

Lesson 11: Teacher's guide



A. Proper and safe use of maintenance tools



B. Competencies

Main competency

Use basic tools safely for the maintenance and repair of domestic appliances.

Sub competencies:

1. Demonstrate proper handling of basic tools.
2. Handle tools safely to avoid injury or damage to components.
3. Select appropriate tools for the task.
4. Clean and store tools properly after use.

C. Learning outcomes

By the end of this lesson, students should be able to show understanding of:

1. the different types of screwdrivers and their uses.
2. the different types of pliers and their uses.
3. how to use an automatic wire stripper.

D. Resources and materials

- a) Different types of screwdrivers: Slotted, pozidriv and cross slot/phillips.
- b) Different types of pliers: Linesman, needle nose, cutter and slip joint.
- c) An automatic wire stripper.
- d) A piece of single core wire.

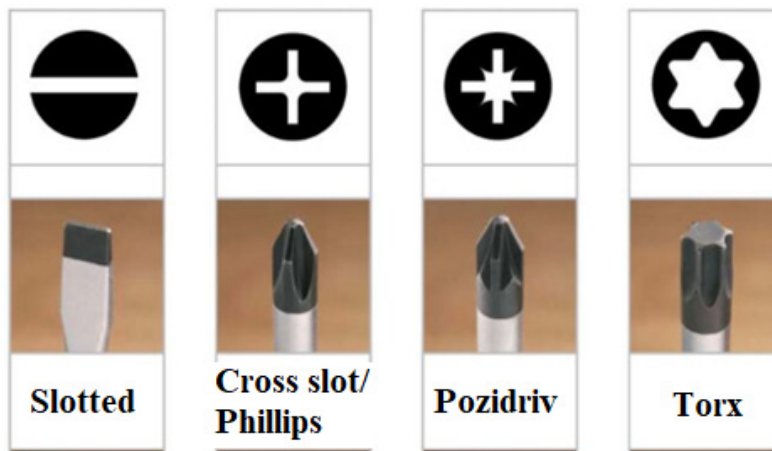
E. Implementation guidelines

Introduction

1. Begin with a brief discussion on different types of screwdrivers and their uses.
 - A screwdriver is an essential tool used to install and remove, as well as to tighten or loosen, screws.
 - It usually has a long and wide shaft that is attached to a screw head (drive tip). The screw head is inserted into the screw, and one can tighten or loosen the screw by turning the screwdriver while holding the handle.



- There are different types of screwdrivers, as shown below. Screwdrivers are manufactured in different shapes and sizes for many purposes. These different types of screwdrivers (those which are available in the school) can be shown to the students.



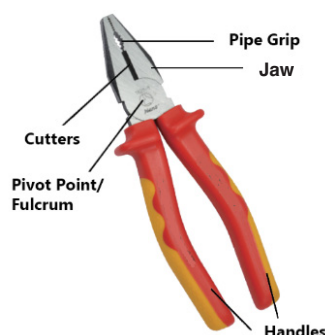
- Another type of screwdriver is the electrical screwdriver. It is shown in the figure below.



Electrical screwdrivers are tools used for electrical work as they are the safest option for electricians. Their shafts are covered in layers of non-conductive material which protects users from electrical shocks while carrying out repairs.

2. Brief discussion and explanation of the different types of pliers.

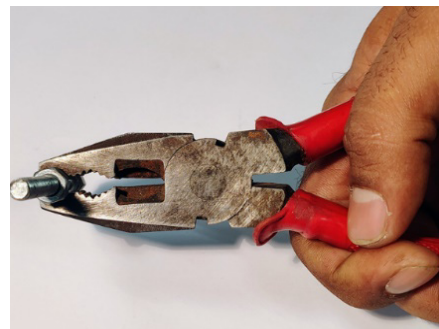
- Pliers are mainly used to grip objects requiring more force than bare hand. They are also employed to access awkward spaces, hold wires, bend loops, and connect wires. There are various types of pliers that are designed for different purposes, for example to cut through tough materials or more specialised ones used to grip delicate items like jewellery.
- The picture below shows the different parts of a pair of pliers.



- Examples of different types of pliers are shown below. Different types of pliers can be brought in the class and shown to the students.



- **Lineman's pliers** are commonly used for cutting, stripping, and bending wires. The jaws of lineman's pliers consist of three sections.
 - i) The tips of the jaws are particularly effective for gripping wires and objects.



- ii) The middle section of the jaws is designed to grip round objects, such as the heads of bolts.



iii) The third section contains the cutters, which are used for cutting wires.



- Cutters are used for a variety of applications across numerous fields, involving wire processing, cutting cables, bolts, nails, cable ties, or excess leads of electronic components.



- Slip joint pliers can be useful for holding, bending, crimping, and cutting. With their flat and serrated jaws, they can also be used to tighten or loosen nuts and bolts.



3. Brief discussion and explanation of an automatic wire stripper.

- An **automatic wire stripper** is a handheld tool used by electricians to strip and remove the plastic insulation that typically covers the outer layer of electrical cables and wires.



- Educator can demonstrate the use of the automatic wire stripper by stripping a piece of single-core wire. The weblink below can be used to demonstrate how to use an automatic wire stripper.

<https://www.youtube.com/watch?v=gjZTUH-y4>

Safety Aspects

- Select a screwdriver with the correct tip and size that fits the head of the screw to avoid slippage or its damage.
- Maintain the screwdriver in good condition. A broken handle, bent blade, or a worn out or twisted tip may cause the screwdriver to slip and lead to injury.
- Grip the screwdriver firmly and comfortably with your hand. Avoid applying excessive force, as this can result in slippage and potential injuries.
- Avoid leaning on the screwdriver or applying more pressure than needed to keep it engaged with the screw
- Never use the screwdriver as a pry bar, chisel, punch, or lever. Use it solely for driving screws.
- When using electric screwdrivers, avoid environments that are highly humid or wet to reduce the risk of electric shock.
- Always place the screwdriver on a workbench. Carry screwdrivers in toolboxes or tool belts – never in your pocket to prevent accidental injury.
- Never use pliers as hammers, shears, or wrenches. They are designed for gripping, bending, or cutting specific materials. Furthermore, avoid using them to remove nuts or bolts, as this may damage both the tool and the nuts or bolts.

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- Do not attempt to cut hardened wire unless you are using pliers specifically designed for that purpose.
 - It is recommended to wear eye protection when using pliers, especially when cutting wire or working in environments where flying particles may be present.
 - When using pliers to cut, ensure that the cutting jaws are facing away from your body to avoid any injury from flying debris.
 - When working with live electrical components, always use insulated pliers to minimise the risk of electric shock.
 - Choose pliers with a span of 6 cm to 9 cm for improved control and to ensure your hands are kept safely away from potential pinch points. Furthermore, select the appropriate type of pliers (e.g., needle-nose or linesman pliers) based on the task at hand.
 - Ensure that pliers are kept clean and dry, and lubricate the fulcrum for smooth operation and an extended lifespan. Damaged or worn pliers should be replaced to prevent accidents.

Conclusion

Summarise the key points:

- The different types of screwdrivers and their uses.
- The different types of pliers and their uses.
- The function of an automatic wire stripper.
- Tools need to be correctly maintained/stored to ensure long life span and their proper operation.

F. Assessment (in worksheet)

G. Extension activity

Encourage students to discuss about additional tools necessary for the maintenance of domestic appliances, such as a multimeter, magnetic screwdriver and interchangeable screwdriver set.



Interchangeable screwdriver set



Multimeter



Magnetic screwdriver