

Department of Education
SPTVE
Exploratory 7
Electrical Installation and Maintenance
Carry Out Measurement and Calculation
Quarter 2: Week 4 Module



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Expectations

At the end of the module, you should be able to:

1. convert units of measurement from English to Metric and vice versa.
2. identify the parts and uses of an analog multi-tester.
3. observe proper care and maintenance of a multi-tester.



Pre-Test

Directions. Read the questions carefully and choose the correct answer. Write the words of your choice on your answer sheet.

1. This system of measurement which uses the units such as inch, yard and foot.
A. English measurement
B. English system
C. Metric system
D. System of measurement
2. A set of units which can be used to specify anything that can be measured.
A. English measurement
B. English system
C. Metric system
D. System of measurement
3. Decimalized system of measurement and uses the units such as meter and centimeter.
A. English measurement
B. English system
C. Metric system
D. System of measurement
4. It is the best instrument that can measure voltage, resistance and current.
A. Ammeter
B. Micrometer
C. Voltmeter
D. Volt-Ohmmeter
5. The needle-shaped rod that moves over the scale of a meter.
A. Pointer
B. Range selector knob
C. Scale
D. Test probe
6. How many decimeters in meter?
A. 1
B. 10
C. 100
D. 1000
7. How many centimeters are there in 1 yard?
A. 11.53 cm
B. 55.44 cm
C. 91.44 cm
D. 201.5 cm

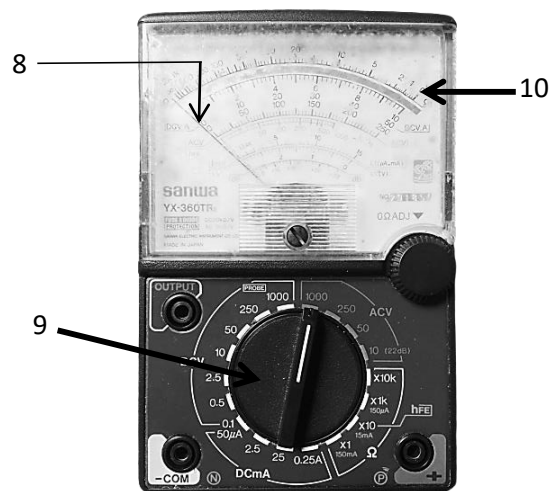
8-10 What do you call this part of the multi-tester?

A. Pointer

B. Range selector knob

C. Scale

D. Test probe






LOOKING BACK

The previous lesson has taught you different kinds of measuring tools and their description.

Activity 1. “MATCH ME!”

Directions: Match the picture from column A to its description from column B.

Column A	Column B
1. 	A. Voltmeter
2. 	B. Micrometer
3. 	C. Clamp Ammeter

4.		D. Test light
5.		E. Ammeter

Activity 2. “CAN YOU IDENTIFY ME?”

Directions: Write the name of the tools that best describe the statement

- _____ 1. It is used in determining the size of wires and conductors
- _____ 2. It is also called a multi-tester
- _____ 3. It is used to measure electrical pressure
- _____ 4. It is a pocket size tool used to test the circuit for
Current
- _____ 5. It is also called a tong tester



Brief Introduction

Measurements and calculations are of equal importance in electricity. One has to have the basic knowledge in converting units of measurements and using work-specific instruments such as the volt-ohm-meter or commonly known as the multi-tester.



Activities

A **system of measurement** is a set of units which can be used to specify anything that can be measured.

There are common units of measurement used in making layout and installation of electrical materials, and these are:

English system provides the creative way on how people can measure certain things and objects. This is an old system of measurement. Before, people measure shorter distances on the ground with their feet while they measure long distances by

their palms which is equal to a yard. Lengths and distances are measured in inches, feet, yards and miles.

Metric system is a decimalized system of measurement and it is much simpler. It exists in several variations with different choices of base units. Metric units are widely used around the world for personal, commercial and scientific purposes. Millimeter, centimeter, decimeter and meter are the common units of measurement.

Common Units and Its Equivalent

English

- ☐ 12 inches (in or ") = 1 foot (ft)
- ☐ 1 foot (ft) = 3 yards (yd)
- ☐ 1 yard (yd) = 36 inches (in or ")

Metric

- ☐ 10 millimeters (mm) = 1 centimeter (cm)
- ☐ 10 centimeters (cm) = 1 decimeter (dm)
- ☐ 10 decimeters (dm) = 1 meter (m)

English to Metric

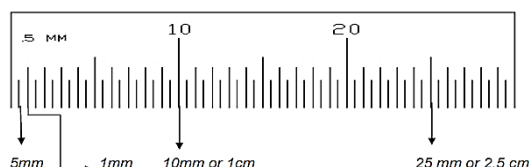
- ☐ 1 inch (in) = 2.54 centimeters (cm)
- ☐ 1 foot (ft) = 30.48 centimeters (cm)
- ☐ 1 yard (yd) = 91.44 centimeters (cm)

The centimeter graduation

The graduation shows that every digit is 0.5mm

How to read the cm graduation:

1. First graduation is .5 mm
2. Second graduation is 1mm
3. Third graduation is 1.5mm
4. Fourth graduation is 2mm

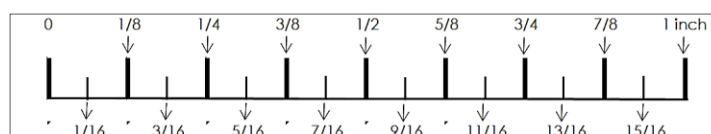


Note: If the graduation reaches 10mm, it is equivalent to 1cm.

The inch graduation

How to read the inch (in) graduation:

1. First graduation is $1/16$
2. Second graduation is $1/8$
3. Third graduation is $3/16$
4. Fourth graduation is $1/4$, then follow the given scale on the right.



Converting units of measurement:

English to Metric and vice versa

1. 12 inches = _____ cm

Since

$$12 \text{ inches} \times \frac{2.54 \text{ cm}}{1 \text{ inch}} \quad \text{Cancels the common unit and apply cross multiplication}$$

$$\frac{12 \times 2.54 \text{ cm}}{1} \quad \text{Perform the indicated operation}$$

Therefore: 12 inches = 30.48 cm

2. 6 feet = _____ inches

Since

$$6 \text{ feet} \times \frac{12 \text{ inches}}{1 \text{ foot}} \quad \text{Cancels the common unit and apply cross multiplication}$$

$$\frac{6 \times 12}{1} \quad \text{Perform the indicated operation}$$

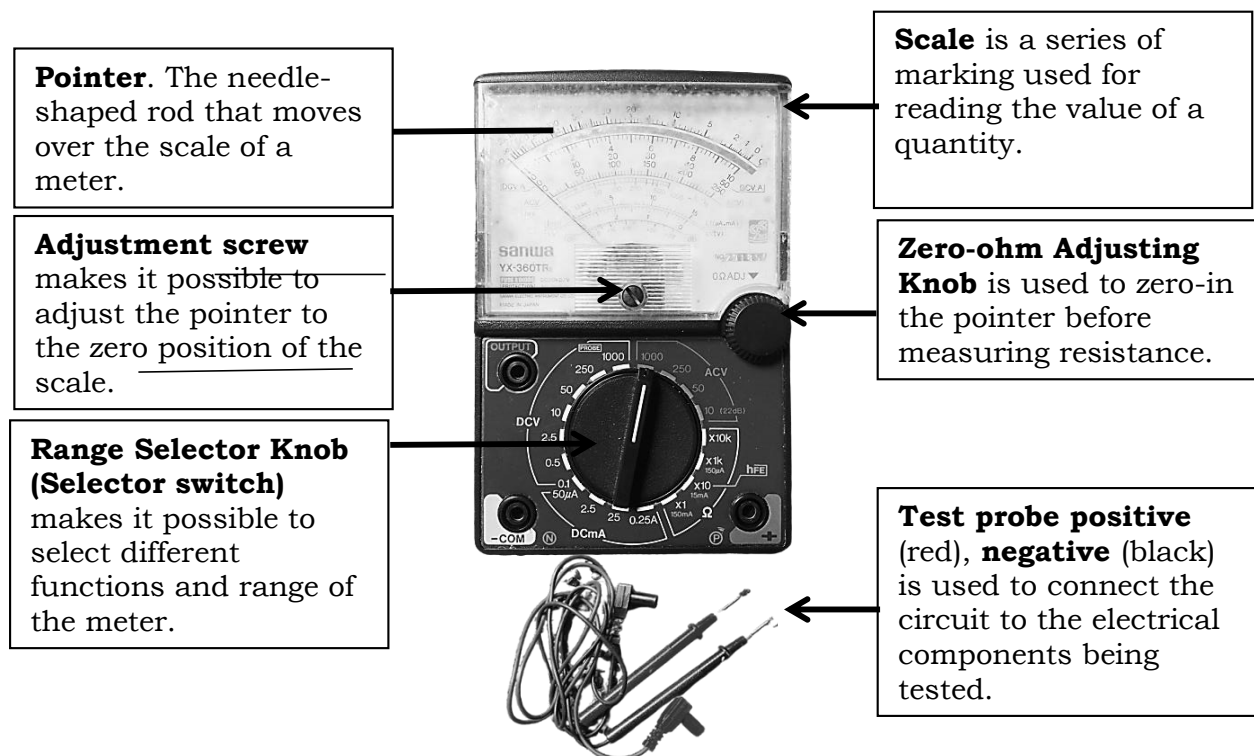
Therefore: 6 feet = 72 inches

THE MULTI-TESTER

Introduction:

The **Multi-tester** is sometimes called as **multi-meter** or **VOM** (voltmeter, ohmmeter, milli-ammeter). It is the best instrument that can measure voltage, resistance and current.

Parts of an Analog Multi-tester



Proper care and maintenance of the multi-tester

1. Read manual of instructions on how to operate the multi-tester.
2. In reading the amount of voltage, always start with the highest range to avoid reading voltage higher than the tester setting.
3. Be sure that the tester is set to the correct range setting: resistance range when measuring the ohm, voltage range when measuring voltage and ammeter range when measuring the value of electric current.
4. Always check the condition of its battery. Worn out batteries will damage the internal setting of the tester.
5. When the tester is not in used or will be stored, set the selector switch to 1000V or to OFF.



Remember

- ✓ There are two (2) common units of measurement, the English and the Metric.
- ✓ Converting units of measure can be done from English to Metric and vice versa,
- ✓ The multi-tester is the best instrument that you can use to measure voltage, current and resistance in a circuit.



Check Your Understanding

MATCHING TYPE:

Direction. Match Column A with Column B. Write the letter of your choice on the space provided before the number.

Column A

- ____ 1. This system of measurement uses the units such as inch, yard and foot.
- ____ 2. A set of units which can be used to specify anything that can be measured.
- ____ 3. Decimalized system of measurement and uses the units such as meter and centimeter.
- ____ 4. It is the best instrument that can measure voltage, resistance and current.

Column B

- A. Metric System
- B. System of Measurements
- C. VOM
- D. English system

- _____ 5. The needle-shaped rod that moves over the scale of a meter E. Pointer



Post-Test

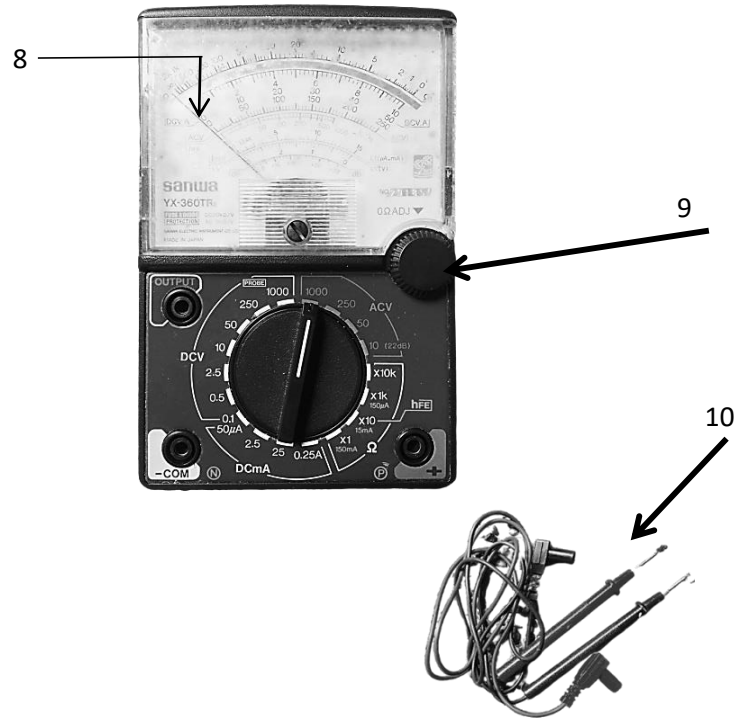
Directions: Read the questions carefully and choose the correct answer. Write your answer on a separate sheet of paper.

1. The needle-shaped rod that moves over the scale of a meter.
A. Pointer
B. Range selector knob
C. Scale
D. Test probe
2. This part makes it possible to select different functions and range of the meter
A. Pointer
B. Range selector knob
C. Scale
D. Test probe
3. This is a series of marking used for reading the value of a quantity
A. Pointer
B. Range selector knob
C. Scale
D. Test probe
4. This system of measurement which uses the units such as inch, yard and foot.
A. English measurement
B. English system
C. Metric system
D. System of measurement
5. Decimalized system of measurement and uses the units such as meter and centimeter.
A. English measurement
B. English system
C. Metric system
D. System of measurement
6. How many inches are there in 14 decimeters?
A. 3.55 inches
B. 35.56 inches
C. 35.56 inches
D. 55.12 inches
7. Convert 70 centimeter in feet.
A. 0.43 ft
B. 2.29 ft
C. 14.81 ft
D. 330.70 ft

8-10 What do you call this part of the multi-tester?

- A. Pointer
- B. Scale

- C. Test probe
- D. Zero-ohm adjusting knob



ANSWER KEY:

Pre-Test:

1. English system
2. System of measurement
3. Metric system
4. Volt-Ohmmeter
5. Pointer
6. 10
7. 91.44
8. Pointer
9. Range selector knob
10. Scale

Looking back:

Match Me

1. Clamp ammeter
2. Voltmeter
3. Micrometer
4. Ammeter
5. Test light

Checking Your Understanding:

1. English system
2. System of measurement
3. Metric system
4. Volt-Ohmmeter
5. Pointer

Post Test:

1. Pointer
2. Range selector knob
3. Scale
4. English system
5. Metric system
6. 55.12 inches
7. 2.29 feet
8. Pointer
9. Zero-ohm adjusting knob
10. Test probe

Can you identify me

1. Wire gauge
2. Volt-ohm-milliammeter
3. Voltmeter
4. Test light
5. Clamp ammeter

References

1. Electrical materials and tools, Department of Education, **K to 12 Basic Education Curriculum Technology and Livelihood Education** Learning Module
2. Philippine Electrical Code, 2000 Edition
3. Electrical instruments, retrieved from <https://creativecommons.org>