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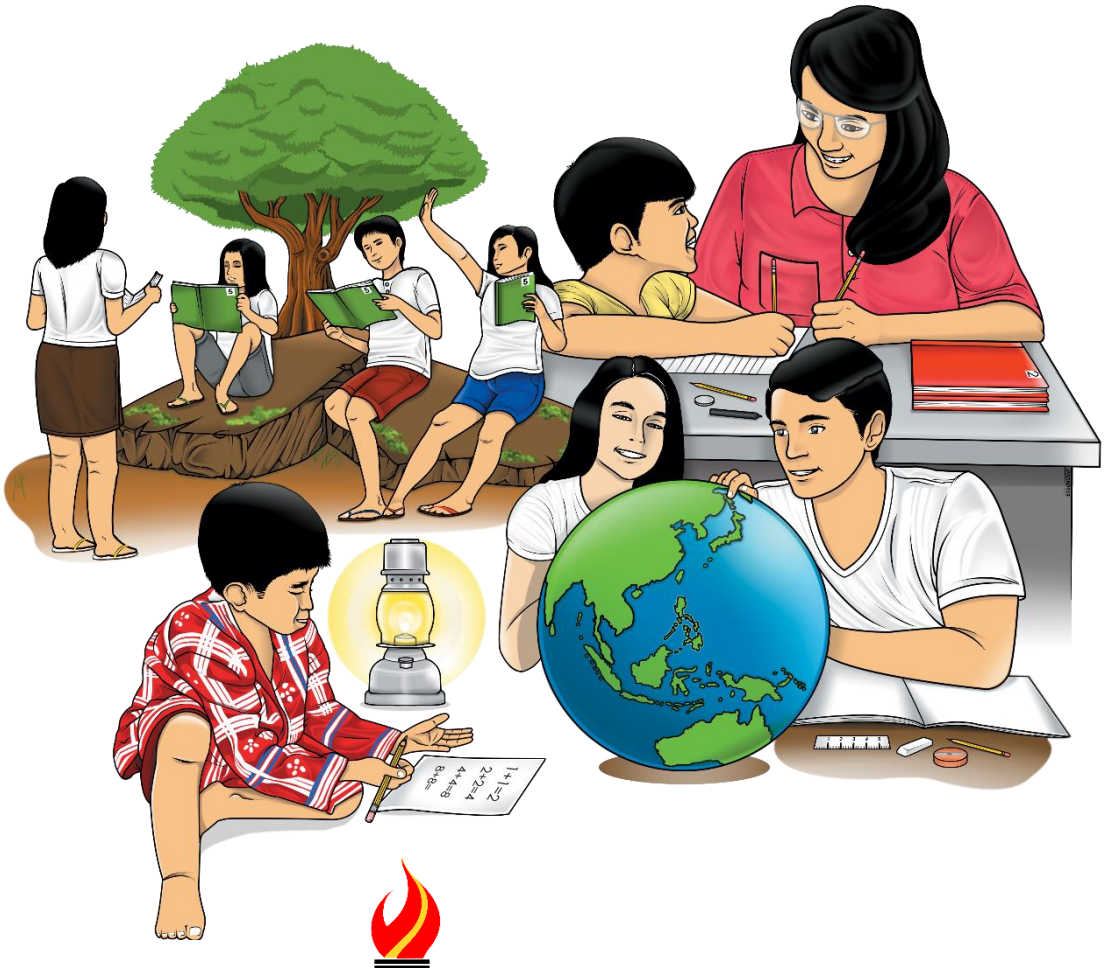
DEPARTMENT OF EDUCATION

TLE- EPAS

Quarter 1 – Module 6: Using and Maintaining Hand Tools



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7/8

TLE- EPAS

Quarter 1 – Module 6:
Using and Maintaining Hand Tools

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-tests 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 Teacher are also provided to our 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. And 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

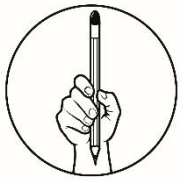
This module was designed and written with you in mind. It is here to help you master the Using and Maintaining Hand Tools. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged 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.

This module consists one lesson:

- Lesson 3 – Maintain hand tools (TLE_IAEPAS912UMHT-IIi-j19)

After going through this module, you are expected to:

1. handle tools without damage according to procedures;
2. undergo routine maintenance of tools according to standard operational procedures, principles and techniques; and
3. store tools safely in appropriate locations in accordance with manufacturer's specifications.



What I Know

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

1. Which is determined after the operation of a hand tool is tested?
   a. service span
   b. performance
   c. physical appearance
   d. repair maintenance

2. What will you use if you work with live wires?
   a. both hands
   b. hand gloves
   c. one hand
   d. wet hands

3. If you used a damaged hand tool, what will you do?
    a. tag a tool
    b. don't use it
    c. put in a trash can
    d. none of the above

4. Where will you return the tools after used?
    a. classroom
    b. laboratory
    c. store
    d. tool box

5. What procedure will you follow in sharpening hand tools?
    a. friendly
    b. common
    c. safety
    d. sanitary

6. How often does Oscilloscope be tested?
    a. once a day
    b. once week
    c. twice a week
    d. twice a month

7. Which is/are the proper procedure/s in maintaining screwdrivers?

    I. Select screwdriver that's fit the screw head slot perfectly.
    II. Keep the screwdriver's handle dry, and clean to prevent slippages.
    III. Never use a screwdriver as chisel.

    a. I only
    b. II only
    c. III only
    d. I, II and III

8. Why does soldering gun not suited for mass production?
    a. because soldering gun might be overheated and will consume more power
    b. because soldering gun is more expensive
    c. because soldering gun is not flexible
    d. because soldering gun is heavy

9. Why is there a need for hand tools to be cleaned and be freed from ferrous or other contaminants?
    a. to prevent hand tools from corrosion
    b. to keep it safe and organize
    c. to keep it functional and condition
    d. to keep hand tools easy to use

10. As a trainee, what will you do first if accident happened?
    a. report immediately to your teacher
    b. apply first aid
    c. call for help assistance
    d. clean with water and cloth

11. What is the best way to avoid accidents in the work place due to incorrect use of hand tools?
    a. understand the proper use of these tools
    b. practice using of hand tools
    c. call for an expert for its usage
    d. use tools based on your experience

12. What will you do with defective hand tools having major defects?
    I. Repair
    II. Condemnation
    III. Display/sample

    a. I only
    b. II only
    c. III only
    d. I, II, and III

13. A maintenance process of moving assembled parts and hand tools through the use of oil and greases.
    a. simple repair
    b. lubricating
    c. hand sharpening
    d. tightening

14. What is considered a minor repair?
    a. the task not too long to perform
    b. whole item to be replaced
    c. motor overhauling
    d. cleaning the tools

15. How will you check whether hand tools are defective or non-defective?
    I. length of service
    II. trade mark of the manufacturer
    III. physical appearance

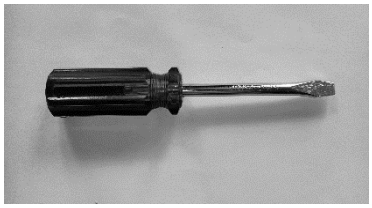
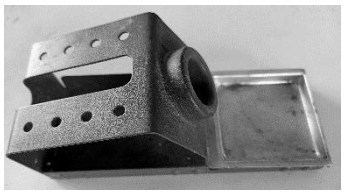
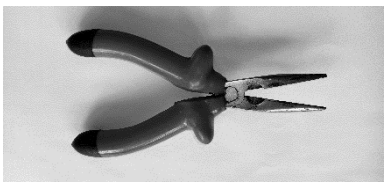
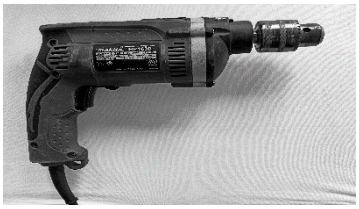
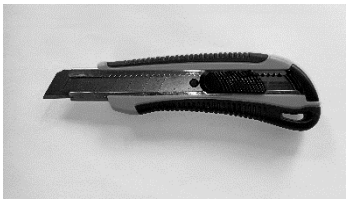
    a. I and ll only
    b. II and lll only
    c. III only
    d. I and III only

Lesson 10 Using and Maintaining Hand Tools

What's In

Activity 1

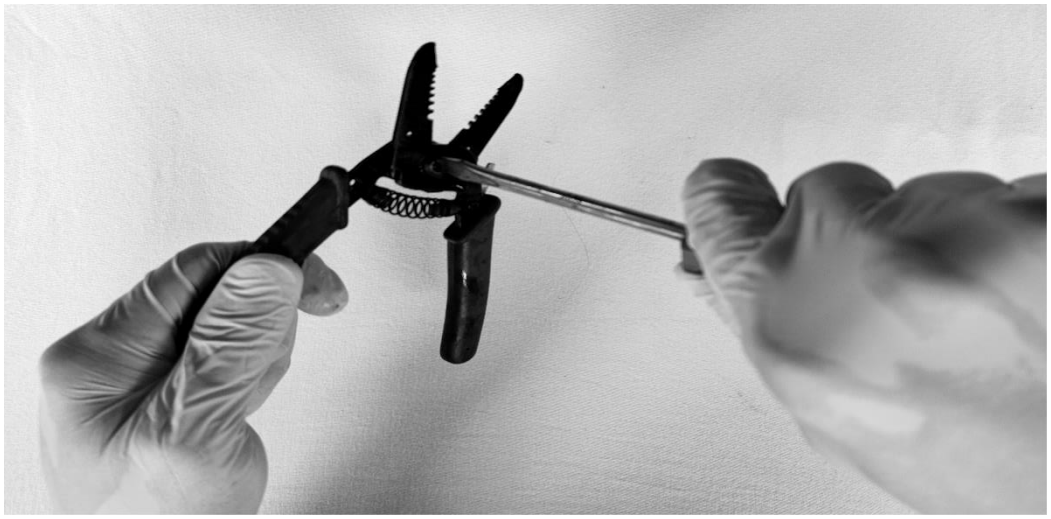
Directions: Name and classify the following hand tools according to its use by completing the table below.

Hand Tools	Specific Name	Classification
		
		
		
		
		

What's New

Activity 2: "Picture Analysis"

Directions: Analyze the pictures below and answer the questions that follow.



1. What do you think is being done with the tools in pictures?

   _____
   _____
   _____
   _____

2. Why is there a need to clean the tools?

   _____
   _____
   _____

What is It

Maintaining Tools

To avoid accidents in the workplace due to incorrect use of hand tools, it is a must that you understand the proper use of these tools. Study and practice proper use and maintenance of tools to prolong their life span and of course to avoid accidents due to improper or misuse of such tools.

Proper Use, Maintenance and Storage Tools

The use of safety hand tools should be a key component of most school safety programs. An understanding of the hand tool's intended use and environment, combined with proper tool selection, maintenance and storage, will greatly reduce the risk of harmful accidents.

The following are guidelines maintaining and storing tools.

- 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 acetyl ides, 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 used hand tools fitted 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. In addition to the probability that the tool will be damaged, this is a dangerous practice for the safety of the operator.

- 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.

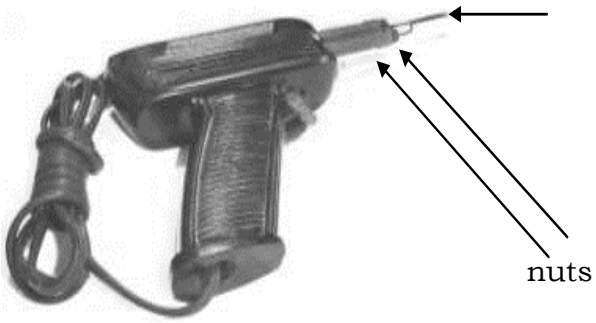
- When sharpening hand tools, follow normal safety procedures, such as the provision of eye and face protection, adequate extraction and dust collecting facilities.

Specifically, some tools require special care and maintenance due to their features and frequent use in any electronics or electrical job. Additional care and maintenance must be observed to the following:

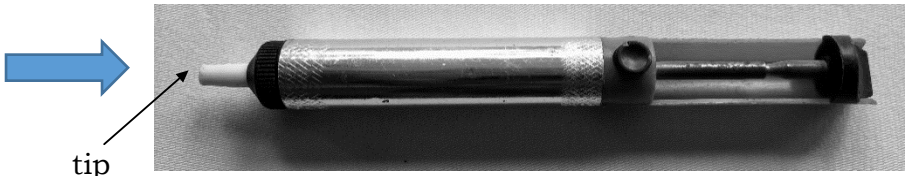
- ***Soldering iron***
  - Always clean the tip before and after using.
  - Do not wash the tip just to speed up its cooling process after using it. It might damage the heating element and corrode the tip.

- ***Soldering gun***
  - Be sure to tighten the two nuts holding the tip before using it to have maximum heat transfer to its tip.

- **Soldering gun**
  - Never use a soldering gun in mass production assembly. It might be overheated and will consume more power compared to a soldering iron.



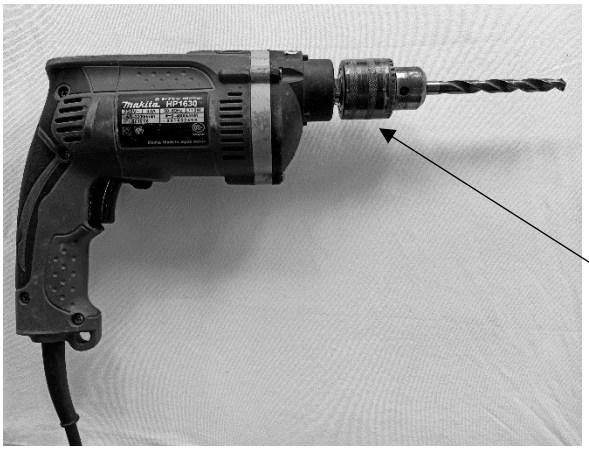
- ***Desoldering tool***
  - Keep it in good condition by cleaning its inside and apply a small amount of oil regularly.



Desoldering tool

  - Avoid direct contact of the soldering iron's tip to the tip of the desoldering tool when doing desoldering work.

- ***Electric drills***
  - These are tools that are used to bore holes in metals, wood, plastic or PCB in the process of electronic projects assembly. The most common of these are the mini drill powered from 12V DC voltage and the standard electric drill that can be connected directly to the 220 V AC power line.



  - Before using a drill, be sure to tighten the chuck jaw and secure the drill bit properly. The materials to be bored and the drill bit must be at 90 degrees angle to achieve efficient boring operation.

Additional Safety Pointers in Electronics Shop Work

As a reminder, a good technician should always remember that "prevention is better than cure" to avoid accidents that might cause damage to tools, instruments, or even inflict injuries to himself while performing electronic jobs.

- Be sure you are physically and mentally fit when working with electrical or electronic circuits.
- Use only standard tools and instruments in performing any electronic job.
- Always use the right tool for the right job.
- Do not attempt to use tools or instruments you are not familiar with. Ask the assistance of your teacher or a person in authority in operating such unfamiliar electronic gadget.
- Keep all tools and instruments in a safe place like toolbox or tool cabinet to avoid accident and easy access when these tools are needed for use.
- If accidents happened, report immediately to your teacher.
- Keep all tools and instruments in good condition by following the steps of proper care and maintenance of electronic tools and instruments.
- Your working area must be kept clean, in order, and free from any object that might hamper your work.
- Keep flammable substance and materials away from your working area by keeping them in a safe place intended for them.
- If possible, work with only one hand while working in a "live" circuit.

- Keep yourself insulated from earth ground when working on power line circuit, since one side of the line is connected to the earth.
- When your work is done, clean your working table and return all tools and instruments in their proper places.
- 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. If you note damage, *tag the tool* as faulty and organize a repair or replacement.
- 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.

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.

Maintaining Hand Tools

1. **Screwdrivers**
   - Select screwdriver that's fit the screw head slot perfectly.
   - Keep the screwdriver's handle dry, and clean to prevent slippages.
   - Never use a screwdriver as chisel.
   - Never hammer a screwdriver's handle.

2. **Pliers**
   - Always keep pliers in good condition by cleaning and regular application of oil.
   - Never use pliers as substitute for a wrench or hammer.
   - Never hammer the pliers when cutting wires.

3. **Files**
   - When using a file, keep a firm grip on its handle at all times.
   - Do not blow filings as they may get into your eyes.
   - Always use a file card in cleaning a file.

4. **Mini drill**
   - Hold the mini drill firmly at 90 degrees with the material to be bored and make sure to tighten the chuck jaw of the mini drill securely before using it.
   - Hold the metal, wood, or plastic firmly on the vise when drilling holes. Do not hold it with your hands.
   - Clean chips with a brush, not with your hands.
   - Keep the work area always clean by using paint brush.

5. **Pencil type soldering Iron.**
    - Clean and tin the tip of the soldering iron before use.
    - A 30-watt soldering iron is recommended for soldering electronic components in printed circuit board.
    - Clean the soldering tip with dry cloth, cotton, or tissue paper after using.
    - Do not wash the tip of the soldering iron with water to speed up its cooling process after use. It might corrode the soldering tip.

6. **Soldering Gun**
    - Do not use this type of the soldering instrument with light soldering work. It might damage the Electronic components and
    - PCB because of its very high temperature.
    - If the soldering tip fails to achieve its maximum temperature, tighten the two nuts holding the tip of the soldering gun.
    - Do not use in mass production assembly. It might be overheated.
    - This type of soldering equipment is more convenient where only few connections are to be made requiring much higher temperature like direct chassis soldering.

7. **Desoldering tool**
    - Heat the terminals to be resoldered before sucking the melted soldering lead with the desoldering tool to avoid direct contact of the desoldering tool's tip with the tip of the soldering iron.
    - Clean and oil the inside sucking spring and the tip of the desoldering tool regularly so that the melted soldering lead will not stick permanently inside the desoldering tool.

8. **Volt -Ohm- Milliammeter (VOM)**
    - Do not play with this instrument by holding both test leads or connecting them in any part of your body trying to measure your resistance.
    - Rest the function switch at 250 V AC when not in use.
    - Place this instrument in a dry cool place, In free from any vibrations
    - When making current and voltage measurements, be sure you are in the correct settings of function switch. If the current or voltage being measured is much greater than the value indicated in the function switch, the VOM will be damaged.
    - Avoid touching any metallic part of the test lead when measuring current or voltage.

Electronic instruments like oscilloscopes, signal generators, digital multimeters and like should be connected to the power line at least once a week to warm up the circuit. This will serve as regular check-up and it will prevent the electronic components from corrosion due to moist specially during rainy season when the air is wet.

Defective and Non-Defective Hand tools

There are many ways of identifying hand tools. One of these is to identify them according to their function. However, awareness of defective and non-defective hand tools is a primordial concern of workers/welders to be effective in their jobs.

Below are the recommended practices to identify defective and non-defective hand tools.

1. Visual inspection:

Defective tools can easily be distinguished from the functional ones through visual
inspection. The physical appearance of tools will describe such characteristics as dullness, sharpness, dismantled parts, and unevenness of the teeth of the cutting tools.

2. Functionality:

Another way is to check the quality of the manufactured tools. Is it already susceptible to wear and tear? Has it already exceeded its service life? Has it passed the manufacturer's quality control test?

A few pieces of the hand tools issued in the shop can be subjected for
Condemnation they are no longer serviceable. Some hand tools issued for years in shops and few pieces of these can be subjected for condemnation.

3. Performance:

Performance of hand tools is determined not only during the actual use but also after use to find out whether the hand tools are still worth using.

4. Service span:

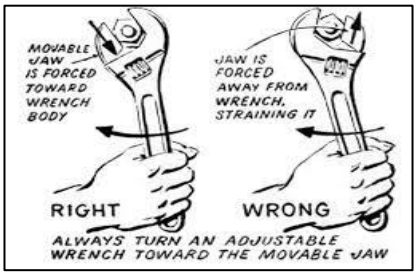
Hand tools are issued to shop teacher at one time. However, this must be recorded to determine when it was received and how long the tools have been kept in the shop. A hand tool which is too old is unsafe for both the students and workers. Such tool should be marked defective and segregated from the good ones.

1. ROUTINE MAINTENANCE

Maintenance of hand tools and machines are both primordial concerns of a repair technician in the welding shops and/or in the welding production. The activities should be on schedule and with proper coordination with the production people. The term "repair" and "maintenance" works mean differently. Repair, unusually focuses on the program of works done in the operation of power plants in machines that are in trouble of stopping its function. While the term "maintenance" means a scheduled or a planned visit of tools or equipment's for inspection and from there, reports and recommendation developed and the next tasks to be decided such as cleaning, application of lubricants, dismantling and etc.
Some of the simple maintenance activities for hand tools, and the maintenance schedule should be posted in a visible corner of the shop where everybody can read it.

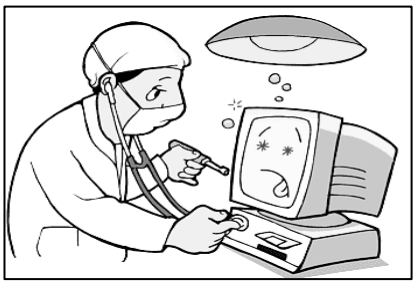
▪ **Lubricating**. A task performed in the shop/production. Through the application of lubricant substance to the identified items in parts like barrels, rollers, springs, bearing, bolts and nuts, and other automotive parts.

▪ **Tightening/Loosening**. In an assembly of structures, we have tools for fittings that need to be tightened and loosened and in as much as they pose high risk to safety. Tightening bolts and nuts and other fittings requires procedures should carried out compliance.



▪ **Tool for hand Sharpening**. Some tools need to be sharpened such as blades of knife, cold chisel, punches and many others. To do hand sharpening for hand tools requires techniques and application. In some multi knives cutter, manufacturers produce knife sharpening system to hold or clamp the blade for ensuring strong blade to stone contact during sharpening and also provided with course to fine honing stones. For cold chisel and punches, the right file-size and grades are used for repairing the defective anvil curve.

▪ **Simple Repair**. Repair practices of hand tools are still available anytime. But, to some extent, tools are checked yearly and many of the hand tools are eligible for condemnation and the whole items are to be replaced by a new unit. However, there are instances that minor repair can be performed, like replacement of wooden handle of a hammer and mushroomed head of a cold chisel.



▪ **Cleaning**. Simple process applied to hand tools. The cleaning approach may differ from one another. For example, cleaning of the rack corners of hand tools by using air vacuum or by a piece of clothes. Similar process may be applied to identical cleaning situations.

2. PROPER STORAGE OF HAND TOOLS/EQUIPMENT
(5S Implementation)

- ✓ Clearly label machinery, equipment, part, jigs, tools, and their locations, so that everything is understandable, and visible to everyone at a glance.
- ✓ Don‟t pile up jigs, tools, and materials without separators (shelves). They should be picked up easily.
- ✓ Rearrange machinery and equipment to make smooth production flow, when necessary.
- ✓ Maintain the space around the fire extinguishers and evacuation passages free.

What's More

Activity 3: "True or False"

Directions: Write **TRUE** if the statement is correct and **FALSE** if it is wrong. Write your answer on the activity sheet provided.

1. Use only standard tools and instruments in performing any electronic job.
2. Use a tool or instruments you are not familiar with.
3. Always use the right tool for the right job.
4. If possible, work with only both hands while working in a "live" circuit.
5. Your working area must be kept clean, in order, and free from any object that might hamper your work.
6. Keep all tools and instruments in a safe place like tool box or tool cabinet to avoid accident and easy access when these tools are needed for use.
7. Be sure you are physically fit only when working with electrical or electronic circuits.
8. Keep yourself insulated from earth ground when working on power line circuit, since one side of the line is connected to the earth.
9. If accidents happened, report immediately to your partner.
10. When your work is done, clean your working table and return all tools and instruments in their proper places.

What I Have Learned

Activity 4: "Sum It Up"

Answer the following questions briefly. Write your answer on the activity sheet provided.

1. What will you do if a hand tool is damaged due to misuse?

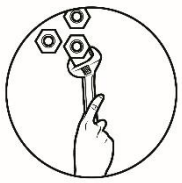
_____
_____
_____
_____
_____
_____

2. You are working in an untidy work station, what will you do?

_____
_____
_____
_____
_____
_____

3. If the hand tools are oily or greasy, what is the proper thing to do?

_____
_____
_____
_____
_____
_____



What I Can Do

Activity 5 "My Condition; Your Action"

In the matrix below, each hand tool is given its condition. Write under the third column the action/s you should take to maintain the functionality of the tools.

Hand tools	**Condition of the hand tools**	**Action/s to be Taken**
long nose pliers	rusty	
flat screwdriver	rounded tip	
soldering iron	distorted tip	
diagonal cutter	dull cutting edges	
paint brush	oily brush	

Assessment

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

1. What is the best way to avoid accidents in the work place due to incorrect use of hand tools?
   a. understands the proper use of these tools
   b. practice using of hand tools
   c. call for an expert for its usage
   d. use tools based on your experience

2. What will you do with defective hand tools having major defects?
   I. Repair
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   a. I only
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6. How often does Oscilloscope be tested?
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9. Why is there a need for hand tools to be cleaned and be freed from ferrous or other contaminants?
    a. to prevent hand tools from corrosion
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    c. to keep it functional and condition
    d. to keep hand tools easy to use

10. As a trainee, what will you do first if accident happened?
    a. report immediately to your teacher
    b. apply first aid
    c. call for help assistance
    d. clean with water and cloth

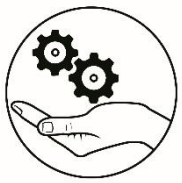
11. Which is determined after the operation of a hand tool is tested?
    a. service span
    b. performance
    c. physical appearance
    d. repair maintenance

12. What will you use if you work with live wires?
    a. both hands
    b. hand gloves
    c. one hand
    d. wet hands

13. If you used a damaged hand tool, what will you do?
    a. tag a tool
    b. don't use it
    c. put in a trash can
    d. none of the above

14. Where will you return the tools after used?
    a. classroom
    b. laboratory
    c. store
    d. tool box

15. What procedure will you follow in sharpening hand tools?
    a. friendly
    b. common
    c. safety
    d. sanitary



Additional Activities

Activity No. 6: "Rearrange Me"

Directions: Identify the word in the following statements. Use the scrambled letters as your clue. Write your answer in the activity sheet.

1. It refers to a substance, such as oil or grease, used for minimizing friction, especially in an engine or component.
2. It is the process of maintaining or preserving someone or something, or the state of being maintained.
3. It refers to the action or method of storing something for future use.
4. It is the action, process, or result of arranging or being arranged.
5. It is a tool in the hand and operated without electricity or other power.
6. It is the action of making something clean, especially the inside of the house.
7. It is the action of fixing or mending something.
8. It means to make arrangements or preparation for an event or activity.
9. It refers to a room or building in which goods are manufactures or repaired.
10. It is a condition of being protected from or unlikely to cause danger, risk, or injury.

1. BRICLUANT - _____
2. TEANCEMAINN - _____
3. AGESTOR - _____
4. ANGEARRMENT- _____
5. DANH SLOOT - _____
6. NGINACLE - _____
7. PAIRER - _____
8. GANIZERO - _____
9. POSHWORK - _____
10. ETYFAS - _____

Answer Key

Assessment

1. a
2. d
3. b
4. d
5. c
6. b
7. d
8. a
9. a
10. a
11. b
12. c
13. a
14. d
15. c

What's More

1. T
2. F
3. T
4. T
5. T
6. T
7. F
8. T
9. F
10. T

What I know

1. b
2. c
3. a
4. d
5. c
6. b
7. d
8. a
9. a
10. a
11. a
12. d
13. b
14. d
15. c

Additional Activities

1.Lubricant
2. Maintenance
3. Storage
4. Arrangement
5. Hand Tools
6. Cleaning
7. Repair
8. Organize
9. Workshop
10. Safety

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