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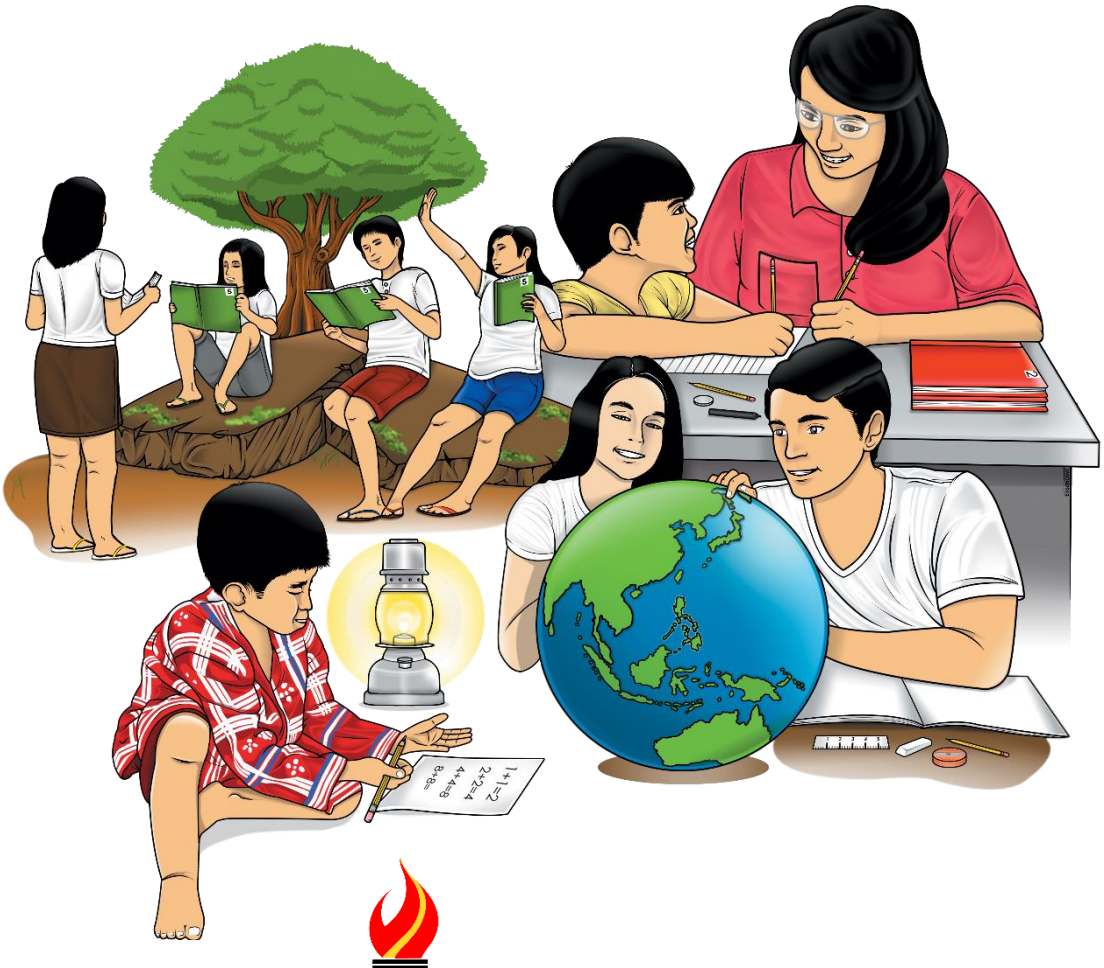
TLE- EPAS

Quarter 1 – Module 5:
Using and Maintaining Hand Tools



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7/8

TLE- EPAS

Quarter 1 – Module 5: Using and Maintaining Hand Tools

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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by- step as you discover and understand the lesson prepared for you.

Pre-test are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module, or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teachers are also provided to the facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. Read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

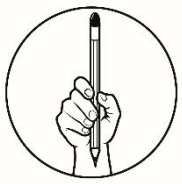
This module was designed and written with you in mind. It is here to help you master the (Exploratory of Electronic Products Assembly and Servicing). The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

The module is divided into two lessons, namely:

- Lesson 1 – Prepare hand tools (TLE_IAEPAS912UMHT-IIg-17)
- Lesson 2 – Use appropriate hand tools and equipment (TLE_IAEPAS912UMHT-IIh-i18)

After going through this module, you are expected to:

1. identify appropriate hand tools for proper operation and safety;
2. mark unsafe or faulty tools for repair in accordance with standard company procedure;
3. use tools according to the tasks to be undertaken;
4. discuss safety procedures in using tools at all times and use appropriate PPE; and
5. report malfunctions, unplanned or unusual events to the supervisor.



What I Know

Multiple Choice: Directions: Read and choose the letter of your answer. Use the activity sheet for your answer.

1. Why don't we use dull blades?
    a. because they need to be sharpened
    b. because they require more force
    c. because they contribute to work simplification
    d. because they provide comfort

2. Why do threads become stripped?
    a. screws are over tightened
    b. screws are heated
    c. screws are molded
    d. screws are painted

3. These are specifically designed to insert & tighten screws.
    a. soldering tools
    b. screw drivers
    c. long nose pliers
    d. metal files

4. What is the significance of regular checkup for oscilloscope and signal generator?
    a. To prevent components from moisture that can cause trouble in the circuits
    b. To prevent from rusting
    c. To be safe from explosion
    d. To be safe from combustion

5. Which hand tool is used solely for cutting metals?
    a. utility knife
    b. kitchen knife
    c. hack saw
    d. metal files

6. When you are attaching two electronic components, what hand tools should we use?
    a. soldering iron
    b. welding machine
    c. soldering paste
    d. gun torch

7. It is one of the safety precautions in VOLT-OHM -Milliammeter instrument.
    a. Place the instrument in a moist place.
    b. Set the function switch in lower current.
    c. Place the instrument near the magnetic device.
    d. Rest the function switch at 250V AC if an OFF position is not available

8. Which type of screwdriver could take greater torque and could provide tighter fastening?
    a. slotted screwdriver
    b. Phillips screwdriver
    c. Jeweler's screwdriver set
    d. stubby screwdriver

9. Which hand tool is used for holding, bending, and stretching the lead of electronic component or connecting wires?
   a. side cutting pliers
   b. long nose pliers
   c. wire stripper
   d. vise grip

10. Which equipment is used to measure a resistance?
   a. VOM
   b. oscilloscope
   c. signal generator
   d. frequency meter

11. What is the use of soldering tool stand?
   a. an object for support
   b. a place for soldering iron during usage
   c. a thing for scaffolding
   d. an object for balancing

12. This is simply used to cut wires.
   a. long nose pliers
   b. side cutter
   c. wire stripper
   d. mini drill

13. What is being produced by a signal generator?
   a. UV rays
   b. vibrations
   c. wave forms
   d. radiations

14. Which is applicable on the use of pliers?
   a. never use as a prybar
   b. never use as chisel
   c. do not substitute for wrench when tuning bolts & nuts
   d. never use as hammer

15. How do you properly use hand tools and equipment?
   a. Always wear protection.
   b. Follow the correct procedure in using every tool.
   c. Don't work with oily or greasy hands.
   d. all of the above

Lesson 9 Using and Maintaining Hand Tools

What's In

Activity 1.
Directions: Match the different hand tools with their actual pictures. On your activity sheet, write the letter of your answer.

_____ 1. compass

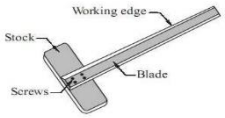
_____ 2. protractor

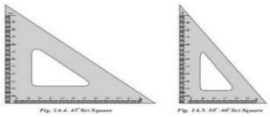
_____ 3. set squares

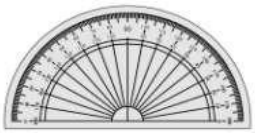
_____ 4. T-square

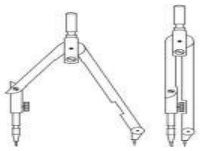
_____ 5. drawing board

a. 

b. 

c. 

d. 

e. 

What's New

Activity No. 2: "What Am I"

Directions: Examine the picture below and answer the following questions. Write your answers on the activity sheet provided.

1. What can you say about the picture?
2. Name the tools in the picture and classify them according to their uses?

What is It

Hand tools are classified into driving tools, soldering tools, splicing tools, boring tools, cutting tools, and auxiliary tools.

A. Driving of Tools

1. **Screwdrivers** are hand tools specifically designed to insert and tighten, or to loosen and remove screws. A screwdriver comprises a head or tip, which engages with a screw, a mechanism to apply force by rotating the tip, and some

way to position and support the screwdriver, the tip of which is shaped in to fit a particular type of screw.

a. Slotted Screwdriver - used to drive or fasten negative slotted screws.

b. Phillips Screwdriver – used to drive or fasten positive slotted screws. It is a screwdriver that could take greater torque and could provide tighter fastenings.

c. Jeweler's Screwdriver Set – is a set of small screw drivers composed of slotted and Phillips screwdrivers.

B. Soldering Tools

1. **Soldering Iron** is a device for applying heat to melt solder in attaching two metal parts. A soldering iron is composed of a heated metal tip and an insulated handle. For electrical work, wires are usually soldered to printed circuit boards, other wires, or small terminals. A low-power iron (20-30 Watts) is suitable for this work.

2. **Soldering Tool Stand** is a place where the soldering iron is placed during usage. This will keep the soldering iron away from flammable materials. The stand often comes with a sponge used in cleaning the tip of the soldering iron.

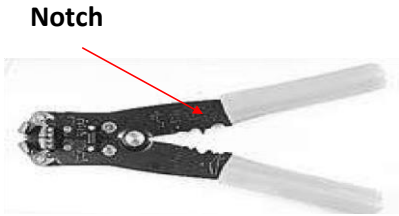
3. **Desoldering tool** is used in removing soldered wires and components on printed circuit boards for troubleshooting and repair purposes.

C. Splicing Tools

1. **Long Nose** is used for holding, bending, and stretching the lead of electronic component or connecting wires.

2. **Side Cutter** is a wire-cutting pliers, though they are not used to grab or turn anything but are used to cut wires.

3. **Wire Stripper** is a pair of opposing blades much like scissors or wire cutters. The addition of a center notch makes it easier to cut the insulation without cutting the wire.



D. Boring Tools

1. **12V Mini-Drill** – is used to bore or drill holes in the printed circuit board (PCB) with sizes from 1/32" – 1/16".

2. **Portable Electric Drill** is used for boring hole(s) in plastic or metal chassis with the used of drill bits having sizes from 1/6" to approximately 1/4".

3. **Metal Files** are hand tools having a series of sharp, parallel ridges or teeth. Most files have a narrow, pointed tang at one end to which a handle can be fitted.

a. **Flat File** is parallel in width and tapered in thickness. They are used for flat surfaces and edges.

b. **Half Round File** is tapered in width and thickness, coming to a point, and is narrower than a standard half round and used for filing inside of rings.

c. **Round File** - is also called rat-tail file which is gradually tapered and used for many tasks that require a round tool, such as enlarging round holes or cutting a scalloped edge.

E. Cutting Tools

1. **Utility Knife** is a common tool used in cutting various trades and crafts for a variety of purposes.

2. **Hacksaw** is used for cutting metals. Some have pistol grips which keep the hacksaw firm and easy to grip. The small hand-held hacksaws consist of a metal arch with a handle that fits around a narrow, rigid blade.

F. Auxiliary Tools

1. **Magnifying Glass** is a convex lens which is used to produce a magnified image of an object. The lens is usually mounted on a frame with a handle. Roger Bacon is the original inventor of the magnifying glass. A magnifying glass works by creating a magnified virtual image of an object behind the lens. Some magnifying glasses are foldable with built-in light.

Paint Brush – made of bristles set in handle, used for cleaning dirty parts of a circuit or an object.

ELECTRONIC EQUIPMENT

Aside from hand tools, equipment is also needed for more accurate and quality output. In this connection, three of the most used equipment are presented here for you to be familiar with their uses and the proper ways of maintaining them.

1. **Volt-Ohm-Milliammeter**. It is an equipment that combines three functions: as a voltmeter that measures both AC and DC voltages; an ohmmeter that measures resistance; and milliammeter that measures small amount of DC current. As safety precautions in the maintenance of this instrument, the following should be observed:

    • Always rest the function switch at 250V AC if an OFF position is not available in the instrument.

    • For current and voltage measurements, always set the function switch in the correct setting which is a little higher than the expected current or voltage present in the circuit.

    • Place the instrument in a cool dry place, away from any magnetic devices, and free from vibrations.

Volt-Ohm-Milliammeter

Signal generator

Oscilloscope

2. **Oscilloscope**. An oscilloscope (commonly abbreviated CRO, for cathode-ray oscilloscope, or scope) is a piece of electronic test equipment that allows signal voltages to be viewed, usually as a two-dimensional graph of one or more electrical potential differences (vertical axis) plotted as a function of time or of some other voltage (horizontal axis).

3. **Signal Generator**. A signal generator is a device which produces simple wave forms.

    Such device contains an electronic oscillator, a circuit that is capable of creating a repetitive waveform. These are typically used in simple electronics repair and design where they are used to stimulate a circuit under test.

    Oscilloscope and signal generator should be given regular checkup for at least once a week by connecting them in the power line. This will help prevent their components from having moisture that might cause trouble in their circuits. In any activity involving skills, it is a standard procedure that you must always use the right tool or equipment properly that would fit in a particular task. In spite of this reminder or caution, some students abuse the use of tools and still practice the following common faults that must NOT be done.

DOs AND DON'Ts IN USING HAND TOOLS

Pliers:

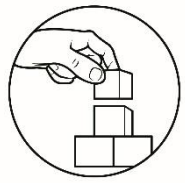
- Do not increase the handle length of pliers to gain more leverage. Use a larger pair of pliers or bolt cutters if necessary.
- Do not substitute pliers for a wrench when turning bolts and nuts. Pliers cannot grip these items properly and might cause a slip and create an accident.
- Never use pliers as a hammer on the handle. Such abuse is likely to result in cracks or breaks.
- Cut hardened wires only with pliers designed for that purpose.
- Always cut the wires in right angle. Never rock from side to side or bend wire back and forth against the cutting edges.

Screwdrivers:

- Never use screwdrivers as a pry bar, chisel, and punch stirrer or scraper.
- Never use screwdrivers with broken or worn-out handles. Screwdrivers of these kinds should have tags to indicate that it is defective.
- Never use pliers on a screwdriver for extra leverage. Only use wrench or screwdrivers specifically designed for purpose.

Utility Knives/ Blades:

- Do not use dull blades because they require more force, thus are more likely to slip. Replace the blade when it starts to "tear" instead of cut.
- Never leave a knife unattended with the blade exposed.
- Don't bend or apply side loads to blades by using them to open cans or loosen tight cover of containers. Blades are brittle and can snap easily.



What's More

Activity No. 3: "Proper or Improper"

Put a check mark (✓) in the box if the corresponding statement shows proper handling of hand tools and put an x-mark (✘) if the statement shows improper handling of hand tools.

	1. Always cut the wires in right angle. Never rock from side to side or bend wire back and forth against the cutting edges.
	2. Substitute pliers for a wrench when turning bolts and nuts.
	3. Bend or apply side loads to blades by using them to open cans or loosen tight cover of containers.

	4. Never use screwdrivers with broken or worn-out handles. Screwdrivers of these kinds should have tags to indicate that it is defective.

	5. Do not increase the handle length of pliers to gain more leverage. Use a larger pair of pliers or bolt cutters if necessary.

What I Have Learned

Activity No. 4: "Fill Me In"

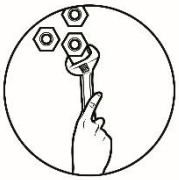
Fill in empty boxes to complete the diagram below with appropriate tools discussed earlier in this module.

Hand Tools

Driving Tools	Soldering Tools	Splicing Tools	Boring Tools	Cutting Tools
1. a. b. c.	1. 2. 3.	1. 2. 3.	1. 2. 3. a. b. c.	1. 2.

Electronic Tools

Name of Tools	Safety Precautions
1.	
2.	
3.	

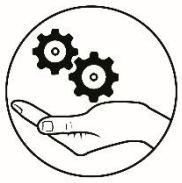


What I Can Do

Activity No. 5: "Tool My Defect"

Given below are electronic components with their specific defects. List all the tools you think are needed to repair such defect.

Defective Radio Receiver/Trouble No Power	Tools Needed
	
Defective Rice Cooker/ Trouble Cut off thermal Fuse	Tools Needed
	



Additional Activities

Activity 6: "Where Do I Belong"

Classify the different kinds of hand tools according to their specification in Consumer Electronics Servicing. Write the answer on activity sheet.

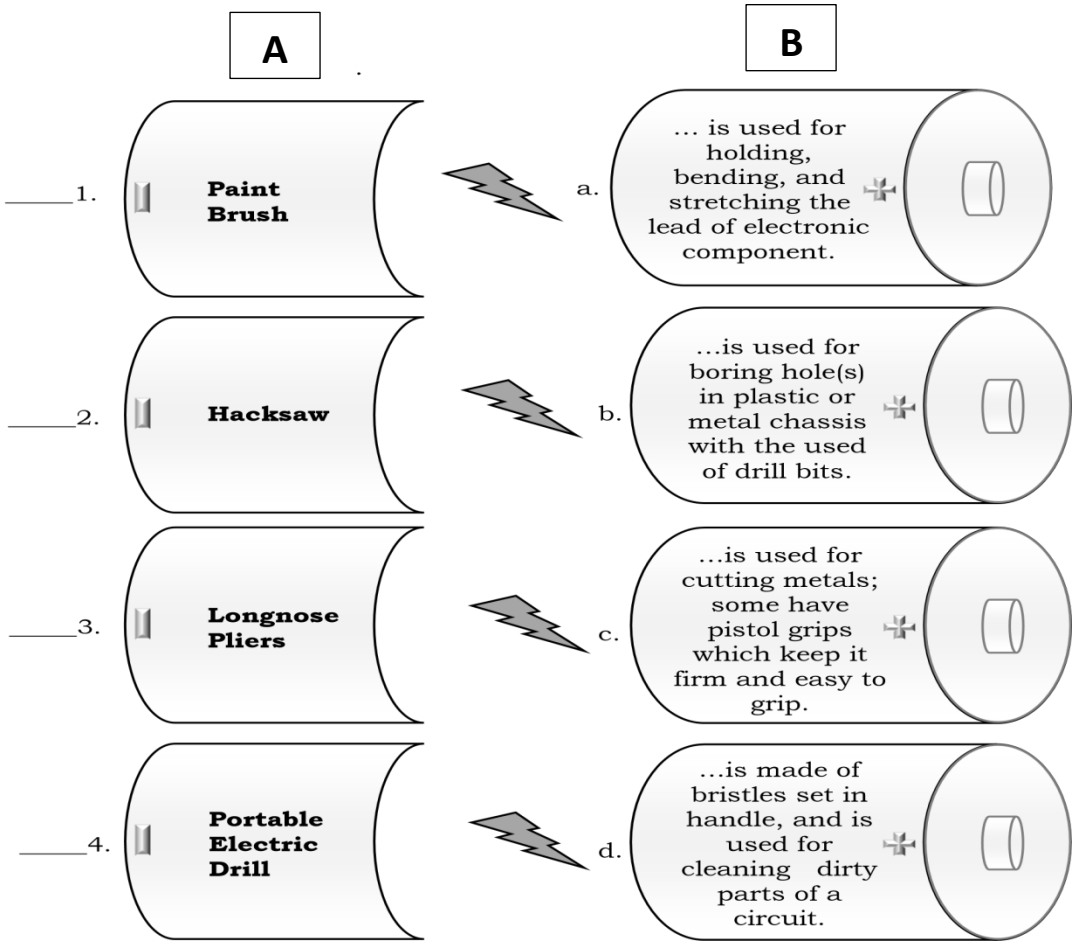
Hand tools	Classification
1. Desoldering Tool	
2 Wire Stripper	
3. Side Cutter	
4 Long Nose Pliers	
5 Mini Drill	
6 Magnifying Glass	
7 Soldering Stand	
8 Screwdriver	
9 Soldering Iron	
10. Portable Electric Drill	

Lesson 10 Using Appropriate Hand Tools and Equipment

What's In

Activity 7: Pair Me Up!

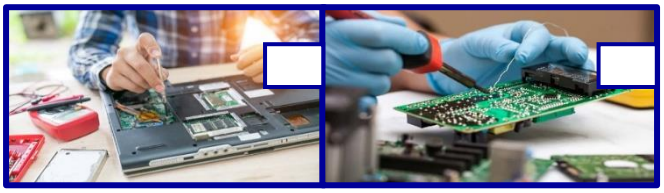
Hand tools below are not paired correctly. Column A contains hand tools while column B contains description and use of a hand tool. Pair the tools in column A to the corresponding description in column B. Write the letter of your answer on the blank provided before each number.



What's New

Activity No. 8: "Safety Check"

Put a check mark on the box of a picture if it shows a correct way of electronic servicing and put an x-mark if it shows an incorrect way.



What is It

In areas where students are acquiring basic technical skills, safety begins the moment they enter the work area or at times before reaching that work area. Identifying health hazards and occupational risks is indispensable. In laboratory areas where students stay to acquire skills, there are certain points to consider.

1. **Electrical hazards.** Electrical hazards are the type of risks that are more likely fatal than any other hazards that can happen in a laboratory room. Electrical hazards such as electrical shocks from open wires and grounded electrical appliances can be found anywhere in a disorganized laboratory area.

2. **Hazards from improper use of hand tools.** Hand tools are classified into cutting tools, driving tools, boring tools, joining tools, and measuring tools. Cutting tools may inflict injuries when improperly handled due to its sharp edges that can cut through the skin of the human body.

3. **Driving tools** like screw drivers and hammers, when used improperly can break human flesh or fracture bones which are very painful to an individual.

4. **Boring tools.** Drill bits, Center punch, and reamer are boring tools. These tools also do damage when not properly used.

5. **Soldering tools.** Soldering tools such as soldering iron, soldering gun and hot air soldering cause extreme heat and burn in the skin when improperly used.

The following safety rules should be understood and strictly followed to avoid accidents while working.

1. Avoid wearing loose clothing when working. Sleeves should be fit and shirts tucked in as much as possible. Remove ties, watches, rings, and other jewelry from your body.
2. Report immediately injuries or accidents of any type to your teacher.
3. Never put fasteners or any small metal articles in or near the mouth when working.
4. Never throw tools of any type around. Make sure the sharp edge of cutting tools are away from the edge of the table or work bench.
5. Keep working areas clean and free from disposable materials.
6. Secure the help of your classmates when carrying heavy tools to avoid accidents.
7. Never use dull or damaged tools.
8. Do not use tools with loose handles and ragged. Report cases like these to the teacher and do necessary repair and adjustments, if possible.
9. Know and observe safety measures specific for each tool or operation.

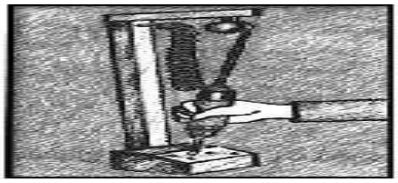
Safety Requirements:

For your protection, observe the following safety requirements:

1. Follow all cautions, warnings, and instructions marked on the equipment.
2. Ensure that the voltage and frequency rating of the power outlet matches the electrical rating labels on the system.
3. Use properly grounded power outlets.

Safety Requirements with the Use of Personal Protective Equipment:
Hand Tool Design, Selection, and Setup

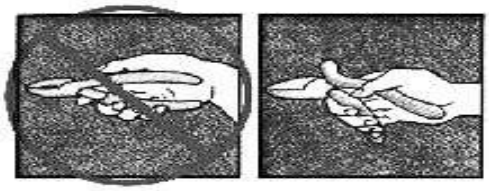
1. **Weight —** Use the lightest weight tool possible to avoid injury. Excessively heavy tools must be equipped with mechanical support and attached hoses should be supported.



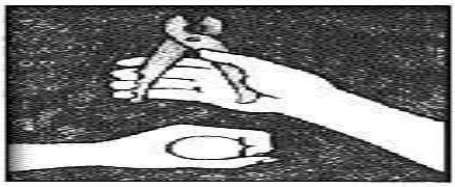
2. **Balance —** Additional force is required to use an unbalanced tool. The tool's center of gravity should be close to the body, close to the handles, and in line with the center of the hand holding the tool.


3. **Torque Control —** High torque requires a lot of force to keep the tool from rotating out of your hand. Torque settings should be set to the minimum required by job specifications, especially for in-line and pistol-shaped tools.

4. **Grip —** Tool handles should allow stable and efficient grip. The handle should be cylindrical or oval in shape, with a diameter of between 1.25 and 1.75 inches. Tool handles should contact as much of the hand and fingers as possible. Grips should be made of non-slip compressible and non-conductive material. Avoid form-fitting handles (handles with finger grooves), since they may not fit the hand size of every user. Handles should be kept clean and free from slippery grease, oil, or sweat.



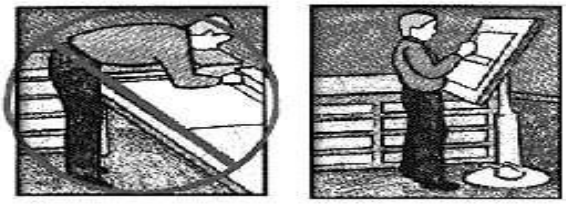
5. **Span —** On two-handled manual tools, like pliers, the open span should be about 4 inches and the closed span should only be about 1.5 inches.



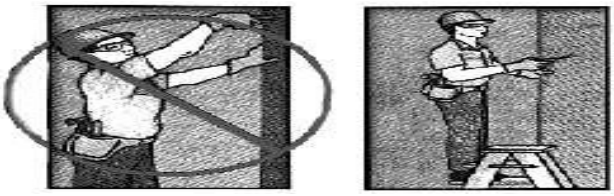
6. **Spring-loaded handles —** A spring-loaded mechanism saves muscular effort and reduces mechanical stress on the backs and sides of fingers for tools such as scissors, pliers, and other manual cutting and gripping tools which have to be opened and closed repeatedly during use.

7. **Choose the right tool shape** - Pistol-shaped tools should be used on a vertical surface or on a horizontal surface below waist height. Bend the tool, not the wrist.

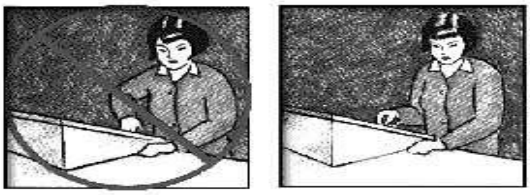
8. **Avoid bending over your work.**



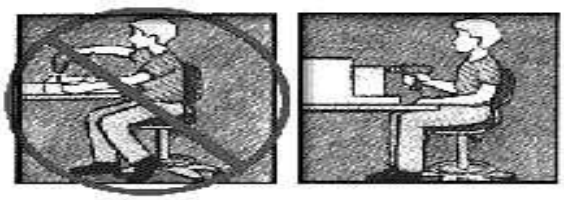
9. Avoid overhead work if possible. Use a ladder to reduce the need for outstretched arms.



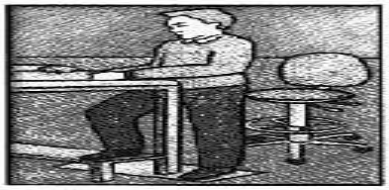
10. Keep the elbows close to the body.



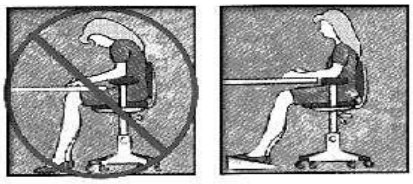
11. Tilt the work surface instead of the wrist.



12. **Stand with weight evenly distributed on both feet.** When standing for long periods of time, rest one foot on a sturdy object above floor height and switch legs periodically.



13. **Sit up straight so the chair offers good back support.** Adjust the chair back so it comfortably supports the natural curve of the lower back. Adjust the seat height to allow thighs to be parallel to the floor.



1. **Electronics Laboratory -** a place where activities pertaining to electronics projects are done.
2. **Electric shock -** effect on animal body on sudden discharge of electricity.
3. **Electrostatic discharge -** releasing of the electrical charges produced by the human body to ground.
4. **Gloves -** covering of leather, cotton, silk, etc. for the hand usually with separated fingers.
5. **Goggle -** spectacles for protecting eyes from glare, dust, and other pollutants.
6. **Hazard -** something causing danger.
7. **Mask -** covering for concealing the face.
8. **Maintenance -** keeping up with an A1 operation.
9. **Occupational health -** pertaining to wellness of an individual with reference to an activity or job in an electronics lab.
10. **Personal Protective Equipment - (PPE)** equipment used to protect one's body from hazards and danger of the electronics trades.
11. **Risk -** exposure to something unpleasant.
12. **Safety practices -** set of rules or procedure intended for a safe execution of a certain activity or job in a laboratory.
13. **5S -** five actions that start with letter S that helps in the arrangement of things in a laboratory - *Systematize, Sort, Sweep, Self-discipline, Sanitize*
14. **Systematize** - arrange methodically things in a laboratory.
15. **Standardize -** to make things in same features or level in quality or achievement.
16. **Sort -** arrange things according to kinds, types, or classification.
17. **Injury -** damage or harm caused to the structure or function of the body caused by an outside agent or force, which may be physical or chemical.
18. **Cuts -** break in the skin inflicted by sharp objects.
19. **Burns** - damage in the skin caused by exposure to fire or excessive heat.
20. **Fire extinguisher** - an equipment of chemicals intended to terminate or extinguish fire.
21. **First Aid Kit** – medicine for initial treatment of any wounds inflicted to a person.

COMMON MALFUNCTION IN HAND TOOLS AND EQUIPMENT AND PARAPHELNALIA

The proper use of tools, equipment and paraphernalia will greatly increase efficiency and occupational safety in a workplace. Having the proper knowledge and skills in using such tools is needed in order to operate and use them effectively. But more often than not, problems and malfunctions may arise while using these tools. These malfunctions can be minimized by exercising careful usage of the tools.

Malfunctions and other unplanned and unusual event may not be eliminated, but it can surely be minimized.

Listed below are some of the malfunctions and unplanned events when using the different tools in completing a job requirement:

- When using a driving tool, screws may slip the tip of the screwdriver. This happens when the screwdriver is not properly aligned with drive of the screw's head. This can be minimized by making sure that the tip of the screwdriver is well secured in the drive of the screw's head. Using a screwdriver with a magnetized tip can also help minimize this type of malfunction.
- Small objects tend to fall when being held by a gripping tool like pliers. This usually happens when the jaws of the pliers are blunt, thus making it hard to hold on things. This can be prevented by making sure that gripping tools have well maintained jaws that can grasp objects properly.

- The use of striking tools also imposes a great threat if there will be a malfunction. Common hazards are heads separating away from the handle. This could cause severe injuries to anyone. To avoid this type of accident, the handle of a striking tool must be tightly attached to its head.
- Mishaps in using cutting tools is also dangerous. Malfunctions may arise from slippage of the material to be cut. This may also happen if a cutting tool is not sharp enough. These unplanned events will cause laceration and wounds to the user. To avoid this, cutting tools must always be kept sharp.
- Power tools also impose danger during mishaps. Common problems are electrical short circuiting or mechanical problems. Malfunctioning power tools may cause electrocution and even decapitation of the limbs. These accidents can be avoided by making sure that all power tools are well maintained and are in fit operating condition.
- Diagnostic tools may not impose a threat to the well-being of a worker but inaccurate reading may compromise the completion of a job requirement. Inaccurate reading may occur if a diagnostic tool is not properly calibrated. To avoid this, a regular calibration to all diagnostic tools must be done.

REMEMBER:

- There is certainly no absolute way to avoid any unforeseen malfunctions.
- The only way to minimize them is to have the appropriate knowledge in using the different tools.

- Proper inspection and assessment of tools must also be practiced to ensure the safety of the worker and the accurate completion of a job requirement.
- Having a first aid kit in the work area is also necessary so that quick response and cure can be applied in case of any injuries.

What's More

Activity No. 9: "Paint Me a Picture"

In your activity sheet, draw/cut a picture being described in the statement.

Description	Picture
medicine for initial treatment of any wounds inflicted to a person	
covering of leather, cotton, silk, etc. for the hand usually with separated fingers	
spectacles for protecting eyes from glare, dust, and other pollutants	
covering for concealing the face	
an equipment of chemicals intended to terminate or extinguish fire	
damage in the skin caused by exposure to fire or excessive heat	

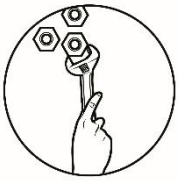
What I Have Learned

Activity No. 11: "Fill Me In"

Fill in the blanks to complete the statements below.

1. A _____ is a covering made up of leather, cotton, silk, for the hand usually with separated fingers.
2. A_____ is personal protective equipment used for protecting eyes from glare, dust, and other pollutants.
3. A _____ is used to cover the face.
4. After using a tool, clean it thoroughly with a _____ before keeping it in a toolbox or cabinet.
5. All tools and equipment must be checked to be in _____ before they are lent to users.
6. Keep _____ clean and free from disposable materials.

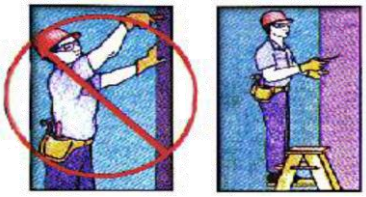
7. _____ tools should be used on a vertical surface or on a horizontal surface below waist height.
8. _____ is a set of rules or procedure intended for a safe execution of a certain activity or job in a laboratory.
9. Electrical hazards such as _____from open wires and grounded electrical appliances can be found anywhere in a disorganized laboratory area.
10. _____ is pertaining to wellness of an individual with reference to an activity or job in an electronics laboratory.



What I Can Do

Activity No. 12: "Safety Requirements"

Identify the safety requirement with the use of personal protective equipment shown in each picture. Write your answer on your activity sheet.

1.	
2.	
3.	
4.	
5.	

Assessment

Directions: Read each question carefully. Choose the letter of the best answer. Write the chosen letter on activity sheet.

1. What is the use of soldering tool stand?
   a. an object for support
   b. a place for soldering iron during usage
   c. a thing for scaffolding
   d. an object for balancing

2. This is simply used to cut wires.
   a. long nose pliers
   b. side cutter
   c. wire stripper
   d. mini drill

3. What is being produced by a signal generator?
   a. UV rays
   b. vibrations
   c. wave forms
   d. radiations

4. Which is applicable on the use of pliers?
   a. never use as a pry bar
   b. never use as chisel
   c. do not substitute for wrench when tuning bolts & nuts
   d. never use as hammer

5. How do you properly use hand tools and equipment?
   a. Always wear protection.
   b. Follow the correct procedure in using every tool.
   c. Don't work with oily or greasy hands.
   d. all of the above

6. Why don't we use dull blades?
   a. because they need to be sharpened
   b. because they require more force
   c. because they contribute to work simplification
   d. because they provide comfort

7. Why do threads become stripped?
   a. screws are over tightened
   b. screws are heated
   c. screws are molded
   d. screws are painted

8. These are specifically designed to insert & tighten screws.
   a. soldering tools
   b. screw drivers

c. long nose pliers
d. metal files

9. What is the significance of regular checkup for oscilloscope and signal generator?
   a. to prevent components from moisture that can cause trouble in the circuits
   b. to prevent from rusting
   c. to be safe from explosion
   d. to be safe from combustion

10. Which hand tool is used solely for cutting metals?
   a. utility knife
   b. kitchen knife
   c. hack saw
   d. metal files

11. When you are attaching two electronic components, what hand tools should we use?
   a. soldering iron
   b. welding machine
   c. soldering paste
   d. gun torch

12. It is one of the safety precautions in VOLT-OHM -Milliammeter instrument.
   a. Place the instrument in a moist place.
   b. Set the function switch in lower current.
   c. Place the instrument near the magnetic device.
   d. Rest the function switch at 250V AC if an OFF position is not available.

13. Which type of screwdriver could take greater torque and could provide tighter fastening?
   a. slotted screwdriver
   b. Phillips screwdriver
   c. Jeweler's screwdriver set
   d. stubby screwdriver

14. Which hand tool is used for holding, bending, and stretching the lead of electronic component or connecting wires?
   a. side cutting pliers
   b. long nose pliers
   c. wire stripper
   d. vise grip

15. Which equipment is used to measure a resistance?
   a. VOM
   b. oscilloscope
   c. signal generator
   d. frequency meter

Additional Activities

Activity No. 13: "Hazard Wizard"

Be an expert in identifying the possible hazards or risks in dealing with the following.

Answer Key

What's New	What's More	What I Know
1. Pictures of different tools 2. A. Hacksaw – saw used for cutting metal B. Electric Drill – used for boring C. Saw – used for cutting wood D. Hammer – used for carpentry E. Paint roller – used for painting F. Screwdriver – used to loosen & tighten screws G. Tape measure – used for measuring H. Try square – used for surface straightness I. Wrench – used to turn bolt or knot J. Calliper – used to measure dimension of object	1. √ 2. x 3. x 4. √ 5. √	1. B 11. B 2. A 12. B 3. B 13. C 4. A 14. C 5. C 15. D 6. A 7. D 8. B 9. B 10. A

What's In (Lesson 1)
1. e 2. d 3. c 4. b

Additional Activities

1. Soldering tool
2. Splicing tool
3. Splicing tool
4. Splicing tool
5. Boring tool
6. Auxiliary tool
7. Soldering tool
8. Driving tool
9. Soldering tool
10. Boring tool

What I can Do

1. Defective Radio Receiver
Tools needed: Soldering tools, splicing tools, driving tools, volt-ohm-milliameter
2. Defective rice cooker
Tools needed: Soldering tools, splicing tools, driving tools, volt-ohm-milliameter

What I Have Learned

Driving tools
a. Slotted screwdriver
b. Philips screwdriver
c. Jeweler's screwdriver set

Soldering tool
a. Soldering iron
b. Soldering stand
c. Desoldering tool

Cutting tool
a. Utility knife
b. Hacksaw

Splicing tool
a. Long nose
b. Side cutter
c. Wire cutter

Boring tool
a. 12v mini drill
b. Portable electric drill
c. Metal files: A. Flat file B. Half round file C. Round File

Electronic Tool
1. Volt-ohm-milliameter - Always rest the function switch at 250V AC if an OFF position is not available in the instrument.
2. Oscilloscope – Avoid vibration and mechanical shock.
3. Signal Generator - Regular checkup for at least once a week by connecting them in the power line. This will help prevent their components from having moisture that might cause trouble in their circuits.

Lesson 10

Assessment			
1. B	11. A		
2. B	12. D		
3. C	13. B		
4. C	14. B		
5. D	15. A		
6. B			
7. A			
8. B			
9. A			
10. C			

What I have Learned			
1. Gloves	6. Area		
2. Goggles	7. Pistol Shaped tools		
3. Mask	8. Safety practices		
4. Damp cloth	9. Electrical shocks		
5. Good condition	10. Occupational	health	

What's New		
1. x	4. √	
2. √	5. x	
3. √	6. x	
4. B		

What's In	
1. D	
2. C	
3. A	

Additional Activities
1. Can cause electrical overload and can result to fire
2. Improper use of hand tools has the possibility of injuring oneself.
3. Improper use of hand tools can cause injury especially in hands.
4. Improper use of soldering tools can cause extreme heat and burn.
5. Improper use of boring tools can cause more severe injury like bruises and laceration.

What I Can Do
1. Avoid bending over your work
2. Avoid overhead work if possible
3. Sit up Straight
4. Stand with weight evenly
5. Torque control

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