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DepED
DEPARTMENT OF EDUCATION

Lesson Exemplar for TLE

Quarter 4
Lesson
8

Lesson Exemplar for TLE Grade 7
Quarter 4: Lesson 8 (Week 8)
SY 2024-2025

Development Team

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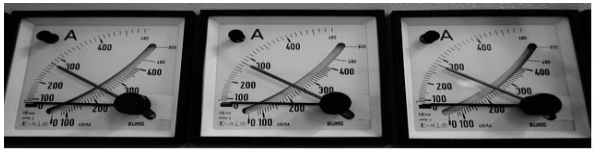
TLE/ QUARTER 4 /GRADE 7

I. CURRICULUM CONTENT, STANDARDS, AND LESSON COMPETENCIES	
A. Content Standards	Demonstrate an understanding of the concepts and principles in performing mensuration and calculation.
B. Performance Standards	The learners perform mensuration and calculations following safety precautions.
C. Learning Competencies and Objectives	**Learning Competency:** Demonstrate mensuration and calculations following safety precautions. **Lesson Objectives:** 1. Familiarize the different systems of measurement. 2. Convert decimal numbers to fractions/ fractions to decimals. 3. Convert Metric System measurements. 4. Convert English System measurements. 5. Convert Metric System measurements to English System and vice versa. 6. Solve circuit problems using Ohm's Law and Power Law.
D. Content	• Mensuration and Calculation • Systems of Measurement • Conversions of Fraction to Decimal and Decimal to Fraction • Conversion of System Measurement • Ohm's Law • Power Law
E. Integration	**SDG 9:** Industry Innovation and Structures

II. LEARNING RESOURCES
Definition of fraction. (2024, February 19). Merriam-Webster: America's Most Trusted Dictionary. https://www.merriam-webster.com/dictionary/fraction Electric power. (2019, March 21). BYJUS. https://byjus.com/physics/electric-power/ Math skills - Dimensional analysis. (n.d.). Department of Chemistry | Texas A&M University. https://www.chem.tamu.edu/class/fyp/mathrev/mr-da.html Measurement | Definition, types, instruments, & facts. (1998, July 20). Encyclopedia Britannica. https://www.britannica.com/technology/measurement System of measurement. (n.d.). Cuemath. https://www.cuemath.com/measurement/system-of-measurement/

III. TEACHING AND LEARNING PROCEDURE		NOTES TO TEACHERS
A. Activating Prior Knowledge	**DAY 1** **1. Short Review** Ask the students to identify the following measuring tools and state their function.  https://pixabay.com/photos/ammeter-electricity-measuring-device-2292980/  https://www.istockphoto.com/photo/electronic-circuit-testing-gm485815316-73621921  https://www.bing.com/images/search?view=detailV2&ccid=bgwods9r&id=6629EE264A60C5147C97FF7FEB9CC4936D7619E0&thid=OIP.bgwods9rwYpxlLPFkLNLGAHaHa&mediaurl=https%3a%2f%2f5.imimg.com%2fdata5%2fSELLER%2fDefault%2f2022%2f3%2fEA%2fVY%2fNW%2f120704Z%2fdigital-tachometer-500x500.jpg&exph=500&expw=500&q=tachometer+used+in+electricity&simid=607902792260290883&FORM=IRPRST&ck=9A63C490D05ECBE93D541C932FE52D87&selectedIndex=16&itb=0  https://pixabay.com/photos/ohmmeter-electrical-instrument-5699344/ **2. Feedback (Optional)**	The teacher may also employ comparing and contrasting.
B. Establishing Lesson Purpose	**1. Lesson Purpose** Units of measurement | Why measurements matter? | The Dr Binocs show | Peekaboo Kidz. (2022, August 16). YouTube. https://youtu.be/AVC-426M6V0?si=Rxhfc6sHAWB68uyB **2. Unlocking Content Vocabulary** 1. **Measurement** is the process of associating numbers with physical quantities and phenomena. It is fundamental to the sciences; to engineering construction, and other technical fields; and to almost all everyday activities. 2. **Circuit** path for transmitting electric current. An electric circuit includes a device that gives energy to the charged particles constituting the current, such as a battery or a generator; devices that use current, such	The teacher could play the video about the importance of measurement and ask the students their personal life situations that involve measurement. The teacher may add other words that would help unlock unfamiliar words.

as lamps, electric motors, or computers; and the connecting wires or transmission lines.

3. **Current** is the rate at which electric charge flows through a surface or a circuit. Current is measured in Amperes.
4. **Voltage** is the pressure from an electric source that pushes the electrons to flow. Voltage is measured in Volts.
5. **Resistance** is the opposition to the flow of current in an electrical circuit. The unit of measurement of resistance is Ohms (Ω).
6. **Power** is the rate at which electrical energy is transferred or transformed by an electric circuit. It is a measure of how much work is done or energy is used in a span of time. Power is measured in Watts.

C. Developing and Deepening Understanding

SUB-TOPIC 1: SYSTEMS OF MEASUREMENT

1. Explicitation

Measurement systems are a collection of units of measurement and rules relating them to each other. The word "measurement" is derived from the Greek word "metron," which means a limited proportion. It is used to associate physical quantities and phenomena.

The teacher will discuss the two systems of measurement and their linear units of measurement and abbreviations.

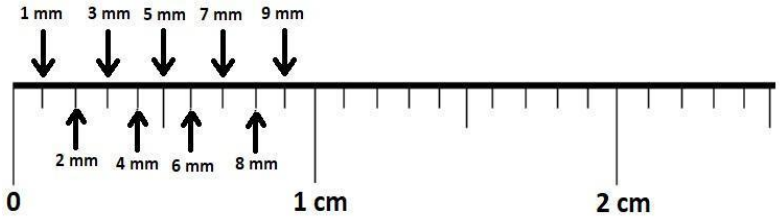
2. Worked Example

The **Metric system** is a decimal-based system of measurement. The current international standard for the metric system is the International System of Units (Système international d'unités or SI), in which all units can be expressed in terms of seven base units: the meter, kilogram, second, ampere, kelvin, mole, and candela.

The teacher let the students bring their own ruler to personally identify the different linear measurements.

UNITS OF LINEAR MEASUREMENTS

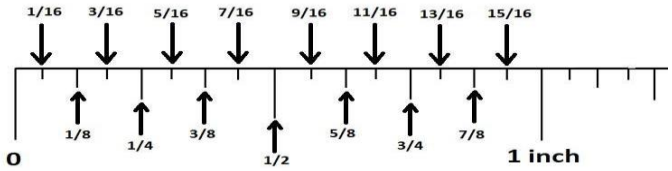
Symbol	Unit
mm	Millimeter
cm	Centimeter
dm	Decimeter
m	Meter
dam	Decameter
hm	Hectometer
km	Kilometer



The **English system** of measurement is used in medieval England which evolved from the Anglo-Saxon and Roman systems. The basic units for length or distance measurements in the English system are the inch, foot, yard, and mile.

Symbol	Unit
in	Inch
ft	Foot
yd	Yard
mi	Mile

In English system, the inch is divided into 16 graduations and the smallest graduation is read as 1/16 inch.



3. Lesson Activity

Let the students accomplish Worksheet No. 1

Directions: Color the balloons with Metric System units YELLOW and ORANGE for English System units.

SUB-TOPIC 2: Conversion Of Fraction and Decimal

1. Explicitation

Fraction is a numerical representation that indicates the quotient of two numbers. It represents a part of a whole or, more generally, any number of equal parts. A fraction has two parts:

a. Numerator: It is the top part of the fraction, that represents the sections of the fraction.
b. Denominator: It is the bottom part that represents the total parts in which the fraction is divided.

Decimal is a type of of number that consists of a whole number and a fractional part separated by a decimal point.

2. Worked Example

Changing Fractions to Decimals

Any rational number can be changed from fraction to decimal. This is done by simply dividing the numerator by the denominator.

Example:

The teacher may show saved video about conversion of fraction to decimal and vice versa. It is also encouraged to do group and individual activities and giving the students more problems to solve.

The teacher may use this OER link to supplement the lesson.

Reed, A. (n.d.). Fundamental laws of algebra. Wisc-Online OER. https://www.wisc-online.com/learn/mathematics2/algebra/gem704/fundamental-laws-of-algebra

A. $\frac{3}{8}$

$= 8\overline{)\,3}$

$= \boxed{0.375}$

B. $\frac{7}{25}$

$= 25\overline{)\,7}$

$= \boxed{0.28}$

C. In case of a mixed fraction, change it first to improper fraction.
   a. Multiply the whole number by the denominator.
   b. Add on the numerator.
   c. Write the improper fraction by using the calculated value as the numerator over the original denominator.

$2\frac{3}{4} \longrightarrow \frac{(2 \times 4)+3}{4} \longrightarrow \frac{11}{4}$

$= 4\overline{)\,11}$

$= \boxed{2.75}$

Changing Decimal to Fraction

A decimal is changed to fraction by using 10 or any power of 10 as denominator of the given decimal. Then reduce to lowest term if possible.
Examples:

A. 0.5

$= \frac{5}{10}$

$= \frac{5}{10} \div \frac{5}{5}$

$= \boxed{\frac{1}{2}}$

B. 0.15

$= \frac{15}{100}$

$= \frac{15}{100} \div \frac{5}{5}$

$= \boxed{\frac{3}{20}}$

C. 0.125

$= \frac{125}{1000}$

$= \frac{125}{1000} \div \frac{125}{125}$

$= \boxed{\frac{1}{8}}$

3. Lesson Activity

Let the students accomplish Worksheet 2.

Directions: Write down how many parts of the following pizza is left unconsumed in fraction and in decimal.

DAY 2

SUB-TOPIC 3: Metric System Conversion

1. Explicitation

Factor-Label Method

The factor-label method, also called Dimensional Analysis, is a problem-solving technique using units (labels) and conversion factors. It uses the fact that any number or expression can be multiplied by one without changing its value.

The teacher may also use Metric Staircase Method in facilitating the lesson.

LINEAR METRIC SYSTEM UNITS EQUIVALENT

10 millimeters (mm) = 1 centimeter (cm)
10 centimeters (cm) = 1 decimeter (dm)
10 decimeter (dm) = 1 meter (m)
10 meters (m) = 1 decameter (Dam)
10 decameter (dam) = 1 hectometer (hm)
10 hectometer (hm) = 1 kilometer (km)

2. Worked Example

Sample Problems:

1. How many millimeters are in 1 meter?

$$1\ \text{meter} \times \frac{10\ \text{decimeter}}{1\ \text{meter}} \times \frac{10\ \text{centimeter}}{1\ \text{decimeter}} \times \frac{10\ \text{millimeters}}{1\ \text{centimeter}}$$

$$1\ \cancel{\text{meter}} \times \frac{10\ \cancel{\text{decimeter}}}{1\ \cancel{\text{meter}}} \times \frac{10\ \cancel{\text{centimeter}}}{1\ \cancel{\text{decimeter}}} \times \frac{10\ \text{millimeters}}{1\ \cancel{\text{centimeter}}}$$

$$1 \times 10 \times 10 \times 10\ \text{millimeters}$$

1,000 millimeters

2. How many centimeters are in 25 decameters?

$$10\ \text{Dam} \times \frac{10\ \text{m}}{1\ \text{Dam}} \times \frac{10\ \text{dm}}{1\ \text{m}} \times \frac{10\ \text{cm}}{1\ \text{dm}}$$

$$10\ \cancel{\text{Dam}} \times \frac{10\ \cancel{\text{m}}}{1\ \cancel{\text{Dam}}} \times \frac{10\ \cancel{\text{dm}}}{1\ \cancel{\text{m}}} \times \frac{10\ \text{cm}}{1\ \cancel{\text{dm}}}$$

$$10 \times 10 \times 10 \times 10\ \text{cm}$$

10, 000 cm

3. How many meters is in 1,000 centimeters?

$$1{,}000\ \text{cm} \times \frac{1\ \text{dm}}{10\ \text{cm}} \times \frac{1\ \text{m}}{10\ \text{dm}}$$

$$1{,}000\ \cancel{\text{cm}} \times \frac{1\ \cancel{\text{dm}}}{10\ \cancel{\text{cm}}} \times \frac{1\ \text{m}}{10\ \cancel{\text{dm}}}$$

$$1{,}000 \times \frac{1}{10} \times \frac{1\ \text{m}}{10}$$

$$\frac{1{,}000\ \text{m}}{100}$$

10 m

Helpful OER links for teachers to use.

- Dahche, N. (n.d.). *How to convert from one unit to another in the metric system.* Wisc-Online OER. https://www.wisc-online.com/learn/mathematics2/essentials/abm4402/how-to-convert-from-one-unit-to-another-in-th
- Dahche, N. (n.d.). *Measuring length in the metric system.* Wisc-Online OER. https://www.wisc-online.com/learn/mathematics2/essentials/abm13120/measuring-length-in-the-metric-system

4. How many meters are in 4,000 millimeters?

$$4{,}000\ mm \times \frac{1\ cm}{10\ mm} \times \frac{1dm}{10\ cm} \times \frac{1\ m}{10\ dm}$$

$$4{,}000\ \cancel{mm} \times \frac{1\ \cancel{cm}}{10\ \cancel{mm}} \times \frac{1\ \cancel{dm}}{10\ \cancel{cm}} \times \frac{1\ m}{10\ \cancel{dm}}$$

$$\frac{4{,}000\ m}{1{,}000}$$

4 m

3. Lesson Activity

Let the students accomplish Worksheet 3.

Direction: Complete the table by converting the given units.

SUB-TOPIC 4: English System Conversion

1. Explicitation

How do you convert measurements in English System?

2. Worked Example

The teacher may use a ruler to present sample problems.

LINEAR ENGLISH SYSTEM UNITS EQUIVALENT

12 inches = 1 foot
3 feet = 1 yard
1,760 yards = 1 mile

Sample Problems:

$$4\ feet \times \frac{12\ inches}{1\ foot}$$

$$4\ \cancel{feet} \times \frac{12\ inches}{1\ \cancel{foot}}$$

$$4 \times 12\ inches$$

48 inches

1. How many inches are in 4 feet?

$$60\ yd \times \frac{3\ ft}{1\ yd}$$

$$60\ \cancel{yd} \times \frac{3\ ft}{1\ \cancel{yd}}$$

$$60 \times 3\ ft$$

180 ft

2. How many feet are in 60 yards?

$$360\ in \times \frac{1\ ft}{12\ in} \times \frac{1\ yd}{3\ ft}$$

$$360\ \cancel{in} \times \frac{1\ \cancel{ft}}{12\ \cancel{in}} \times \frac{1\ yd}{3\ \cancel{ft}}$$

$$\frac{360\ yd}{36}$$

10 yd

3. How many yards are in 360 inches?

3. Lesson Activity

Let the students accomplish Worksheet 4.

Direction: Complete the table by converting the given units.

DAY 3

SUB-TOPIC 5: Metric System to English System Conversion / English System to Metric System Conversion

1. Explicitation

Metric System to English System Conversion Table

1 millimeter = 0.03937 inch
1 centimeter = 0.3937 inch
1 meter = 39.37 inches

English System to Metric System Conversion Table

1 inch	= 25.4 millimeters	= 2.54 centimeters	= 0.0254 meter
1 foot	= 304.8 mm	=30.48 cm	=0.3048 m
1 yard	= 914.4 mm	=91.44 cm	= 0.9144 m

2. Worked Example

Sample Problems:

A. Convert 15 cm to inch 15 X 0.3937 = 5.906 inches	B. Convert 28 meters to inch 28 X 39.37 = 1,102.36 inches
C. Convert 7 feet to centimeters 7 X 30.48 = 213.36 cm	D. Convert 10 yards to meter 10 x 0.9144 = 9.144 meters

3. Lesson Activity

Let the students accomplish Worksheet 5.

Direction: Complete the table by converting the given units.

DAY 4

SUB-TOPIC 6: Ohm's law and Power law

1. Explicitation

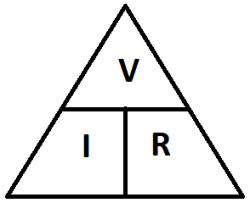
The continuous movement of electrons through a circuit is called **current.** The unit of measurement is Ampere which is named after Andre-Marie **Ampere**, a French physicist and mathematician who was one of the founders of the science of classical electromagnetism, which he referred to as "electrodynamics". Current is symbolized by the letter I.

Voltage is the force that pushes electrons to flow through a circuit. It is measured in **Volt,** the unit of measure derived from Alessandro Volta, an Italian physicist and chemist who was a pioneer of electricity and power. Voltage is symbolized by the letter V or E.

Resistance is the opposition to the flow of electrons on a circuit. It is measured in Ohm or the symbol Ω, named after Georg Simon Ohm, a German physicist and mathematician. It is symbolized by the letter R.

QUANTITY	SYMBOL	UNIT OF MEASUREMENT	UNIT ABBREVIATION
Volage	V or E	Volt	V
Current	I	Ampere	A
Resistance	R	Ohm	Ω

Ohm's Law states that the current through a conductor between two points is directly proportional to the voltage across the two points. It can be represented by the mnemonic device below.



If you need to calculate V, cover the V with your thumb, and you'll see **IR.** If you need to calculate I, cover it and what's left is **V/R**. And if you need to calculate R, cover it to reveal **V/I**.

V= I x R I= V / R R= V / I

Power is the rate at which an electrical energy is transferred or transformed by an electric circuit. It is a measure of how much of work is done or energy is used

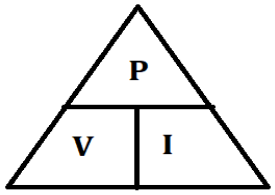
The teacher should explain the use of letter **I** as mathematical letter for current.

The teacher should explain the use of **E** and **V** in Ohms Law.

If the school has good internet connection, the teacher may use the following OER link that is highly interactive for teacher to fully illustrate the concept.

- Hoppe, P. (n.d.). *Ohm's law: The relationship of voltage, current, and resistance*. Wisc-Online OER. https://www.wisc-online.com/learn/manufacturing-engineering/man-eng-electronics/dce8104/ohms-law-the-relationship-of-voltage-current
- Tewalt, T. (n.d.). *Ohm's law: Current*. Wisc-Online OER. https://www.wisc-online.com/learn/manufacturing-engineering/man-eng-electronics/dce17818/ohms-law-current
- Tewalt, T. (n.d.). *Ohm's law: Power*. Wisc-Online OER. https://www.wisc-online.com/learn/manufacturing-engineering/man-eng-electronics/dce17618/ohms-law-power
- Hoppe, P. (n.d.). *Power law: The relationship of voltage, current, and Watts*. Wisc-Online OER. https://www.wisc-online.com/learn/manufacturing-engineering/man-eng-electronics/dce8204/power-law-the-relationship-of-voltage-current

in a span of time. In a circuit, power is the product of voltage and current. Power is measured in Watts.

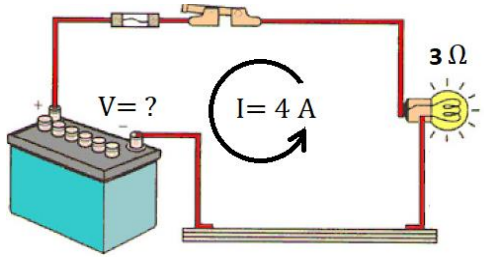


P= V x I
V= P / I
I= P / V

2. Worked Example

Sample Problems (Ohm's Law)

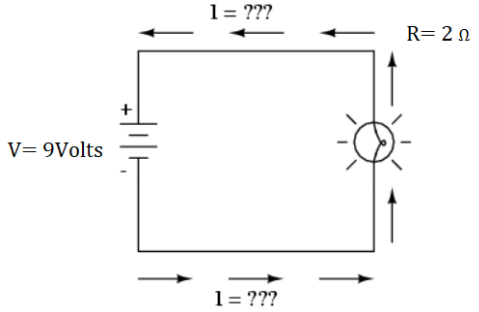
A. Calculate the voltage, given the values of current (I) and resistance (R).



http://www.nissantechnicianinfo.mobi/htmlversions/Summer_2011/Electrical_Part_2.html

V= I x R
V= 4 A x 3Ω
V= **12 Volts**

B. Calculate the amount of current (I) in a given circuit where the values of resistance (R) and Voltage (V).



I= V/R
I= 9 Volts / 2 Ω
I= **4.5 Amp**

C. What resistance would produce a current of 60 Amp from a 6 Volts battery?

R= V/I

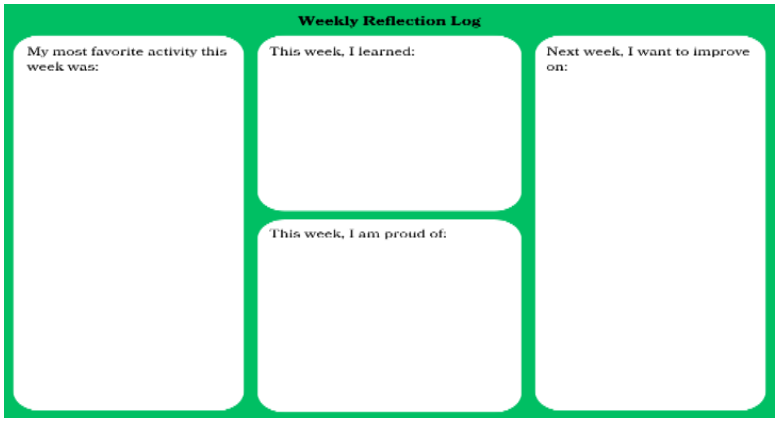
The teacher may show saved video about Ohm's Law and Power Law. It is also encouraged to do group and individual activities and giving the students more problems to solve.

They may also use actual electrical circuit and integrate the use of VOM in determining the voltage current and resistance.

The teacher may opt to use the following OER link for sample Ohms Law and Power Law problems provided the school has a good internet connectivity.

- Hoppe, P. (n.d.). *Ohm's law practice problems #1*. Wisc-Online OER. https://www.wisc-online.com/learn/manufacturing-engineering/man-eng-electronics/dce11904/ohms-law-practice-problems-1
- Hoppe, P. (n.d.). *Ohm's law practice problems #2*. Wisc-Online OER. https://www.wisc-online.com/learn/manufacturing-engineering/man-eng-electronics/dce12004/ohms-law-practice-problems-2
- Hoppe, P. (n.d.). *Ohm's law practice problems #3*. Wisc-Online OER. https://www.wisc-online.com/learn/manufacturing-engineering/man-eng-electronics/dce12104/ohms-law-practice-problems-3
- Hoppe, P. (n.d.). *Ohm's law practice problems #4*. Wisc-Online OER. https://www.wisc-online.com/learn/manufacturing-engineering/man-eng-electronics/dce12204/ohms-law-practice-problems-4

	R= 6 Volts / 60 Amp R= **0.1 Ω** Sample Problems (Power Law) A. If the current and voltage of an electric circuit are given as 2.5 A and 10 V respectively. Calculate the electrical power. P= V x I P= 10 V x 2.5 A P= **25 Watts** B. How much current can run a 50 Watts microwave that is linked to a 20 Volts source? I= P / V I= 50 Watts / 20 Volts I= **2.5 A** C. What is the value of the source of a circuit that has 2 A of current passing through a 30W load? V= P / I V= 30 W / 2 A V= **15 Volts** **3. Lesson Activity** Let the students accomplish Worksheet 6.	• Hoppe, P. (n.d.). *Ohm's law practice problems #5*. Wisc-Online OER. https://www.wisc-online.com/learn/manufacturing-engineering/man-eng-electronics/dce12304/ohms-law-practice-problems-5 Power Law • Hoppe, P. (n.d.). Power law practice problems #1. Wisc-Online OER. https://www.wisc-online.com/learn/manufacturing-engineering/man-eng-electronics/dce12404/power-law-practice-problems-1 • Hoppe, P. (n.d.). Power law practice problems #2. Wisc-Online OER. https://www.wisc-online.com/learn/manufacturing-engineering/man-eng-electronics/dce12504/power-law-practice-problems-2 • Hoppe, P. (n.d.). Power law practice problems #3. Wisc-Online OER. https://www.wisc-online.com/learn/manufacturing-engineering/man-eng-electronics/dce12604/power-law-practice-problems-3 • Hoppe, P. (n.d.). Power law practice problems #4. Wisc-Online OER. https://www.wisc-online.com/learn/manufacturing-engineering/man-eng-electronics/dce12704/power-law-practice-problems-4 • Hoppe, P. (n.d.). Power law practice problems #5. Wisc-Online OER. https://www.wisc-online.com/learn/manufacturing-engineering/man-eng-electronics/dce12804/power-law-practice-problems-5
D. Making Generalizations	**1. Learners' Takeaways** 1. What are the different Systems of Measurement? 2. What is the relationship of current, voltage, and resistance as stated in Ohm's Law?	

	3. How can you calculate power on a given circuit? **2. Reflection on Learning** The students will accomplish the weekly reflection log. 	

IV. EVALUATING LEARNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION		NOTES TO TEACHERS
A. Evaluating Learning	**Formative Assessment** Multiple choice Quiz: Students will take the 10-item test. 1. What system of measurement is decimal-based and has the current international standard of International System Units? a. linear system b. English System c. Metric System d. US Standard System 2. What is the abbreviation of decimeter? a. dm b. dam c. km d. mm 3. What is the smallest unit of measure in English System? a. inch b. foot c. mile	**Answer key:** 1. c 2. a 3. a 4. d 5. d 6. c 7. c 8. b 9. b 10. d

d. yard

4. What is the equivalent decimal of 2/5?
    a. 0.1
    b. 0.2
    c. 0.3
    d. 0.4

5. What is 0.75 in fraction?
    a. 1/3
    b. 2/3
    c. 2/4
    d. 3/4

6. If 1cm has 10mm, how many millimeters are there in 10.5cm?
    a. 0.105mm
    b. 1.05mm
    c. 105mm
    d. 1,050mm

7. The perimeter of a lot is 60 yards. How many feet of barbwire can surround it?
    a. 20 feet
    b. 120feet
    c. 180feet
    d. 240feet

8. If an inch is 2.54cm, how many centimeters are there in 1 foot?
    a. 15.24cm
    b. 30.48cm
    c. 45.72cm
    d. 60.96cm

9. A circuit has 12V source and 6Ω load. How much current is passing through the circuit?
    a. 0.5A
    b. 2A
    c. 18A
    d. 24A

<table>
<tr><td></td><td colspan="3">10. Calculate the power of a circuit having 9V battery and 3A of current passing through it.
a. 0.33W
b. 3W
c. 12W
d. 27W</td><td></td></tr>
<tr><td rowspan="5">B. Teacher's Remarks</td><td>Note observations on any of the following areas:</td><td>Effective Practices</td><td>Problems Encountered</td><td rowspan="5">The teacher may take note of some observations related to the effective practices and problems encountered after utilizing the different strategies, materials used, learner engagement and other related stuff.

Teachers may also suggest ways to improve the different activities explored/ lesson exemplar.</td></tr>
<tr><td>strategies explored</td><td></td><td></td></tr>
<tr><td>materials used</td><td></td><td></td></tr>
<tr><td>learner engagement/ interaction</td><td></td><td></td></tr>
<tr><td>others</td><td></td><td></td></tr>
<tr><td>C. Teacher's Reflection</td><td colspan="3">Reflection guide or prompt can be on:
▪ <u>Principles behind the teaching</u>
What principles and beliefs informed my lesson?
Why did I teach the lesson the way I did?

▪ <u>Students</u>
What roles did my students play in my lesson?
What did my students learn? How did they learn?

▪ <u>Ways forward</u>
What could I have done differently?
What can I explore in the next lesson?</td><td>Teacher's reflection in every lesson conducted/ facilitated is essential and necessary to improve practice. You may also consider this as an input for the LAC/Collab sessions.</td></tr>
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