BASIC SKILLS IN PLUMBING

Foundation Programme in Literacy, Numeracy and Skills (FPLNS)

Mauritius Institute of Education
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Panel

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FPLNS | PLUMBING PANEL

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Table of Content

UNIT 1 - Introduction to plumbing

1.0 Overview

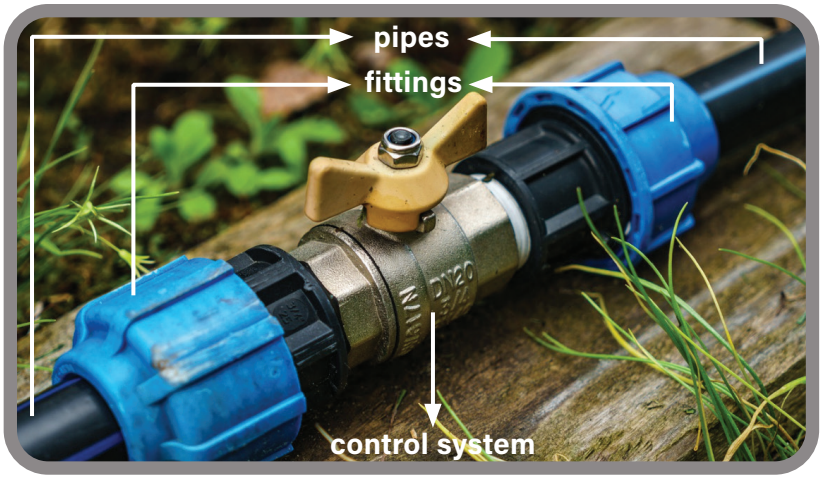
Water is essential for life. Water supply is important for drinking, cooking, washing, personal hygiene, irrigation and cleaning. Plumbing involves the installation and maintenance of piping system to ensure the efficient delivery and control of water for those in need. A plumber is a professional who installs, connects, repairs and fixes pipes and control systems. This elective provides students with basic knowledge and skills for a domestic water supply system. Through this elective student will develop competencies to safely manipulate basic plumbing tools and equipment to realise a project work on a simple residential pipe work.

1.1 Objective of the elective

- recognise the importance of plumbing in our daily life.
- understand and apply safety and health protocols for plumbing work.
- identify basic plumbing tools and equipment, including their functions and safe practices.
- recognise basic plumbing pipes, fittings, materials and control systems of a domestic water supply.
- distinguish various components of polythene or polypipe fitting.
- manipulate safely basic plumbing tools and equipment.
- develop competencies to measure, cut and connect polythene or polypipes.
- understand potential career opportunities in the plumbing trade.
- design and realise a prototype for part of a domestic piping system.

1.2 Introduction

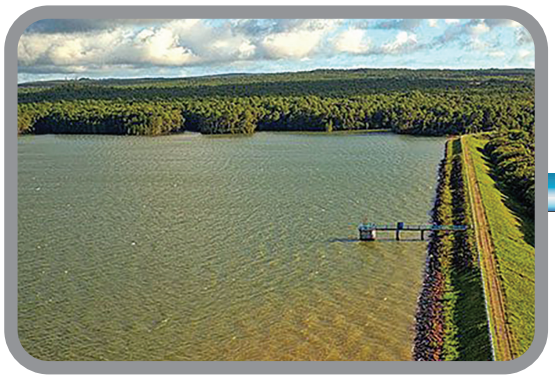
Plumbing is a working system of **pipes**, **fittings**, and **control system** that help us obtain clean water in our **home**.



1.3 Distribution of water in Mauritius

The water is carried through pipes from the reservoir. The Central Water Authority (CWA) is the authority who is responsible for treatment, distribution and control of water supply in Mauritius. The diagram below provides an overview of how potable water is distributed in Mauritius.

Rain water is collected in various reservoirs. The collected water is pumped and sent to treatment plants through water pipes.



A metre is used to monitor the amount of water consumed

In filter plants, the water is filtered to eliminate all microorganisms

Potable water in obtained in homes for drinking, food preparation and for other purposes

1.4 Plumbing systems in our houses

Different pipes, fitting and control system are used to distribute water in our house. Figure 2 shows some everyday life applications where plumbing systems are used in our home and their respective importance.

Activity: Poster on plumbing system in my environment

Collect some pictures or photos showing plumbing systems being used in your living environment. The title of the A2 poster is '**Plumbing in my environment**'.

2.0 Introduction

Safety plays an important role in any field, including plumbing. Plumbing is essential in our daily lives. It involves working with different tools, fittings, pipes, control systems and equipment. In this part, you will learn about basic Personal Protective Equipment (PPE) and safe practices related to plumbing.

2.1 Personal Protective Equipment (PPE) for plumbing

Plumbers should wear:

Safety cap

To protect the head

Safety gloves with rubber grips

To protect hands from sharp objects, and for handling pipes and fittings

Safety glasses

To protect the eyes from dust and debris

Over coat

To protect clothing and body

Protective shoes

To protect the feet

2.2 Safe practices

It is essential to be aware of safe practices while using any plumbing tools and equipment.

Note to educators

It is important to develop the proper attitude towards safe practices before using any tools and equipment. You must ensure that each safe practice is properly explained, demonstrated and followed.

The grid shows some basic safe practices related to plumbing.

Use the right tool for the right job.

Ensure that each tool or equipment is in good working condition.

Always clean each tool and equipment after use.

Ensure your hands are dry before using any power tool.

Ensure that tools and equipment fit properly before use.

Note to educators

You are required to ask your students to watch a plumber at work and notice the safety measures observed.

3.0 Introduction

Various tools and equipment are used in plumbing. Developing the skills required to use those tools is fundamental. While using tools and equipment, it is necessary to be aware of certain safety measures.

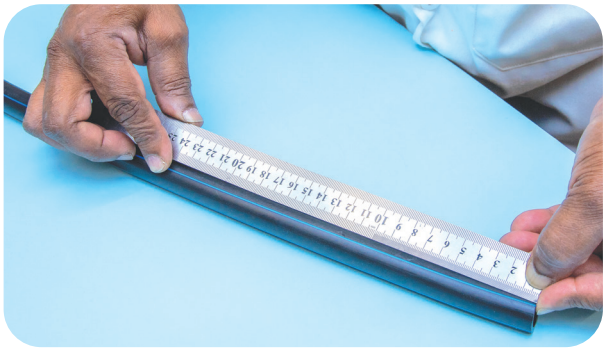
3.1 Plumbing tools

Some common tools, their function and associated safety measures are described below:

(a) Steel Rule (300 mm length)

Function It is used for measuring dimensions up to 300mm

Activity Use a steel rule to measure a length of 200mm, 175mm and 78mm on a polypipe.



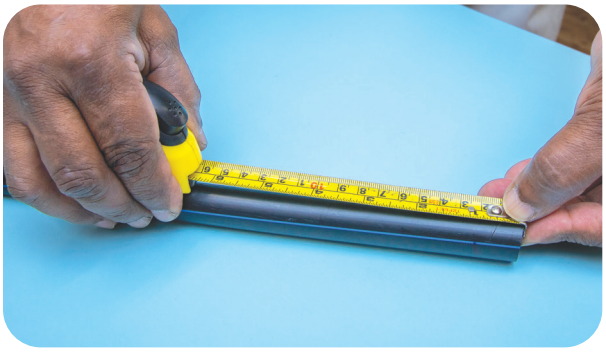
Safety measure

- Avoid parallax error.
- Be careful with the sharp corners.

(b) Measuring Tape (up to 3 meter)

Function - It is used for measuring long dimensions.

Activity - Use a measuring tape to measure a length of 1200mm, 1475mm, 2575mm on a polypipe.



Safety measure

- Retract the tape slowly.
- Always keep your fingers clear from the edges and the end hook when retracting it.
- Ensure that the locking mechanism is engaged when extending it for long measurements.

(c) Permanent Marker

Function - It is used for marking.

Activity - Use a permanent marker to mark out a length of 250mm on a polypipe.

Safety measure

- Close the cap after use.
- Avoid contact with the eyes.

(d) Quick Release Pipe Cutter

Function - It is used to cut plastic pipes.

Activity - Use a quick release pipe cutter to cut a polypipe of length 250mm, 75mm, 455mm and 800mm.

Safety measure
- Keep your fingers away from the cutting blade.
- Position the pipe firmly in the jaws of the cutter before cutting.

(e) Hacksaw

Function - It is used to cut plastic pipes and other materials.

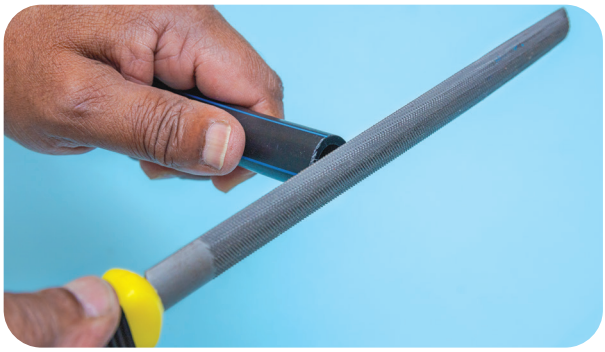
Activity - Use a hacksaw to cut a polypipe of length 250mm, 455mm and 89mm.

Safety measure
- Ensure that the blade is properly tightened before cutting.

(f) Half Round File

Function - It is used to clean pipe edge.

Activity - Use a half round file to clean the edge of a piece of polypipe.



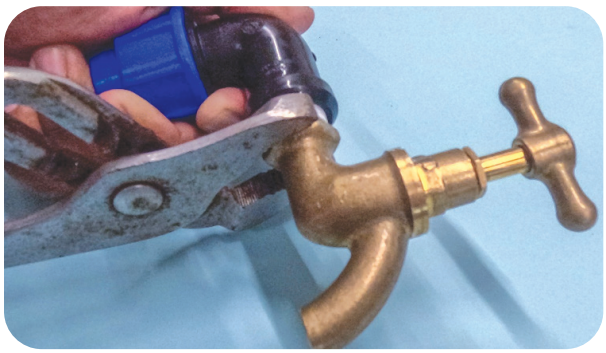
Safety measure

- Avoid applying too much pressure on the file.
- Keep your fingers away from the grits of the file.
- Do not use the file as a can opener.

(g) Slip-joint Plier

Function - It is used to hold, tighten and loosen control system and fittings.

Activity - Use a slip-joint plier to **tighten** and **loosen** a tap in fitting.



Safety measure

- Adjust the plier to the correct size of control system or fitting.
- Keep your fingers away from the jaws when using it.

Activity 1

Match the following tools with their respective names.

- Measuring Tape
- Hacksaw
- Slip-joint plier
- Half Round File
- Pipe cutter

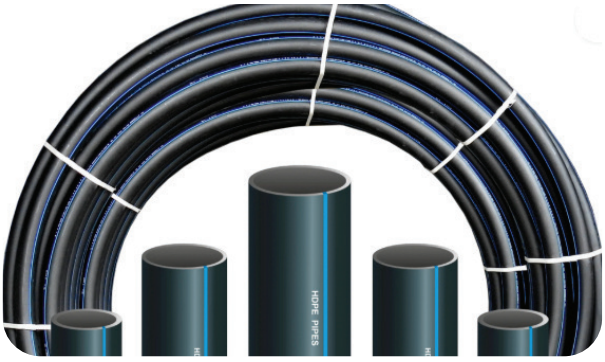
4.0 Introduction

Plumbing systems are made up of three main parts: pipes, fittings, and control systems. Pipes carry water in and out, fittings are special parts that connect pipes together or help change their direction, and control systems control the flow of water.

4.2 Polypipe

Polypipe is commonly used locally. They are readily available, cheap and easy to work with. They are black in colour with blue stripes. They exist in different diameters. In this lesson, the focus will be only on ½ inch (20mm) diameter pipe.

Characteristics of Polypipe

Black in colour with blue stripes	
Flexible	
Available in reels or required length	
Durable and long lasting	

Corrosion resistant	
Suitable for carrying water over long distances	 **One reel of polypipe is 50 m long**
Suitable for use below the ground	

Activity 2

Fill in the blanks to complete the word.

1. **Polypipe is f l e _ _ _ _ _ .**

2. **Polypipe is b _ _ _ k in colour with b _ _ _ stripes.**

3. **Polypipe is suitable to be used b _ _ _ _ the ground.**

4. **Polypipe is available in both r _ _ _ s and required length.**

5. **Polypipe is c _ _ r _ _ _ _ n resistant.**

4.3 Fittings

Fittings are used to allow the flow of water in different directions and to accommodate the control system. Below are some commonly used fittings.

(a) Straight septor [*Septor droite* in Kreol Morisien (KM)]

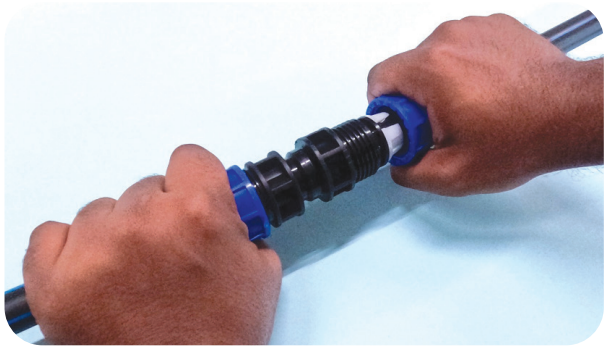
A straight septor is used to join two lengths of polypipe of the same diameter in a straight run.

Different components of a straight septor

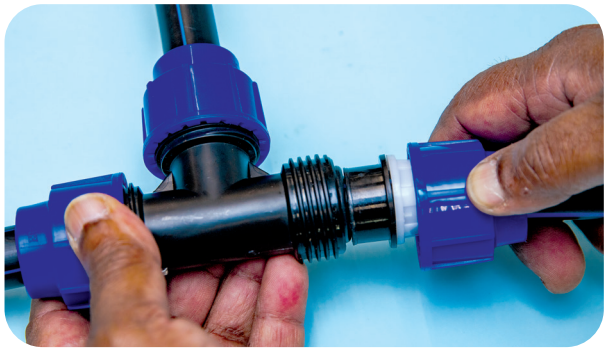
A straight septor consist of the following components:

Activity 3

You are required to disassemble and assemble a straight septor in the correct order.

Activity - Use a straight septor and two pieces of polypipe to connect them in a straight run.


(b) Equal tee septor [*Septor T* in KM]

Function - It is used to connect a three-branch piping system.
Activity - Use an equal tee septor to connect pieces of polypipe in a three-branch piping system.


(c) Elbow septor [*Septor Coude* in KM]

Function - It is used to connect polypipe at a corner (90^{o}).

Activity - Use an elbow septor to connect two pieces of polypipe at a corner (90^{o}).

(d) Polypipe female septor [*Septor Femel* in KM]

Function - It is used to connect polypipe with male threaded fitting or control system.

Activity - Connect a piece of polypipe to a female septor.

Activity 4

Complete the table below by giving the name and function of each of the fittings shown.

Photo	Name	Function
	....	**Used to connect polypipe at a corner**
	**Equal tee septor**	....
	....	....
	....	....

4.4 Control System

Control systems are devices used to control the flow and supply of water at different points. Below are some common control systems.

(a) Bib tap [*Robine* in KM]

Function - Used to supply and control the flow of water at a water point.
Activity - Connect a bib tap to a polypipe female septor.


(b) Garden tap [*Robine Zardin* in KM]

Function - It is used to supply and control the flow of water when connected to a hose.

Activity - Connect a garden tap to a polypipe female septor.

(c) Winding seal tape on control systems

Function - It is used to seal any gap between fittings and the control system.

Activity - Apply seal tape to a bib tap and then connect it to a polypipe fitting.

Activity 5

Project Work

You will need the following materials.

Straight septor		½ inch
Elbow septor		½ inch
Equal tee septor		½ inch
Polypipe		½ inch Length: 1 Metre

The plan of a simple plumbing system is shown in **Figure 1**. You are required to use the correct fittings and length of polypipe to realise it. Remember to observe all safety procedures and practices while carrying out this project. With the help of your teacher, you can fix it using appropriate clips on a piece of plywood. If a bib tap and a female septor is available, you can connect them at one end of the polypipe of your choice.

Wish you best of luck and enjoyment.

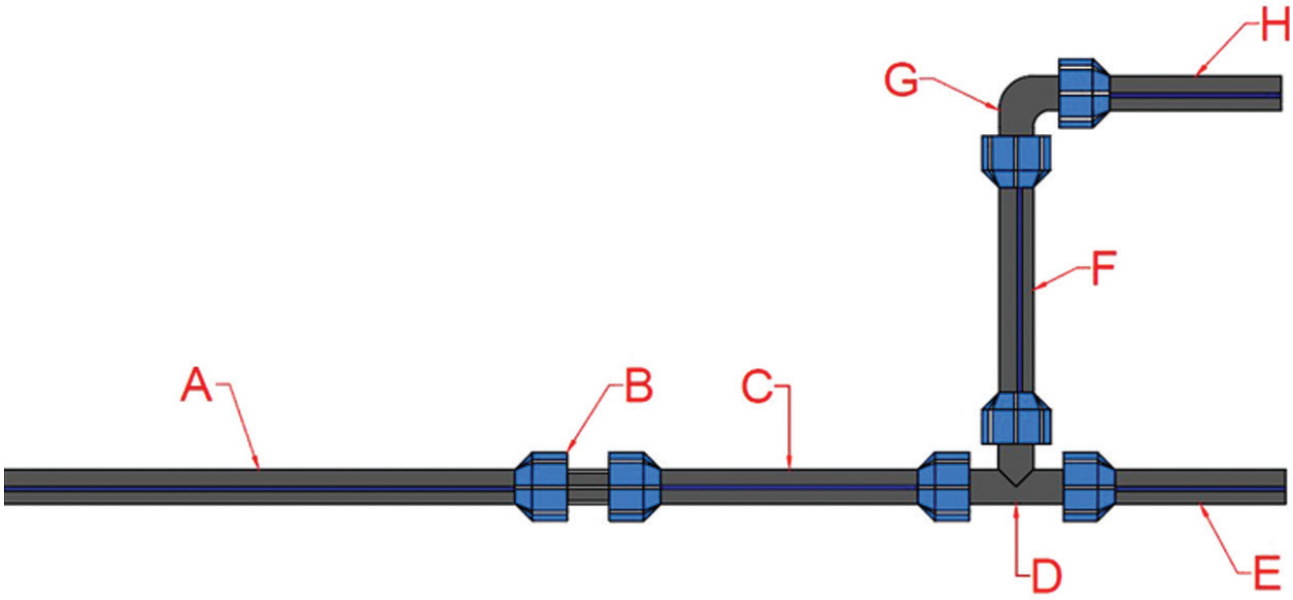


Figure 1

PART	NAME	SPECIFICATION
A	Polypipe	250mm
B	Straight Septor	½ inch
C	Polypipe	150mm
D	Equal Tee Septor	½ inch
E	Polypipe	100mm
F	Polypipe	150mm
G	Elbow Septor	½ inch
H	Polypipe	100mm

Assessment Grid for project work

Competencies	Not achieved		Partly achieved		Fully achieved	
1. Measuring Polypipe	Measurements not taken or incorrect lengths used		Measurements taken but with minor errors		All lengths accurately measured as per the plan	
2. Marking Out	Markings not made or not carried out at the required lengths		Markings are present but with minor errors		Markings are clearly made at correct positions for cutting and joining	
3. Cutting Polypipe	Cuts are uneven, rough or at wrong positions		Cuts are acceptable but slightly off the mark		Cuts are clean, straight, and made at the correct marked points	
4. Assembling fittings	Fittings are loose, misaligned or incorrectly placed		Fittings are mostly aligned, but some are slightly loose or wrongly placed		All fittings are correctly aligned, securely fixed, and match the plan	
5. Finishing	Poor quality work and finishing		Work is acceptable but finishing can be improved		Work is neat, good standard, and well finished	
6. Safety	Unsafe practices observed and poor handling of tools/ material		Some safety measures followed; minor issues noticed		Tools and materials correctly handled and all safety rules duly observed	
7. Planning of task	No clear sequence; unsure of steps; works randomly		Basic sequence of actions observed but lacks order or some steps missed		Clear step-by-step plan prepared and followed confidently	
8. Time management	Task not completed or completed very late		Task completed but took longer than expected or rushed at the end		Task completed within allocated time with steady progress	