

7

Lesson Exemplar for TLE

Quarter 4

Lesson

7

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

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TLE /QUARTER 4/ GRADE 7

I. CURRICULUM CONTENT, STANDARDS, AND LESSON COMPETENCIES

A. Content Standards	The learners demonstrate an understanding of the concepts and principles in performing mensuration and calculations.
B. Performance Standards	The learners perform mensuration and calculations following safety precautions
C. Learning Competencies and Objectives	Learning Competency Interpret the readings in different measuring instruments. Learning Objectives At the end of the lesson, the students are expected to: 1. Explain the function and uses of tachometer, oscilloscope, and ampere meter. 2. Identify the parts of the tachometer, oscilloscope, and ampere meter. 3. Interpret the readings of tachometer, oscilloscope, and ampere meter.
D. Content	Topic: Scale Reading Subtopics: Tachometer, Oscilloscope, Ampere meter
E. Integration	SDG 9: Industry Innovation and Structures

II. LEARNING RESOURCES

Ammeters - A complete guide. (2023, March 7). Industrial Solutions & Electrical Components | RS. <https://ph.rs-online.com/web/content/discovery/ideas-and-advice/ammeters-guide>

How to measure current (Amperes) using analog multi-meter. (2021, June 28). YouTube. <https://youtu.be/CcfQFqcMa7U?si=v31yCNTeM1giOB8j>

Huang, Y. (2022, June 21). How does a tachometer work? | KUS Americas, Inc. KUS USA. <https://kus-usa.com/resources/how-does-a-tachometer-work/>

Kulkarni, A. (2022, April 15). What is ammeter? Uses and benefits | Complete guide on ammeter. BEEMET. <https://beemet.com/ammeter-guide/>

Tachometer: Uses, types, measurement & working. (2021, November 29). Tesca Global Blog. <https://www.tescaglobal.com/blog/digital-and-mechanical-tachometer/>

Tachometers - A complete guide. (2023, January 24). Industrial Solutions & Electrical Components | RS. <https://uk.rs-online.com/web/content/discovery/ideas-and-advice/tachometers-guide>

Understanding oscilloscope parts and function: A comprehensive guide - Keysight technologies. (n.d.). <https://savings.em.keysight.com/en/knowledge/guides/used-oscilloscope-buying-guide/oscilloscope-parts-and-function>
 What is an oscilloscope? (2021, May 11). Test and Measurement Equipment | Tektronix. <https://www.tek.com/en/blog/what-is-an-oscilloscope#EbUses>

III. TEACHING AND LEARNING PROCEDURE		NOTES TO TEACHERS
A. Activating Prior Knowledge	DAY 1 1. Short Review Pass the Cabbage Create a cabbage-like vegetable made of crumpled papers, cabbage will be passed to one another as the class sings any type of song. Once the music stops, a student who got the cabbage will peel one page and answer the question that is written on the cabbage paper. 2. Feedback (Optional)	Create a set of questions about VOM Scale, Ohmmeter Function and Voltmeter Function. A teacher may also include questions about students' personal experiences in connection with the previous topic. Write each set of question on each leaf of a cabbage-like paper.
B. Establishing Lesson Purpose	1. Lesson Purpose Ask students if they have seen their grandfather, father, uncle, or elder brother using Multi tester at home. Let them share their experiences and encounters seeing multi tester being used. 2. Unlocking Content Vocabulary • Tachometer – It is an instrument that measures the working speed of an engine, typically in revolutions per minute (RPM). • Oscilloscope – It is an instrument that graphically displays electrical signals and shows how those signals change over time. • Ammeter – It is a measuring device that measures the flow of current in a circuit. • Milliammeter – A measuring instrument that measures small electrical currents (milliamps).	Show a picture or actual Multi tester to let students think and share their experiences.

C. Developing and Deepening Understanding

SUB-TOPIC 1: Tachometer

1. Explication

A tachometer is an instrument that is used to measure the working speed of an engine, usually in revolutions per minute (RPM). It is commonly used in cars, boats, planes, and other types of vehicles. Most tachometer gauges have either an analog (dial) or digital (LCD or LED screen) display.

A. Types Tachometer:

- **Analog Tachometer**

- It is used to count the RPM based on the period. It uses a series of reeds that helps in detecting the engine speed. It is a device that has all centrifugal force. It has a power on the rotating mass that helps in extending and compressing the mechanical spring.

- **Electronic Tachometer**

- An Electronic Tachometer is a significant component that helps measure the engine's speed in RPM. It is a device that is available in the car's dashboard to measure the driving speed. This device uses a magnetic pickup that you can find here the rotating engine. It produces electric pulses. The pulses that this device causes has a frequency proportional to the engine speed.

B. Parts of Tachometer



Source: <https://megadepot.com/resource/what-is-a-tachometer-and-how-does->

1. **Contact measuring device** is a key part of the whole tachometer.

The teacher is encourage to use these as reference:

Tachometer how it works | *Tachometer working principle* | *techno meters & electronics*. (2022, July 2). YouTube. https://youtu.be/3Ncr0dVCvQs?si=xpmmxXNoF_7uyCPH

Handheld tachometer - Laser & contact - Review & demo. (2020, November 24). YouTube. <https://youtu.be/kPUrsFO38W0?si=ilpASJrOnyrknRwt>
The teacher may use a step-by-step process of using tachometer or may search for a similar video.

The teacher may modify scenario given in worked example that will be answered by the students.

2. **RPM adapter** is the element that contacts the object the speed of which you want to measure.
3. **Function switch** is used to switch between the units of measurement.
4. **Memory call button** is used to show the last reading.
5. **Display** shows the readings or result.
6. **Measure button** is used to start the measurement.
7. **Battery cover** is used to cover and protect the battery from dust and any damage.

2. Worked Example: Class sharing

1. Reflect on your own vehicle experiences. Based on what we discussed today, do you think tachometer displays an important role in our daily living?
2. Recall the time when you observed someone driving a vehicle. How did this lesson impact you as a person riding any type of vehicle?

3. Lesson Activity: Vehicle Operator

Directions: Students will portray as a vehicle operator. As an operator, what will be your plans to be done before driving or operating a vehicle? List down your answers on the space below. **(See worksheet #1 for the activity which students will accomplish.)**



<https://www.vectorcity.com/asset-id/27259058-driver-line-icon-isolated-on-white>

Name and Section

DAY 2

SUB-TOPIC 2: Oscilloscope

1. Explicitation

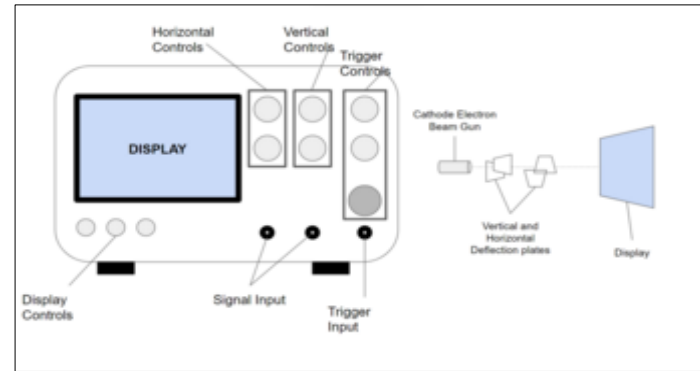
Formerly known as an oscillograph (informally scope, oscope, or o-scope), is a device that graphically displays electrical signals and exhibits how those signals change over time. It measures these signals by connecting with a

How to use an Oscilloscope:

sensor, which is a device that creates an electrical signal in response to physical stimuli like sound, light and heat.

The oscilloscope, an indispensable piece of equipment in signal analysis, helping engineers reveal the hidden rhythms of electricity.

Parts of Oscilloscope-An In-depth Overview



The oscilloscope contains various intricate components that work together to analyze and visualize complex electronic signals. Here's a list of the main parts:

1. *CRT (Cathode Ray Tube)*: Acting as the heart of traditional analog oscilloscopes, the CRT generates electron beams to create visual displays of waveforms.
2. *Display*: Whether a phosphor screen in analog scopes or a digital LCD in modern ones, the display translates complex data into visual waveforms that engineers can interpret.
3. *Vertical system*: This part controls the amplitude of the signal, allowing adjustments to how the waveform stretches or compresses vertically on the display.
4. *Horizontal system*: Governs the time base and allows engineers to control the horizontal scaling of waveforms, essential for examining frequency and time relationships.
5. *Trigger systems*: Ensures stability and clarity of the waveform; the trigger systems detect specific events in the signal, providing a stable and repeatable display.

EEVblog #926 - Introduction to the oscilloscope. (2016, September 24). YouTube. <https://youtu.be/Iq4QlfH-oqk?si=N2iOZczC7cX33599>

How to use an oscilloscope. (2017, February 13). YouTube. <https://youtu.be/u4zyptPLlJI?si=WXq-SrEUEp0SBelz>

The teacher may use a step-by-step process of using oscilloscope or may search for a similar video.

The teacher may use a step-by-step process of using oscilloscope or may search for a similar video.

6. *Probes and input channels:* Acts as the link between the circuit under test and the oscilloscope. These components provide various connection options and enable accurate measurements.
7. *Control panels:* The command center of the oscilloscope, control panels offer knobs, buttons, and interfaces for precise control and customization of measurements.



Visual Representations of Data

Today's oscilloscope displays can represent data in various ways, including:

1. *Waveform views:* Traditional line-based representations of voltage or current over time.
2. *3D and color views:* Utilizing color and three-dimensional rendering to represent additional data dimensions, such as intensity or multiple channel overlays.
3. *On-screen measurements:* Modern screens often display key measurements and statistics directly on the screen, offering real-time insights without the need for manual calculations.

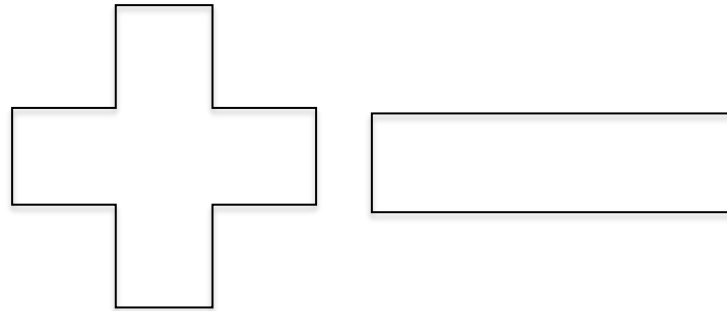
2. Worked Example: Question and Answer

From the video clip presented, ask students the following questions:

1. Do you think the oscilloscope is an accurate device to measure electronic signals?
2. Will this help the electricians or engineers find if the appliances are in good condition or not?
3. What is the importance of using oscilloscope in our industry?

3. Lesson Activity: Describe me

Directions: Describe the characteristics and physical features an oscilloscope have that you observe from the video clip presented earlier. Write your *positive description in an addition shape* and write your *negative description in a subtraction symbol*. **(See worksheet #2 for the activity which students will accomplish.)**



DAY 3

SUB-TOPIC 3: AMPERE METER

1. Explicitation

An ammeter (abbreviation of Ampere meter) is an instrument used to measure the current in a circuit. Electric currents are measured in amperes (A).

An ammeter is a measuring device that measures the flow of current in a circuit. It gives the exact reading of how much current passes through the conductor. Ammeter is derived from the Greek word 'amps' which means current.

Applications of an Ammeter

Ammeters are the current navigators in a variety of situations. From home to industry, they silently play a crucial part in maintaining a balanced current

The teacher should emphasize the difference between AC Current and DC Current.

flow and enhancing our electrical experiences. Let's take a look at their applications:

Home Wiring Check: Ammeters lend a hand in confirming if your home's electrical system is running smoothly. By measuring current flow, they ensure that circuits aren't overloaded, averting potential problems.

Gadget Performance: By hooking up to devices like your computer or fridge, they unveil their power consumption details.

Car Troubleshooting: Behind a vehicle's dashboard, ammeters can uncover if the battery and alternator are matched perfectly. Too much or too little current can point to issues that need fixing.

Industrial Buzz: Ammeters are like stage managers in factories. They keep tabs on the currents feeding heavy machinery, guaranteeing a smooth performance.

Renewable Energy Setup: Ammeters can help us monitor and optimize the energy harnessed from solar panels and wind turbines.

Electronics Creation: They can help fine-tune the components, ensuring they consume the right amount of current.

- **Analog Ammeter**

The pointer inside the ammeter moves within a span of 90°. The tip of the pointer corresponds to a numeric value.



- **Digital Ammeter**

It measures current flow in amps and display current levels as per the number of digits provided on a digital display.



The teacher may use a step-by-step process of using ammeter or multimeter to show how does ampere is being measured. Actual demonstration is also advisable for deep understanding.

	How to use an Ammeter Follow the basic steps using ammeter correctly and safely: 1. Choose the right model. Do you need analog or digital? Do you need high or low capacity? 2. Before you begin, make sure that all the equipment is use has been checked thoroughly for any faults. Use insulated gloves to protect you from live electrical current. 3. Apply the ammeter leads to the target area-the point at which you want to measure the current. Use a crocodile clip, attach the red lead to the wire nearest the positive terminal and black lead to the wire nearest to the negative terminal on the device you are measuring. 4. Check your reading. On analogue panel ammeters, look for the nearest marker to the needle. <i>Note:</i> A multimeter is a great little tool used for testing and checking electrical circuits in your vehicle or electrical devices. The most common use is to check the voltage of electrical circuits, but they can also be used to check the <i>Amperage</i> and Ohms. Milli-Ammeter: Measuring Small Amount of Current 1. When operating on the 50μA range, we utilize the 0-50 scale and read the scale directly. 2. To read current in the 2.5mA range, read the black 0-250 scale and move the decimal point two places to the left. 3. If the instrument is operated on its 25mA range, read the black 0-250 scale and move the decimal point just once to the left. 4. When the VOM is set to its 0.25 range, read the black 0-250 scale and move the decimal point three places to the left. Observe correct polarity of the instrument when measuring DC current. Be very careful against overloading your meter. If you are doubt of approximate reading, always start with the highest range. If the pointer deflects lefts across zero point, just reverse the connections; no damage to the meter if this occurs.	Since milli-ammeter function is not tackled in the previous exemplar, and the subtopic of this exemplar is ammeter. The teacher is encouraged to expound the milli-ammeter function of the VOM The teacher may use this source: Analog multimeter DC current reading Part4. (2021, October 26). YouTube. https://youtu.be/YRmeMa5j1qI?si=zfbgd6ngcwwmfXOk If digital VOM is available, the teacher has the discretion to use reliable source to support the learning process. The teacher may use these as references: <i>How to measure DC amps with a multimeter.</i> (2022, July 29). YouTube. https://youtu.be/F_A2T_YEfCk0?si=SJH_YGfAH41mt4kb <i>How to read the ammeter.</i> (2023, June 10). YouTube. https://youtu.be/tcuyMxBo-Y8?si=w9cSzPkw3Mf4rjcu
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DAY 4

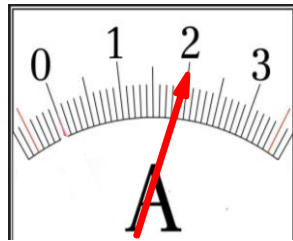
2. Worked Example: Class demonstration

By peers, students will demonstrate the proper way of measuring amperes using multi meter.

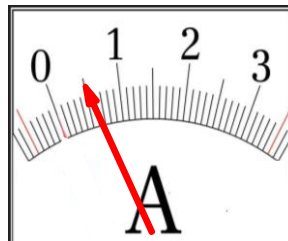
3. Lesson Activity: Ammeter Reading

(See worksheet #3 for the activity which students will accomplish.)

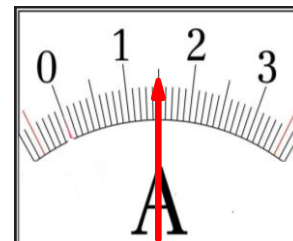
A. Directions: Determine the electric current reading on the ammeter below and indicate its unit of measurement.



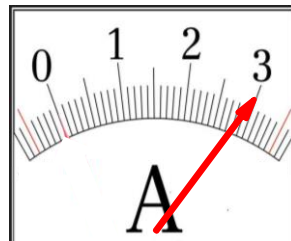
1. _____



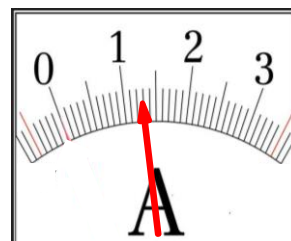
2. _____



3. _____



4. _____

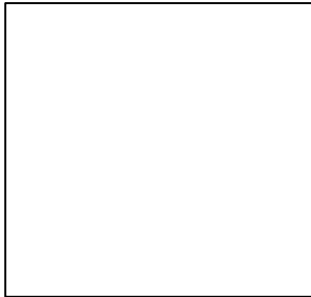
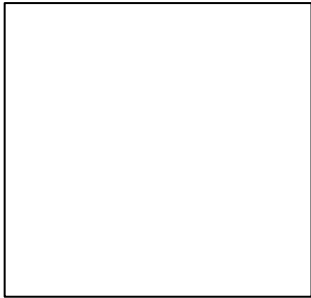


5. _____

The teacher may use also the method of measuring current using clamp meter.

Answer key:

1. 2.0A
2. 0.5A
3. 1.5A
4. 3.0A
5. 1.6A

	B. Directions: Draw your own ammeter with the range of 0 to 1A, smallest division is 0.02A. Show five ammeter results, write the readings on the space provided.  1. _____  7. _____  8. _____  9. _____  10. _____	
D. Making Generalizations	1. Learners' Takeaways • Can you summarize the four different scale reading device and state its functions? What is its importance in our daily lives? • Consider that you are owning any type of business, for you, what is the implication of understanding this lesson? 2. Reflection on Learning • Let the students make a reflection on what was discussed in this lesson by listing the remarkable information they've got.	

IV. EVALUATING LEARNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION		NOTES TO TEACHERS
A. Evaluating Learning	1. Formative Assessment Multiple Choice Quiz. Students will take the 5-item test. - What scale reading device is commonly used in cars, boats, planes, and other vehicles? A. Ammeter B. Oscilloscope C. Tachometer D. Volt-ohm-milliammeter - What part of tachometer is used to show the last readings or result? A. Battery cover B. Contact measuring device C. Function switch D. Memory call button - What part of oscilloscope is used to have knobs, buttons and interfaces for precise control and customization of measurements? A. Control panels B. Display C. Horizontal System D. Probes - Which of the following device creates an electrical signal in response to physical stimuli like sound, light and heat and is formerly known as oscillograph? A. Ammeter B. Oscilloscope C. Tachometer D. Volt-ohm-milliammeter - What type of ammeter is used to measure current flow in amps and display current levels as per the number of digits provided on a digital display? A. Analog Ammeter B. Combined Ammeter C. Digital Ammeter D. Mechanical Ammeter	Answer Key: - C - D - A - B - C

	2. Homework (Optional)			
B. Teacher's Remarks	<i>Note observations on any of the following areas:</i>	Effective Practices	Problems Encountered	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.
	strategies explored			
	materials used			
	learner engagement/ interaction			
	others			
C. Teacher's Reflection	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?			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.