

MASS CLEAN ENERGY CENTER **MODULE 12 · HEAT PUMP COMPONENT TESTS**

Demonstrating How to Use a Multi-Meter

Contextualized ESOL Support Activity

ACTIVITYCollaboration,
Self-Directed
Learning**45-60**
minutes

ACTIVITY – DEMONSTRATING HOW TO USE A MULTI-METER

ACTIVITY OVERVIEW

Objective	Students will be able to demonstrate how to use a multi-meter.
Durable Skill	Collaboration, Self-Directed Learning
Student Interacts With Hypothetical	Service Technicians
When to Use	This activity is best implemented after students have initial experience with using multi-meters.
Activity Type	Small group work
Time Needed	45-60 minutes

STUDENT MATERIALS

- Handout 1: Module 12 – Vocabulary Definitions
- Handout 2: Multi-Meter Guide, MIT Edgerton Center

Instructor Preparation**Activity Location**

- Space with access to trainer or heat pump

Material Preparation

- Review student handouts and make one copy per student.

- Have a heat pump or trainer accessible for the class or for each team of students. Ensure there is one multi-meter per student.
- For background, view these videos:
 - [Multimeter 101 for HVAC 3D \(HVAC School\)](#)
 - [How to Use a Multimeter like a Pro, the Ultimate Guide.](#)
- Students can also view these videos as a post-activity to reinforce learning.
- **Best Practice**
 - Identify any key vocabulary terms from Handout 1: Module 12 – Vocabulary Definitions that students should be referencing as part of the activity. Be prepared to reference these during the activity.
- For instructor and/or student background, review the Amatrol curriculum for the T7200 – Combined Refrigeration Installation, V11133-AA00UEN-E1 - AC/DC Electrical Systems (990-ACDC1) - Module 2 utilization of digital multimeter.

ACTIVITY DIRECTIONS

1. Ask participants, “what four electrical properties does a multi-meter measure?”
 - Voltage
 - Current
 - Resistance
 - Continuity
2. Distribute Handout 2: Multi-Meter Guide. Review the “Quick Guide” on page 1.
3. Explain that the class will be divided into four teams and assigned one measurement to take. (Note: If there are more than 12 participants, have two or more groups for each measurement.) State that the goal is for each team to practice taking the assigned measurement and then be prepared to demonstrate to the class how to take the measurement.
4. Each team will review the steps for the assigned measurement, including reading the information on pages 2-4 of the handout.
5. Then each team member will practice taking the assigned measurement on the heat pump or trainer. Once the team feels confident in their measurement skills, they will identify one person to demonstrate and describe to the class how to take the measurement. Allow 15 minutes for the team activity. (If there are not enough heat pumps or trainers for each team, this activity may take 30 minutes or more.)
6. When the teams are ready, have each teams' spokesperson come to the front of the class to describe and demonstrate how to take the measurement. Allow time for students to ask questions of each spokesperson.
7. Wrap-up by asking students why knowing how to read a multi-meter is essential to the job of a service technician. If not stated, reference that it:
 - Provides the precise electrical measurements required to diagnose hidden system failures
 - Provides a way to test vital components like capacitors and sensors
 - Ensures that the equipment is safely de-energized before performing any maintenance

8. Encourage students to review the vocabulary identified by the instructor at the beginning of class. Suggest that students watch one of the videos listed in “Instructor Preparation” and identify any questions they have. Say that the instructor will make time in another class for students to have their questions answered.

ESOL Strategy Note

Before teams begin practicing their assigned measurement, have each team read the relevant steps on Handout 2 aloud together and circle any unfamiliar terms — this gives multilingual learners a chance to ask about words like “continuity” or “resistance” before they need to explain the measurement to the whole class.

When spokespersons demonstrate their measurement to the class, encourage them to point to the multi-meter and handout as they talk, since gesturing toward the physical steps can help both the presenter and their classmates follow the explanation even if some vocabulary is still developing.