two edges of a metal clip, which it displaces the insulation and exposes the copper conductor. This ensures a solid

connection among the copper conductor and terminating clip. **Stripping** the wire is not needed when using IDC. IDC tools are inexpensive and error-proof.

3. Crimping

Crimping is the most commonly used method of wire termination, and it is the most efficient for large-volume wire termination and it is typically providing a stronger, more reliable termination method than by soldering. Crimp terminations are available in different styles, depending upon the design application and connectivity requirements.

How to Terminate Connectors

1. Put a boot on the cable for later use.
2. Strip the cable jacket about 2 inches, cut foil (if present) to 1/4" and pull back over jacket.
3. Separate the twisted pairs and drain wire; ensure that there were no kinks in any of them.
4. Separate and arrange pairs for desired wiring standard, then cut across all wires.
5. Push wire bar onto all wires, to 3/16" from jacket, then cut wires flush with wire bar.
6. Carefully reshape the cable jacket using lineman's pliers or similar for easier insertion.
7. Insert prepped cable into the connector until copper conductors are seated at front of connector housing.
8. Insert connector into a crimp tool and terminate.
9. Roll drain wire into coil using needle nose pliers or similar.
10. Put drain wire coil and foil if present under external ground tab, press tabs down with flat blade screwdriver or similar to hold in place.
11. Crimp external ground tab to cable, rotating large then small cavities of crimp tool
12. Finish by pulling boot over connector.



DIRECTIONS. Arrange the Step by step guide in Soldering. Write 1 - 10 on the space provided.

- _____ Place soldering iron tip on the pad.
- _____ Most connections are made with stranded wire.
- _____ Remove the solder, then remove the soldering iron.
- _____ Pick up the Soldering Iron in one hand, and the solder in the other hand.
- _____ Leave the joint to cool for a few seconds, then using a pair of cutters trim the excess component lead.
- _____ Start with the smallest components working up to the taller components, soldering any interconnecting wires last.
- _____ Feed a small amount of solder into the joint. The solder should melt on the pad and flow around the component leg.
- _____ Bend the legs slightly to secure the part. Place the board so you can access the pads with a soldering iron.
- _____ Place the component into the board, making sure it goes in the right way around and the part sits flush against the board.
- _____ Make sure the soldering iron has warmed up. If necessary use a brass soldering iron cleaner or damp sponge to clean the tip.



WHAT I HAVE LEARNED!

DIRECTIONS: Answer the following questions below and write it in your TLE journal to be submitted together with your portfolio.

I have learned that _____.
I realized that _____.
I will apply _____.



WHAT I CAN DO!

CAPTURE YOUR ELECTRICAL WIRING TERMINATION PROCESS

Directions: Choose one of the electrical wiring termination process, from Soldering, Crimping, and IDC. Then, follow them properly and capture your step by step procedures. Use the link below for the Rubrics of the Performance task.

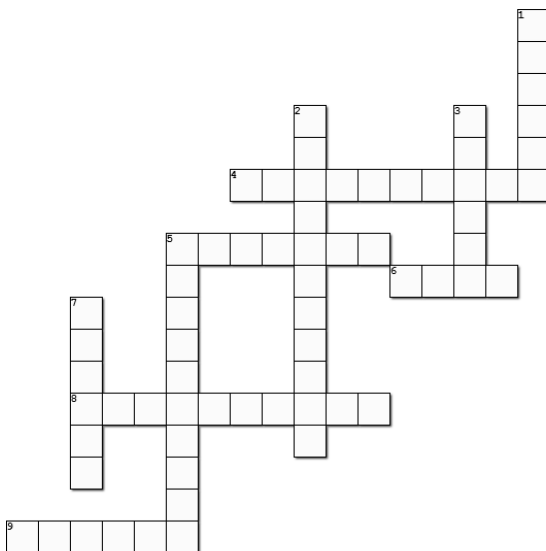
- A. Those who can create a soft copy, make the portfolio using PowerPoint and send it to your teacher via google drive and;
- B. Those who do not have the access to the internet, you can make a hardcopy of the performance task portfolio.

***See K to 12 Basic Education Curriculum. Technology and Livelihood Education. Learning Module. Consumer Electronics Servicing. Exploratory Course. Page 125 for the Rubrics standards.



ASSESSMENT!

DIRECTIONS: Complete the puzzle. Use the clues to help you fill up the boxes with the correct words.



Created using the Crossword Maker on TheTea

Across

1. The process of connections that remove or displace the conductor's insulation as it is seated in the connector.
4. This _____ terminations that are electrical circuits placed at each end of a small computer system interface cable for impedance matching.
8. Soldering is the process of joining two or more electronic parts together by melting _____ around the connection.
9. Crimping is the most commonly used method of wire _____, and is most efficient for high-volume wire termination.
10. Insulation displacement _____ (IDC) are probably the fastest way to terminate wires. IDCs were first used in the telecom industry on small, stranded wire.

Down

2. Simple screw _____ were originally used to terminate wire.
3. Heated _____ tend to oxidize rapidly
5. This _____ is a wire that has been used as an electrical conduit.
6. Electrical _____, these electrical devices are used to prevent electrical interference.
7. Tinning is the _____ of the material to be soldered with a light coat of solder.

**ADDITIONAL ACTIVITIES!**

DIRECTIONS: Answer the following questions. Write your answer on a separate paper. Five (5) points each.

1. What is the difference between soldering, crimping and IDC Terminations?
2. Why do we need to do Soldering?
3. Why do we need to terminate the cable connection?